



## Source Test Report

Marathon Petroleum Corporation  
Galveston Bay Refinery  
2401 5th Avenue South  
Texas City, TX 77592

Source Tested: One (1) SHGP Cogeneration Unit  
Test Dates: April 23 & 24, 2024

Project No. AST-2024-1845-002

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Prepared By  
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**Source Information**

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*Source Name*  
One (1) SHGP Cogeneration Unit

*Target Parameters*  
HCl, HF

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**Contact Information**

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Galveston Bay Refinery  
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Texas City, TX 77592

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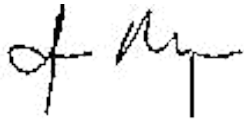
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Alliance Technical Group, LLC (Alliance) has completed the source testing as described in this report. Results apply only to the source tested and operating conditions for the specific test dates and times identified within this report. All results are intended to be considered in their entirety, and Alliance is not responsible for use of less than the complete test report without written consent. This report shall not be reproduced in full or in part without written approval from the customer.

To the best of my knowledge and abilities, all information, facts and test data are correct. Data presented in this report has been checked for completeness and is accurate, error-free and legible. Onsite testing was conducted in accordance with approved internal Standard Operating Procedures. Any deviations or problems are detailed in the relevant sections in the test report.

This report is only considered valid once an authorized representative of Alliance has signed in the space provided below; any other version is considered draft. This document was prepared in portable document format (.pdf) and contains pages as identified in the bottom footer of this document.



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**Jason Myers, QI**  
**Alliance Technical Group, LLC**

8/21/2024

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Date

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## Introduction

## 1.0 Introduction

Alliance Technical Group, LLC (Alliance) was retained by Marathon Petroleum Corporation (MPC) to conduct engineering testing at the Galveston Bay Refinery (GBR) in Texas City, Texas. Testing was conducted to determine the emission rates of hydrochloric acid (HCl) and hydrogen fluoride (HF) at the exhaust of one (1) SHGP cogeneration unit.

## 1.1 Project Team

Personnel involved in this project are identified in the following table.

**Table 1-1: Project Team**

<b>MPC Personnel</b>	Hannah Placzek Madison Herman
<b>Alliance Personnel</b>	Andrew Christiansen Curtis Berridge Colin Brooks Matthew Brumley Rashed Muhtaseb Ryan Simon

## Summary of Results

## 2.0 Summary of Results

Alliance conducted engineering testing at the Galveston Bay Refinery in Texas City, Texas on April 23 and 24, 2024. Testing consisted of determining the emission rates of HCl and HF at the exhaust of one (1) SHGP Cogeneration Unit.

Table 2-1 provides a summary of the emission testing results. Any differences between the summary results listed in the following table and the detailed results contained in the appendices are due to rounding for presentation.

**Table 2-1: Summary of Results – Hydrogen Chloride & Hydrogen Fluoride (Cogeneration Unit)**

Run Number	Run 1	Run 2	Run 3	Average
Date	4/24/24	4/24/24	4/24/24	--
<b>Hydrogen Chloride Data</b>				
Concentration, ppmvd	0.090	0.17	0.11	0.12
<b>Hydrogen Fluoride Data</b>				
Concentration, ppmvd	0.019	0.063	0.042	0.042



## Testing Methodology

### 3.0 Testing Methodology

The emission testing program was conducted in accordance with the test methods listed in Table 3-1. Method descriptions are provided below while quality assurance/quality control data is provided in Appendix D.

**Table 3-1: Source Testing Methodology**

Parameter	U.S. EPA Reference Test Methods	Notes/Remarks
Volumetric Flow Rate	1 & 2	Full Velocity Traverses
Oxygen / Carbon Dioxide	3A	Instrumental Analysis
Moisture Content	4	Gravimetric Analysis
Hydrochloric Acid & Hydrogen Fluoride	26	Constant Rate Sampling

#### 3.1 U.S. EPA Reference Test Methods 1 and 2 – Sampling/Traverse Points and Volumetric Flow Rate

The sampling location and number of traverse (sampling) points were selected in accordance with U.S. EPA Reference Test Method 1. To determine the minimum number of traverse points, the upstream and downstream distances were equated into equivalent diameters and compared to Figure 1-1 in U.S. EPA Reference Test Method 1.

Full velocity traverses were conducted in accordance with U.S. EPA Reference Test Method 2 to determine the average stack gas velocity pressure, static pressure and temperature. The velocity and static pressure measurement system consisted of a pitot tube and inclined manometer. The stack gas temperature was measured with a K-type thermocouple and pyrometer.

Stack gas velocity pressure and temperature readings were recorded during each test run. The data collected was utilized to calculate the volumetric flow rate in accordance with U.S. EPA Reference Test Method 2.

#### 3.2 U.S. EPA Reference Test Method 3A – Oxygen / Carbon Dioxide

The oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) testing was conducted in accordance with U.S. EPA Reference Test Method 3A. Data was collected online and reported in one-minute averages. The sampling system consisted of a stainless-steel probe, Teflon sample line(s), gas conditioning system and the identified gas analyzer. The gas conditioning system was a non-contact condenser used to remove moisture from the stack gas. An unheated Teflon sample line was used, and a portable non-contact condenser was placed in the system directly after the probe. The quality control measures are described in Section 3.5.

#### 3.3 U.S. EPA Reference Test Method 4 – Moisture Content

The stack gas moisture content (BWS) was determined in accordance with U.S. EPA Reference Test Method 4. The gas conditioning train consisted of a series of chilled impingers. Prior to testing, each impinger was filled with a known quantity of water or silica gel. Each impinger was analyzed gravimetrically before and after each test run on the same balance to determine the amount of moisture condensed.

### 3.4 U.S. EPA Reference Test Method 26 – Hydrochloric Acid & Hydrogen Fluoride

The hydrogen chloride (HCl) and hydrogen fluoride (HF) testing was conducted in accordance with U.S. EPA Reference Test Method 26. The complete sampling system consisted of a heated glass-lined probe, heated Teflon filter, gas conditioning train, pump and calibrated dry gas meter. The gas conditioning train consisted of five (5) chilled impingers. The first and second impingers contained 100 mL of 0.1 N H<sub>2</sub>SO<sub>4</sub>, the third and fourth impingers contained 100 mL of 0.1 N NaOH and the fifth impinger contained 200-300 grams of silica gel. The probe liner and filter heating systems were maintained at 248-273°F, and the impinger temperature was maintained at 20°C (68°F) or less throughout the testing.

Following the completion of each test run, the sampling train was leak checked at a vacuum pressure greater than or equal to the highest vacuum pressure observed during the run and the contents of the impingers were measured for moisture gain. The absorbing solution (0.1 N H<sub>2</sub>SO<sub>4</sub>) from the first and second impingers and absorbing solution (0.1 N NaOH) from the third and fourth impingers were placed into separate sample containers (container 3 and container 4). The back-half of the filter holder, first and second impingers and all glassware leading to the outlet of the second impinger were triple-rinsed with DI water. These rinses were placed in container 3. The third and fourth impingers and all associated glassware were triple-rinsed with DI water. These rinses were recovered in container 4. All containers were sealed, labeled and liquid levels marked for transport to the identified laboratory for analysis. The NaOH sample fractions were archived.

### 3.5 Quality Assurance/Quality Control – U.S. EPA Reference Test Method 3A

Cylinder calibration gases used met EPA Protocol 1 (+/- 2%) standards. Copies of all calibration gas certificates can be found in the Quality Assurance/Quality Control Appendix.

Low Level gas was introduced directly to the analyzer. After adjusting the analyzer to the Low-Level gas concentration and once the analyzer reading was stable, the analyzer value was recorded. This process was repeated for the High-Level gas. For the Calibration Error Test, Low, Mid, and High Level calibration gases were sequentially introduced directly to the analyzer. All values were within 2.0 percent of the Calibration Span or 0.5% absolute difference.

High or Mid-Level gas (whichever was closer to the stack gas concentration) was introduced at the probe and the time required for the analyzer reading to reach 95 percent or 0.5% (whichever was less restrictive) of the gas concentration was recorded. The analyzer reading was observed until it reached a stable value, and this value was recorded. Next, Low Level gas was introduced at the probe and the time required for the analyzer reading to decrease to a value within 5.0 percent or 0.5% (whichever was less restrictive) was recorded. If the Low-Level gas was zero gas, the response was 0.5% or 5.0 percent of the upscale gas concentration (whichever was less restrictive). The analyzer reading was observed until it reached a stable value and this value was recorded. The measurement system response time and initial system bias were determined from these data. The System Bias was within 5.0 percent of the Calibration Span or 0.5% absolute difference.

High or Mid-Level gas (whichever was closer to the stack gas concentration) was introduced at the probe. After the analyzer response was stable, the value was recorded. Next, Low Level gas was introduced at the probe, and the analyzer value recorded once it reached a stable response. The System Bias was within 5.0 percent of the Calibration Span or 0.5% absolute difference or the data was invalidated and the Calibration Error Test and System Bias were repeated.

Drift between pre- and post-run System Bias was within 3 percent of the Calibration Span or 0.5% absolute difference. If the drift exceeded 3 percent or 0.5%, the Calibration Error Test and System Bias were repeated.

To determine the number of sampling points, a gas stratification check was conducted prior to initiating testing. The pollutant concentrations were measured at three points (16.7, 50.0 and 83.3 percent of the measurement line). Each traverse point was sampled for a minimum of twice the system response time.

The diluent concentration at each traverse point did not differ more than 5 percent or 0.3% (whichever was less restrictive) of the average pollutant concentration, therefore single point sampling was conducted during the test runs. Copies of stratification check data can be found in the Quality Assurance/Quality Control Appendix.

A Data Acquisition System with battery backup was used to record the instrument response in one (1) minute averages. The data was continuously stored as a \*.CSV file in Excel format on the hard drive of a computer. At the completion of testing, the data was also saved to the Alliance server. All data was reviewed by the Field Team Leader before leaving the facility. Once arriving at Alliance's office, all written and electronic data was relinquished to the report coordinator and then a final review was performed by the Project Manager.

## Appendix A



**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source:** SHGP Cogeneration Unit  
**Project No.:** AST-2024-1845  
**Run No.:** 1  
**Parameters:** VFR

Meter Pressure (Pm), in. Hg

$$P_m = P_b + \frac{\Delta H}{13.6}$$

where,

$P_b$	$\frac{30.12}{13.6}$	= barometric pressure, in. Hg
$\Delta H$	$\frac{1.664}{13.6}$	= pressure differential of orifice, in. H <sub>2</sub> O
$P_m$	$\frac{30.24}{13.6}$	= in. Hg

Absolute Stack Gas Pressure (Ps), in. Hg

$$P_s = P_b + \frac{P_g}{13.6}$$

where,

$P_b$	$\frac{30.12}{13.6}$	= barometric pressure, in. Hg
$P_g$	$\frac{-0.50}{13.6}$	= static pressure, in. H <sub>2</sub> O
$P_s$	$\frac{30.08}{13.6}$	= in. Hg

Standard Meter Volume (Vmstd), dscf

$$V_{mstd} = \frac{17.636 \times Y \times V_m \times P_m}{T_m}$$

where,

$Y$	$\frac{1.008}{17.636}$	= meter correction factor
$V_m$	$\frac{167.864}{17.636}$	= meter volume, cf
$P_m$	$\frac{30.24}{17.636}$	= absolute meter pressure, in. Hg
$T_m$	$\frac{551.5}{17.636}$	= absolute meter temperature, °R
$V_{mstd}$	$\frac{163.638}{17.636}$	= dscf

Standard Wet Volume (Vwstd), scf

$$V_{wstd} = 0.04716 \times V_{lc}$$

where,

$V_{lc}$	$\frac{416.2}{19.628}$	= weight of H <sub>2</sub> O collected, g
$V_{wstd}$	$\frac{19.628}{19.628}$	= scf

Moisture Fraction (BWSsat), dimensionless (theoretical at saturated conditions)

$$BWS_{sat} = \frac{10^{6.37 - \left(\frac{2,827}{T_s + 365}\right)}}{P_s}$$

where,

$T_s$	$\frac{271.3}{365}$	= stack temperature, °F
$P_s$	$\frac{30.08}{365}$	= absolute stack gas pressure, in. Hg
$BWS_{sat}$	$\frac{2.785}{365}$	= dimensionless

Moisture Fraction (BWS), dimensionless (measured)

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

where,

$V_{wstd}$	$\frac{19.628}{0.107}$	= standard wet volume, scf
$V_{mstd}$	$\frac{163.638}{0.107}$	= standard meter volume, dscf
$BWS$	$\frac{0.107}{0.107}$	= dimensionless



**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source:** SHGP Cogeneration Unit  
**Project No.:** AST-2024-1845  
**Run No.:** 1  
**Parameters:** VFR

**Moisture Fraction (BWS), dimensionless**

$$BWS = BWS_{msd} \text{ unless } BWS_{sat} < BWS_{msd}$$

where,

$$\begin{array}{ll}
 BWS_{sat} & \frac{2.785}{0.107} = \text{moisture fraction (theoretical at saturated conditions)} \\
 BWS_{msd} & \frac{0.107}{0.107} = \text{moisture fraction (measured)} \\
 BWS & \frac{0.107}{0.107}
 \end{array}$$

**Molecular Weight (DRY) (Md), lb/lb-mole**

$$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 (100 - \% CO_2 - \% O_2))$$

where,

$$\begin{array}{ll}
 CO_2 & \frac{4.80}{12.38} = \text{carbon dioxide concentration, \%} \\
 O_2 & \frac{12.38}{29.26} = \text{oxygen concentration, \%} \\
 Md & \frac{29.26}{29.26} = \text{lb/lb mol}
 \end{array}$$

**Molecular Weight (WET) (Ms), lb/lb-mole**

$$Ms = Md (1 - BWS) + 18.015 (BWS)$$

where,

$$\begin{array}{ll}
 Md & \frac{29.26}{0.107} = \text{molecular weight (DRY), lb/lb mol} \\
 BWS & \frac{0.107}{28.06} = \text{moisture fraction, dimensionless} \\
 Ms & \frac{28.06}{28.06} = \text{lb/lb mol}
 \end{array}$$

**Average Velocity (Vs), ft/sec**

$$Vs = 85.49 \times Cp \times (\Delta P^{1/2})_{avg} \times \sqrt{\frac{Ts}{Ps \times Ms}}$$

where,

$$\begin{array}{ll}
 Cp & \frac{0.840}{1.052} = \text{pitot tube coefficient} \\
 \Delta P^{1/2} & \frac{1.052}{730.9} = \text{velocity head of stack gas, (in. H}_2\text{O)}^{1/2} \\
 Ts & \frac{730.9}{30.08} = \text{absolute stack temperature, } ^\circ R \\
 Ps & \frac{30.08}{28.06} = \text{absolute stack gas pressure, in. Hg} \\
 Ms & \frac{28.06}{70.3} = \text{molecular weight of stack gas, lb/lb mol} \\
 Vs & \frac{70.3}{70.3} = \text{ft/sec}
 \end{array}$$

**Average Stack Gas Flow at Stack Conditions (Qa), acfm**

$$Qa = 60 \times Vs \times As$$

where,

$$\begin{array}{ll}
 Vs & \frac{70.3}{308.95} = \text{stack gas velocity, ft/sec} \\
 As & \frac{308.95}{1,303,158} = \text{cross-sectional area of stack, ft}^2 \\
 Qa & \frac{1,303,158}{1,303,158} = \text{acfm}
 \end{array}$$

**Average Stack Gas Flow at Standard Conditions (Qs), dscfm**

$$Qs = 17.636 \times Qa \times (1 - BWS) \times \frac{Ps}{Ts}$$

where,

$$\begin{array}{ll}
 Qa & \frac{1,303,158}{0.107} = \text{average stack gas flow at stack conditions, acfm} \\
 BWS & \frac{0.107}{30.08} = \text{moisture fraction, dimensionless} \\
 Ps & \frac{30.08}{730.9} = \text{absolute stack gas pressure, in. Hg} \\
 Ts & \frac{730.9}{844,606} = \text{absolute stack temperature, } ^\circ R \\
 Qs & \frac{844,606}{844,606} = \text{dscfm}
 \end{array}$$

**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source:** SHGP Cogeneration Unit  
**Project No.:** AST-2024-1845  
**Run No.:** 1  
**Parameters:** VFR

**Dry Gas Meter Calibration Check (Yqa), dimensionless**

$$Yqa = \frac{Y - \left( \frac{\Theta}{V_m} \sqrt{\frac{0.0319 \times T_m \times 29}{\Delta H@ \times \left( P_b + \frac{\Delta H_{avg.}}{13.6} \right) \times M_d}} \sqrt{\Delta H_{avg.}} \right)}{Y} \times 100$$

where,

Y	<u>1.008</u>	= meter correction factor, dimensionless
Θ	<u>240</u>	= run time, min.
V <sub>m</sub>	<u>167.864</u>	= total meter volume, dcf
T <sub>m</sub>	<u>551.5</u>	= absolute meter temperature, °R
ΔH@	<u>1.915</u>	= orifice meter calibration coefficient, in. H <sub>2</sub> O
P <sub>b</sub>	<u>30.12</u>	= barometric pressure, in. Hg
ΔH avg	<u>1.664</u>	= average pressure differential of orifice, in H <sub>2</sub> O
M <sub>d</sub>	<u>29.26</u>	= molecular weight (DRY), lb/lb mol
(Δ H) <sup>1/2</sup>	<u>1.290</u>	= average squareroot pressure differential of orifice, (in. H <sub>2</sub> O) <sup>1/2</sup>
Yqa	<u>-0.4</u>	= percent

**Volume of Nozzle (Vn), ft<sup>3</sup>**

$$V_n = \frac{T_s}{P_s} \left( 0.002669 \times V_{lc} + \frac{V_m \times P_m \times Y}{T_m} \right)$$

where,

T <sub>s</sub>	<u>730.9</u>	= absolute stack temperature, °R
P <sub>s</sub>	<u>30.08</u>	= absolute stack gas pressure, in. Hg
V <sub>lc</sub>	<u>416.2</u>	= volume of H <sub>2</sub> O collected, ml
V <sub>m</sub>	<u>167.864</u>	= meter volume, cf
P <sub>m</sub>	<u>30.24</u>	= absolute meter pressure, in. Hg
Y	<u>1.008</u>	= meter correction factor, unitless
T <sub>m</sub>	<u>551.5</u>	= absolute meter temperature, °R
V <sub>n</sub>	<u>252.429</u>	= volume of nozzle, ft <sup>3</sup>





**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source** SHGP Cogeneration Unit  
**Project No.** AST-2024-1845  
**Run No.** 1  
**Parameters** HCl, HF

#### Meter Pressure (Pm), in. Hg

$$P_m = P_b + \frac{\Delta H}{13.6}$$

where,

$P_b$	<u>30.12</u>	= barometric pressure, in. Hg
$\Delta H$	<u>2.100</u>	= pressure differential of orifice, in H <sub>2</sub> O
$P_m$	<u>30.27</u>	= in. Hg

#### Standard Meter Volume (Vmstd), dscf

$$V_{mstd} = \frac{17.636 \times V_m \times P_m \times Y}{T_m}$$

where,

$Y$	<u>0.984</u>	= meter correction factor
$V_m$	<u>126.541</u>	= meter volume, cf
$P_m$	<u>30.27</u>	= absolute meter pressure, in. Hg
$T_m$	<u>538.6</u>	= absolute meter temperature, °R
$V_{mstd}$	<u>123.461</u>	= dscf

#### Hydrogen Chloride Concentration, ppmvd

$$C_{HCl} = \frac{M_{HCl} \times 24.04}{MW \times V_{mstd} \times 28.32}$$

where,

$M_{HCl}$	<u>16.8</u>	= Hydrogen Chloride Mass, ug
$MW$	<u>36.5</u>	= molecular weight, g/g mol
$V_{mstd}$	<u>4.359</u>	= standard meter volume, dscf
$C_{HCl}$	<u>0.09</u>	= ppmvd

#### Hydrogen Chloride Emission Rate, lb/hr

$$ER_{HCl} = \frac{M_{HCl} \times Q_s \times 60}{V_{mstd} \times 4.54E+08}$$

where,

$M_{HCl}$	<u>16.8</u>	= Hydrogen Chloride Mass, ug
$Q_s$	<u>842,471</u>	= average stack gas flow at standard conditions, dscfm
$V_{mstd}$	<u>4.359</u>	= standard meter volume, dscf
$ER_{HCl}$	<u>0.43</u>	= lb/hr

#### Hydrogen Fluoride Concentration, ppmvd

$$C_{HF} = \frac{M_{HF} \times 24.04}{MW \times V_{mstd} \times 28.32}$$

where,

$M_{HF}$	<u>1.99</u>	= Hydrogen Fluoride Mass, ug
$MW$	<u>20.0</u>	= molecular weight, g/g mol
$V_{mstd}$	<u>4.359</u>	= standard meter volume, dscf
$C_{HF}$	<u>0.02</u>	= ppmvd

#### Hydrogen Fluoride Emission Rate, lb/hr

$$ER_{HF} = \frac{M_{HF} \times Q_s \times 60}{V_{mstd} \times 4.54E+08}$$

where,

$M_{HF}$	<u>1.99</u>	= Hydrogen Fluoride Mass, ug
$Q_s$	<u>842,471</u>	= average stack gas flow at standard conditions, dscfm
$V_{mstd}$	<u>4.359</u>	= standard meter volume, dscf
$ER_{HF}$	<u>0.051</u>	= lb/hr

**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX

**Source:** SHGP Cogeneration Unit

**Project No.:** AST-2024-1845

**Run No. /Method** Run 1 / Method 3A

**O<sub>2</sub> - Outlet Concentration (C<sub>O<sub>2</sub></sub>), % dry**

$$C_{O_2} = (C_{obs} - C_0) \times \left( \frac{C_{MA}}{C_M - C_0} \right)$$

where,

C <sub>obs</sub>	12.37	= average analyzer value during test, % dry
C <sub>o</sub>	0.01	= average of pretest & posttest zero responses, % dry
C <sub>MA</sub>	11.00	= actual concentration of calibration gas, % dry
C <sub>M</sub>	11.00	= average of pretest & posttest calibration responses, % dry
C <sub>O<sub>2</sub></sub>	12.38	= O <sub>2</sub> Concentration, % dry

**CO<sub>2</sub> - Outlet Concentration (C<sub>CO<sub>2</sub></sub>), % dry**

$$C_{CO_2} = (C_{obs} - C_0) \times \left( \frac{C_{MA}}{C_M - C_0} \right)$$

where,

C <sub>obs</sub>	4.88	= average analyzer value during test, % dry
C <sub>o</sub>	0.08	= average of pretest & posttest zero responses, % dry
C <sub>MA</sub>	10.97	= actual concentration of calibration gas, % dry
C <sub>M</sub>	11.07	= average of pretest & posttest calibration responses, % dry
C <sub>CO<sub>2</sub></sub>	4.80	= CO <sub>2</sub> Concentration, % dry

## Appendix B

## Emissions Calculations

**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source** SHGP Cogeneration Unit  
**Project No.** AST-2024-1845  
**Parameters** HCl, HF

Run Number		Run 1	Run 2	Run 3	Average
Date		4/24/24	4/24/24	4/24/24	--
Start Time		11:25	12:55	14:01	--
Stop Time		12:25	13:55	15:01	--
<b>Input Data</b>					
Volumetric Flow Rate, dscfm	(Qs)	842,471	842,471	842,471	842,471
Standard Meter Volume, L	(Vmstd)	123.461	121.698	120.392	121.850
Standard Meter Volume, ft <sup>3</sup>	(Vmstd)	4.359	4.297	4.251	4.303
Hydrogen Chloride Mass, ug	M <sub>HCl</sub>	16.8	30.7	20.8	22.8
Hydrogen Fluoride Mass, ug	M <sub>HF</sub>	1.99	6.42	4.22	4.21
<b>Emissions Calculations</b>					
Hydrogen Chloride Concentration, ppmvd	C <sub>HCl</sub>	0.090	0.17	0.11	0.12
Hydrogen Chloride Emission Rate, lb/hr	ER <sub>HCl</sub>	0.43	0.80	0.54	0.59
Hydrogen Fluoride Concentration, ppmvd	C <sub>HF</sub>	0.019	0.063	0.042	0.042
Hydrogen Fluoride Emission Rate, lb/hr	ER <sub>HF</sub>	0.051	0.17	0.11	0.11

## Emissions Calculations

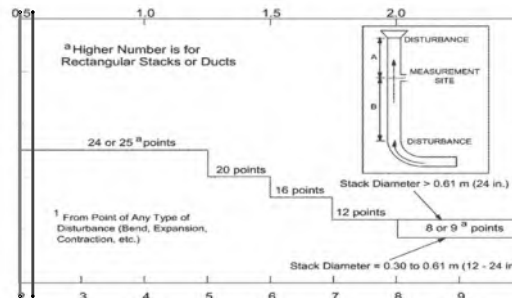
**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source** SHGP Cogeneration Unit  
**Project No.** AST-2024-1845

Run Number		Run 1	Run 2	Run 3	Average
Date		4/23/24	4/24/24	4/24/24	--
Start Time		11:50	8:27	13:03	--
Stop Time		12:49	9:26	14:02	--
<b>Input Data - Outlet</b>					
Moisture Fraction, dimensionless	BWS	0.084	0.085	0.085	0.085
Volumetric Flow Rate (M1-4), dscfm	Qs	844,606	843,339	841,602	843,182
<b>Calculated Data - Outlet</b>					
O <sub>2</sub> Concentration, % dry	C <sub>O<sub>2</sub></sub>	12.38	12.40	12.10	12.29
CO <sub>2</sub> Concentration, % dry	C <sub>CO<sub>2</sub></sub>	4.80	4.75	4.70	4.75

Location Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
Source SHGP Cogeneration Unit  
Project No. AST-2024-1845  
Date: 04/23/24

### Stack Parameters

Duct Orientation: Vertical  
Duct Design: Circular  
Distance from Far Wall to Outside of Port: 250.00 in  
Nipple Length: 12.00 in  
Depth of Duct: 238.00 in  
Cross Sectional Area of Duct: 308.95 ft<sup>2</sup>  
No. of Test Ports: 4  
Distance A: 11.0 ft  
Distance A Duct Diameters: 0.6 (must be ≥ 0.5)  
Distance B: 40.0 ft  
Distance B Duct Diameters: 2.0 (must be ≥ 2)  
Minimum Number of Traverse Points: 24  
Actual Number of Traverse Points: 24  
Number of Readings per Point: 1  
Measurer (Initial and Date): RKS 4/23/24  
Reviewer (Initial and Date): AHC 4/23/24

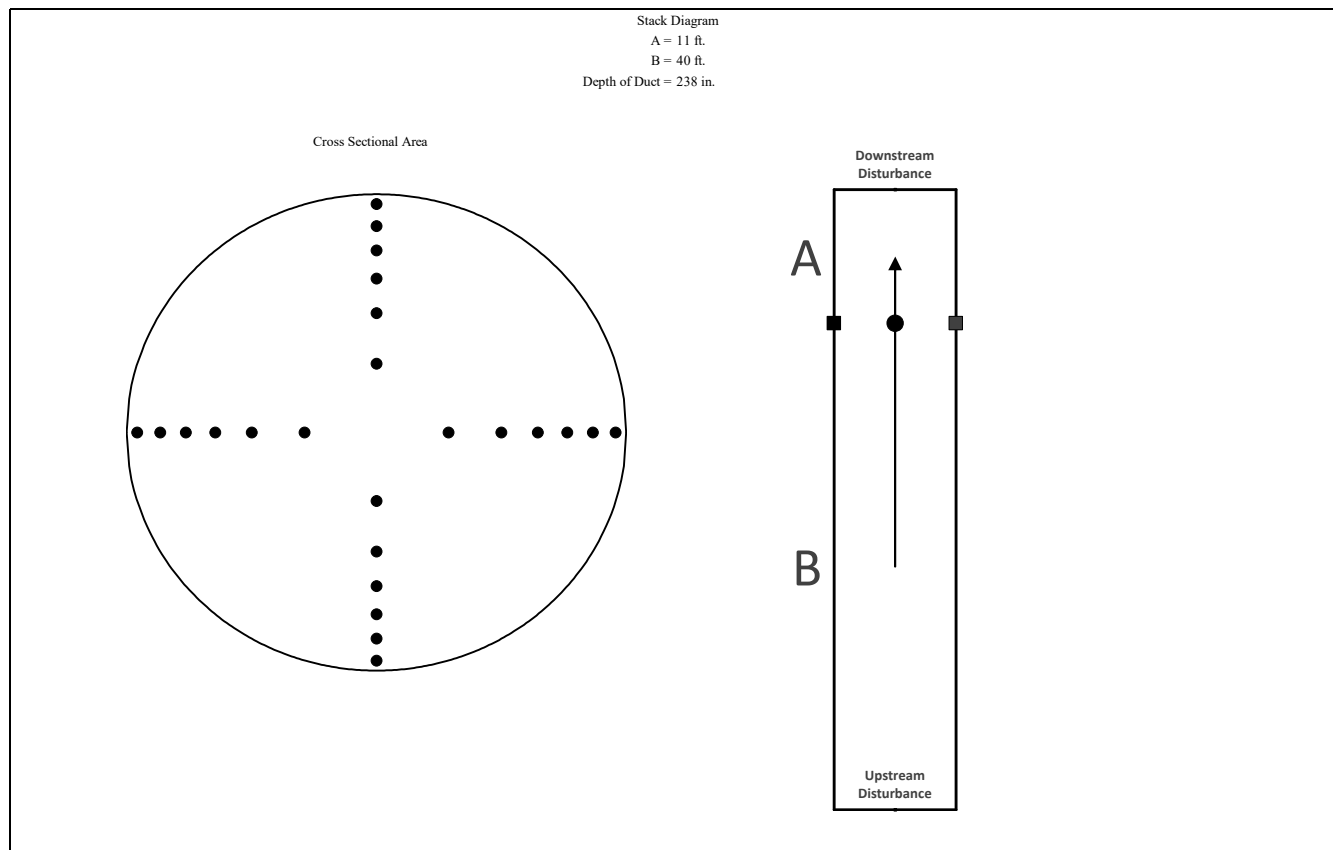


### CIRCULAR DUCT

LOCATION OF TRAVERSE POINTS											
Number of traverse points on a diameter											
	2	3	4	5	6	7	8	9	10	11	12
1	14.6	--	6.7	--	4.4	--	3.2	--	2.6	--	2.1
2	85.4	--	25.0	--	14.6	--	10.5	--	8.2	--	6.7
3	--	--	75.0	--	29.6	--	19.4	--	14.6	--	11.8
4	--	--	93.3	--	70.4	--	32.3	--	22.6	--	17.7
5	--	--	--	--	85.4	--	67.7	--	34.2	--	25.0
6	--	--	--	--	95.6	--	80.6	--	65.8	--	35.6
7	--	--	--	--	--	--	89.5	--	77.4	--	64.4
8	--	--	--	--	--	--	96.8	--	85.4	--	75.0
9	--	--	--	--	--	--	--	--	91.8	--	82.3
10	--	--	--	--	--	--	--	--	97.4	--	88.2
11	--	--	--	--	--	--	--	--	--	--	93.3
12	--	--	--	--	--	--	--	--	--	--	97.9

Traverse Point	% of Diameter	Distance from inside wall	Distance from outside of port
1	2.1	5.00	17
2	6.7	15.95	27 15/16
3	11.8	28.08	40 1/16
4	17.7	42.13	54 1/8
5	25.0	59.50	71 1/2
6	35.6	84.73	96 3/4
7	--	--	--
8	--	--	--
9	--	--	--
10	--	--	--
11	--	--	--
12	--	--	--

\*Percent of stack diameter from inside wall to traverse point.



**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source** SHGP Cogeneration Unit  
**Project No.** AST-2024-1845  
**Parameters** VFR

Run Number		Run 1	Run 2	Run 3	Average
Date		4/23/24	4/24/24	4/24/24	--
Start Time		11:50	8:27	13:03	--
Stop Time		16:00	12:35	17:12	--
Run Time, min		240.0	240.0	240.0	240.0
<b>VELOCITY HEAD, in. WC</b>					
Point 1		1.15	1.12	1.11	1.13
Point 2		1.10	1.11	1.08	1.10
Point 3		1.14	1.12	1.08	1.11
Point 4		1.11	1.10	1.03	1.08
Point 5		1.06	1.16	1.08	1.10
Point 6		1.09	1.18	1.13	1.13
Point 7		1.17	1.09	1.09	1.12
Point 8		1.10	1.10	1.04	1.08
Point 9		1.13	1.11	1.12	1.12
Point 10		1.09	1.15	1.15	1.13
Point 11		1.13	1.11	1.08	1.11
Point 12		1.06	1.11	1.09	1.09
Point 13		1.12	1.16	1.08	1.12
Point 14		1.14	1.12	1.09	1.12
Point 15		1.10	1.09	1.05	1.08
Point 16		1.15	1.13	1.07	1.12
Point 17		1.15	1.11	1.07	1.11
Point 18		1.11	1.12	1.11	1.11
Point 19		1.08	1.08	1.09	1.08
Point 20		1.12	1.12	1.12	1.12
Point 21		1.06	1.09	1.15	1.10
Point 22		1.13	1.10	1.08	1.10
Point 23		1.07	1.12	1.13	1.11
Point 24		1.01	1.05	1.12	1.06
<b>CALCULATED DATA</b>					
Square Root of $\Delta P$ , (in. WC) <sup>1/2</sup>	( $\Delta P$ )	1.052	1.056	1.046	1.051
Pitot Tube Coefficient	(Cp)	0.840	0.840	0.840	0.840
Barometric Pressure, in. Hg	(Pb)	30.12	30.09	30.09	30.10
Static Pressure, in. WC	(Pg)	-0.50	-0.50	-0.50	-0.50
Stack Pressure, in. Hg	(Ps)	30.08	30.05	30.05	30.06
Stack Cross-sectional Area, ft <sup>2</sup>	(As)	308.95	308.95	308.95	308.95
Temperature, °F	(Ts)	271.3	272.4	273.0	272.2
Temperature, °R	(Ts)	730.9	732.1	732.7	731.9
Moisture Fraction Measured	(BWSmsd)	0.107	0.111	0.103	0.107
Moisture Fraction @ Saturation	(BWSsat)	2.785	2.840	2.869	2.831
Moisture Fraction	(BWS)	0.107	0.111	0.103	0.107
O <sub>2</sub> Concentration, %	(O <sub>2</sub> )	12.38	12.4	12.1	12.29
CO <sub>2</sub> Concentration, %	(CO <sub>2</sub> )	4.8	4.75	4.7	4.75
Molecular Weight, lb/lb-mole (dry)	(Md)	29.26	29.26	29.24	29.25
Molecular Weight, lb/lb-mole (wet)	(Ms)	28.06	28.01	28.08	28.05
Velocity, ft/sec	(Vs)	70.3	70.7	70.0	70.3
<b>VOLUMETRIC FLOW RATE</b>					
At Stack Conditions, acfm	(Qa)	1,303,158	1,310,566	1,296,775	1,303,500
At Standard Conditions, scfm	(Qsw)	945,914	948,829	938,043	944,262
At Standard Conditions, dscfm	(Qs)	844,606	843,339	841,602	843,183

**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX

**Source** SHGP Cogeneration Unit

**Project No.** AST-2024-1845

**Date** 04/23/24

Sample Point	Angle ( $\Delta P=0$ )
1	2
2	5
3	7
4	6
5	2
6	3
7	5
8	8
9	9
10	10
11	10
12	7
13	4
14	6
15	1
16	4
17	7
18	10
19	13
20	12
21	8
22	3
23	5
24	2
Average	6



## Method 4 Data

**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source** SHGP Cogeneration Unit  
**Project No.** AST-2024-1845  
**Parameters** VFR  
**Analysis** Gravimetric

<b>Run 1</b>	<b>Date:</b> 4/23/24							
<b>Impinger No.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>Total</b>
<b>Contents</b>	Empty	HNO3/H2O2	HNO3/H2O2	Empty	KMnO4	KMnO4	Silica	--
<b>Initial Mass, g</b>	611.2	768.9	708.3	575.8	738.9	761.2	979.3	5143.6
<b>Final Mass, g</b>	882.3	866.1	724.8	577.9	739.0	760.0	1009.7	5559.8
<b>Gain</b>	271.1	97.2	16.5	2.1	0.1	-1.2	30.4	416.2
<b>Run 2</b>	<b>Date:</b> 4/24/24							
<b>Impinger No.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>Total</b>
<b>Contents</b>	Empty	HNO3/H2O2	HNO3/H2O2	Empty	KMnO4	KMnO4	Silica	--
<b>Initial Mass, g</b>	651.0	745.1	727.4	646.9	750.2	790.8	962.9	5274.3
<b>Final Mass, g</b>	937.1	833.2	743.1	648.8	751.0	791.8	991.5	5696.5
<b>Gain</b>	286.1	88.1	15.7	1.9	0.8	1.0	28.6	422.2
<b>Run 3</b>	<b>Date:</b> 4/24/24							
<b>Impinger No.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>Total</b>
<b>Contents</b>	Empty	HNO3/H2O2	HNO3/H2O2	Empty	KMnO4	KMnO4	Silica	--
<b>Initial Mass, g</b>	612.6	771.2	713.1	577.2	752.2	754.9	1009.6	5190.8
<b>Final Mass, g</b>	872.7	847.0	727.3	581.4	755.9	754.9	1034.4	5573.6
<b>Gain</b>	260.1	75.8	14.2	4.2	3.7	0.0	24.8	382.8

## Method 4 Data

Location Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
Source SHGP Cogeneration Unit  
Project No. AST-2024-1845  
Parameters HCl, HF  
Console Units / Method L M4

Run No.	1					2					3				
Date	4/24/24					4/24/24					4/24/24				
Status	VALID					VALID					VALID				
Start Time	11:25					12:55					14:01				
End Time	12:25					13:55					15:01				
Run Time, min (0)	60					60					60				
Meter ID	VOST 11					VOST 11					VOST 11				
Meter Correction Factor (Y)	0.984					0.984					0.984				
Max Vacuum, in. Hg	2					2					2				
Post Leak Check, L/min (at max vac.)	0.000					0.000					0.000				
Meter Volume, L															
0	0.000					0.000					0.000				
5	10.490					10.510					10.480				
10	20.660					20.690					20.890				
15	31.100					30.770					31.270				
20	42.350					40.910					41.545				
25	53.640					51.480					51.790				
30	64.490					61.880					61.990				
35	75.280					72.630					72.560				
40	85.540					82.970					82.850				
45	95.120					94.030					93.280				
50	106.050					104.620					103.570				
55	116.350					114.920					113.810				
60	126.541					125.429					124.365				
Total Meter Volume, L (Vm)	126.541					125.429					124.365				
Temperature, °F	Meter	Probe	Filter	Vacuum	Imp. Exit	Meter	Probe	Filter	Vacuum	Imp. Exit	Meter	Probe	Filter	Vacuum	Imp. Exit
0	77	259	255	2	64	80	260	254	2	61	80	260	25	2	63
5	77	259	256	2	60	80	261	255	2	55	81	260	256	2	60
10	78	259	256	2	54	81	261	255	2	55	82	260	255	2	54
15	78	260	256	2	54	81	261	255	2	55	82	261	255	2	54
20	78	261	257	2	54	81	260	255	2	56	83	261	256	2	54
25	79	262	258	2	55	82	262	256	2	55	83	261	256	2	54
30	79	261	256	2	55	82	261	257	2	57	83	261	257	2	55
35	79	262	257	2	55	82	260	257	2	57	84	262	257	2	56
40	79	262	257	2	55	83	260	256	2	57	84	261	257	2	56
45	80	62	257	2	56	83	261	256	2	58	84	261	258	2	57
50	80	260	258	2	58	83	261	256	2	58	85	260	258	2	58
55	81	261	258	2	58	83	260	257	2	59	85	260	256	2	61
60	81	261	257	2	659	84	260	256	2	59	85	261	256	2	60
Average Temperature, °F (Tm)	79	245	257	2	103	82	261	256	2	57	83	261	239	2	57
Average Temperature, °R (Tm)	539	705	716	--	--	542	720	715	--	--	543	720	698	--	--
Minimum Temperature, °F	77	62	255	2	54	80	260	254	2	55	80	260	25	2	54
Maximum Temperature, °F	81	262	258	2	659	84	262	257	2	61	85	262	258	2	63
Barometric Pressure, in. Hg (Pb)	30.12					30.12					30.12				
Meter Orifice Pressure, in. WC (AH)	2.100					2.100					2.100				
Meter Pressure, in. Hg (Pm)	30.27					30.27					30.27				
Standard Meter Volume, L (Vmstd)	123.461					121.698					120.392				

Location: Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
Source: SHGP Cogeneration Unit  
Project No.: AST-2024-1845  
Date: 4/23/24

Time Unit Status	O <sub>2</sub> - Outlet % dry Valid	CO <sub>2</sub> - Outlet % dry Valid
Uncorrected Run Average (C <sub>obs</sub> )	12.37	4.88
Cal Gas Concentration (C <sub>MA</sub> )	11.00	10.97
Pretest System Zero Response	0.05	0.05
Posttest System Zero Response	-0.04	0.10
Average Zero Response (C <sub>0</sub> )	0.01	0.08
Pretest System Cal Response	11.03	11.00
Posttest System Cal Response	10.96	11.13
Average Cal Response (C <sub>M</sub> )	11.00	11.07
Corrected Run Average (Corr)	12.38	4.80
11:50	12.33	4.93
11:51	12.37	4.91
11:52	12.35	4.92
11:53	12.35	4.92
11:54	12.35	4.93
11:55	12.33	4.93
11:56	12.33	4.92
11:57	12.34	4.92
11:58	12.33	4.92
11:59	12.32	4.92
12:00	12.32	4.92
12:01	12.31	4.92
12:02	12.30	4.93
12:03	12.30	4.94
12:04	12.34	4.91
12:05	12.34	4.92
12:06	12.35	4.92
12:07	12.36	4.91
12:08	12.35	4.91
12:09	12.35	4.91
12:10	12.35	4.91
12:11	12.36	4.90
12:12	12.36	4.90
12:13	12.34	4.92
12:14	12.34	4.91
12:15	12.36	4.90
12:16	12.35	4.90
12:17	12.36	4.89
12:18	12.38	4.88
12:19	12.37	4.89
12:20	12.36	4.89
12:21	12.36	4.88
12:22	12.37	4.88
12:23	12.36	4.88
12:24	12.36	4.88
12:25	12.36	4.87
12:26	12.43	4.82
12:27	12.31	4.91
12:28	12.13	5.01
12:29	12.23	4.95
12:30	12.40	4.86
12:31	12.49	4.81
12:32	12.46	4.81
12:33	12.45	4.81
12:34	12.42	4.83
12:35	12.38	4.86
12:36	12.34	4.87
12:37	12.39	4.85
12:38	12.44	4.82
12:39	12.48	4.80
12:40	12.47	4.81
12:41	12.44	4.83
12:42	12.42	4.83
12:43	12.44	4.82
12:44	12.47	4.81
12:45	12.47	4.81
12:46	12.48	4.80
12:47	12.46	4.81
12:48	12.45	4.81
12:49	12.43	4.82

Location: Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
Source: SHGP Cogeneration Unit  
Project No.: AST-2024-1845  
Date: 4/24/24

Time Unit Status	O <sub>2</sub> - Outlet % dry Valid	CO <sub>2</sub> - Outlet % dry Valid
Uncorrected Run Average (C <sub>obs</sub> )	12.39	4.82
Cal Gas Concentration (C <sub>MA</sub> )	11.00	10.97
Pretest System Zero Response	0.00	-0.03
Posttest System Zero Response	0.00	-0.03
Average Zero Response (C <sub>o</sub> )	0.00	-0.03
Pretest System Cal Response	10.98	11.10
Posttest System Cal Response	10.99	11.28
Average Cal Response (C <sub>M</sub> )	10.99	11.19
Corrected Run Average (Corr)	12.40	4.75
8:27	12.37	4.84
8:28	12.37	4.84
8:29	12.37	4.84
8:30	12.39	4.83
8:31	12.39	4.83
8:32	12.41	4.81
8:33	12.40	4.82
8:34	12.39	4.83
8:35	12.38	4.84
8:36	12.37	4.84
8:37	12.37	4.84
8:38	12.39	4.83
8:39	12.40	4.82
8:40	12.38	4.83
8:41	12.39	4.82
8:42	12.40	4.82
8:43	12.37	4.83
8:44	12.37	4.84
8:45	12.37	4.83
8:46	12.36	4.84
8:47	12.37	4.84
8:48	12.39	4.83
8:49	12.38	4.84
8:50	12.38	4.84
8:51	12.40	4.83
8:52	12.39	4.83
8:53	12.40	4.82
8:54	12.40	4.82
8:55	12.38	4.83
8:56	12.38	4.83
8:57	12.40	4.82
8:58	12.38	4.84
8:59	12.36	4.84
9:00	12.35	4.85
9:01	12.38	4.83
9:02	12.37	4.83
9:03	12.37	4.83
9:04	12.37	4.83
9:05	12.40	4.81
9:06	12.41	4.80
9:07	12.41	4.80
9:08	12.39	4.81
9:09	12.39	4.81
9:10	12.38	4.82
9:11	12.37	4.82
9:12	12.39	4.81
9:13	12.40	4.81
9:14	12.38	4.82
9:15	12.37	4.82
9:16	12.38	4.82
9:17	12.38	4.82
9:18	12.37	4.82
9:19	12.37	4.82
9:20	12.41	4.80
9:21	12.39	4.81
9:22	12.39	4.81
9:23	12.39	4.82
9:24	12.41	4.81
9:25	12.42	4.81
9:26	12.43	4.80

Location: Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
Source: SHGP Cogeneration Unit  
Project No.: AST-2024-1845  
Date: 4/24/24

Time Unit Status	O <sub>2</sub> - Outlet % dry Valid	CO <sub>2</sub> - Outlet % dry Valid
Uncorrected Run Average (C <sub>obs</sub> )	12.11	4.76
Cal Gas Concentration (C <sub>MA</sub> )	11.00	10.97
Pretest System Zero Response	0.00	-0.03
Posttest System Zero Response	-0.04	-0.03
Average Zero Response (C <sub>0</sub> )	-0.02	-0.03
Pretest System Cal Response	10.99	11.28
Posttest System Cal Response	11.02	11.01
Average Cal Response (C <sub>M</sub> )	11.01	11.15
Corrected Run Average (Corr)	12.10	4.70
13:03	12.12	4.76
13:04	12.14	4.74
13:05	12.14	4.74
13:06	12.13	4.75
13:07	12.13	4.75
13:08	12.12	4.75
13:09	12.11	4.75
13:10	12.12	4.74
13:11	12.10	4.76
13:12	12.10	4.75
13:13	12.11	4.75
13:14	12.13	4.74
13:15	12.12	4.74
13:16	12.10	4.75
13:17	12.07	4.77
13:18	12.08	4.76
13:19	12.09	4.76
13:20	12.10	4.75
13:21	12.11	4.74
13:22	12.09	4.76
13:23	12.11	4.75
13:24	12.12	4.75
13:25	12.11	4.75
13:26	12.12	4.75
13:27	12.11	4.75
13:28	12.10	4.76
13:29	12.13	4.75
13:30	12.13	4.75
13:31	12.11	4.76
13:32	12.13	4.75
13:33	12.11	4.76
13:34	12.12	4.76
13:35	12.12	4.76
13:36	12.11	4.76
13:37	12.10	4.77
13:38	12.10	4.76
13:39	12.11	4.76
13:40	12.12	4.75
13:41	12.10	4.76
13:42	12.10	4.76
13:43	12.11	4.77
13:44	12.16	4.74
13:45	12.14	4.74
13:46	12.16	4.73
13:47	12.15	4.75
13:48	12.16	4.74
13:49	12.13	4.76
13:50	12.11	4.76
13:51	12.11	4.77
13:52	12.10	4.77
13:53	12.09	4.78
13:54	12.11	4.77
13:55	12.12	4.77
13:56	12.10	4.78
13:57	12.05	4.81
13:58	12.05	4.81
13:59	12.08	4.79
14:00	12.09	4.78
14:01	12.09	4.79
14:02	12.12	4.78

## Appendix C

ALLIANCE TECHNICAL GROUP

PROJECT # 2024-1845  
MARATHON PETROLEUM COMPANY

CLIENT # A085  
REPORT # 24-226 REVISION 1

SUBMITTED BY:  
**Alliance Technical Group**  
12242 S.W. GARDEN PLACE  
TIGARD, OR 97223  
(503) 624-2183



12242 SW Garden Place ❖ Tigard, OR 97223-8246 ❖ (503) 624-2183

---

## **Case Narrative**

Date: August 20, 2024

### **General Information**

Client: Alliance Technical Group

Client Number: A085

Report Number: 24-226 Revision 1

Sample Description: Impinger Solutions

Sample Numbers: 24-S1016 – 24-S1023

### **Analysis**

Analytes: HF, HCl

Analytical Protocols: EPA Method 26 (10/7/20 version)

Analytical Notes: There was matrix interference that affected the F peaks. The HF values have a higher level on most samples because of the interference. The analyst used best judgement to approximate peak shapes and remove the interference as accurately as possible. The results are not blank corrected.

QA/QC Review: All the data have been reviewed by the analysts performing the analyses and the project manager. All the quality control and sample-specific information in this package is complete and meets or exceeds the minimum requirements for acceptability.

Comments: If you have any questions or concerns regarding this analysis, please feel free to contact the project manager.

Disclaimer: This report shall not be reproduced, except in full, without the written approval of the laboratory. The results only represent those of the samples as received into the laboratory. All data are reported to the detection limit. Results <5x DL must be considered to have a higher degree of uncertainty associated with them. Due to the statistical process of detection limit determination, data in this report should not be used for statistical analysis as the data has been censored in such a manner as to bias statistical analyses high.

---

Project Manager  
Paul Duda

Date



Lab ID: 24-S1016  
Client ID: R1-C1-SHGP Cogen Unit  
Site: Texas City  
Source: SHGP Cogen Unit Outlet  
Run Number: 1  
Sample Date: 4/24/24  
Sample Volume: 32.5 mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	0.0190	0.011	0.616	0.342
HCl	0.266	0.010	8.65	0.334

---

Lab ID: 24-S1017  
Client ID: R1-C2-SHGP Cogen Unit  
Site: Texas City  
Source: SHGP Cogen Unit Outlet  
Run Number: 1  
Sample Date: 4/24/24  
Sample Volume: 31.0 mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	0.0442	0.011	1.37	0.326
HCl	0.263	0.010	8.16	0.319

---

Lab ID: 24-S1018  
Client ID: R2-C1-SHGP Cogen Unit  
Site: Texas City  
Source: SHGP Cogen Unit Outlet  
Run Number: 2  
Sample Date: 4/24/24  
Sample Volume: 26.5 mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	0.205	0.011	5.44	0.279
HCl	0.765	0.010	20.3	0.272

---

Lab ID: 24-S1019  
Client ID: R2-C2-SHGP Cogen Unit  
Site: Texas City  
Source: SHGP Cogen Unit Outlet  
Run Number: 2  
Sample Date: 4/24/24  
Sample Volume: 32.0 mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	0.0305	0.011	0.977	0.337
HCl	0.325	0.010	10.4	0.329

---

Client: A085 - Alliance Source Testing  
Report Number: 24-226

---

Lab ID: 24-S1020  
Client ID: R3-C1-SHGP Cogen Unit  
Site: Texas City  
Source: SHGP Cogen Unit Outlet  
Run Number: 3  
Sample Date: 4/24/24  
Sample Volume: 33.5 mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	0.0821	0.011	2.75	0.353
HCl	0.291	0.010	9.75	0.344

---

Lab ID: 24-S1021  
Client ID: R3-C2-SHGP Cogen Unit  
Site: Texas City  
Source: SHGP Cogen Unit Outlet  
Run Number: 3  
Sample Date: 4/24/24  
Sample Volume: 32.5 mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	0.0453	0.011	1.47	0.342
HCl	0.337	0.010	11.0	0.334

---

Lab ID: 24-S1022  
Client ID: .1N H2SO4 Blank  
Site: Texas City  
Sample Date: 4/24/24  
Sample Volume: 220. mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	< DL	0.011	< DL	2.32
HCl	0.281	0.010	61.7	2.26

---

Lab ID: 24-S1023  
Client ID: DI Water Blank  
Site: Texas City  
Sample Date: 4/24/24  
Sample Volume: 220. mL

Analyte	mg/L		µg/sample	
	Conc.	DL	Conc.	DL
HF	< DL	0.011	< DL	2.32
HCl	< DL	0.010	< DL	2.26

---

## QA/QC Report

Client Name: Alliance Source Testing  
Project Number: A085  
Analytical Technique: Ion Chromatography  
Instrument: Thermo ICS-5000  
Sample Description: EPA Method 26A  
Report Number: 24-226

### Blank Data

Analyte	Sample ID	Measured Conc. mg/L	DL Conc. mg/L
F	ICB	< DL	0.010
F	CCB	< DL	0.010
F	CCB	< DL	0.010
F	CCB	< DL	0.010
F	CCB	< DL	0.010
F	CCB	< DL	0.010
Cl	ICB	< DL	0.010
Cl	CCB	< DL	0.010
Cl	CCB	< DL	0.010
Cl	CCB	< DL	0.010
Cl	CCB	< DL	0.010
Cl	CCB	< DL	0.010

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank

\*: Sample Media Blank (SM\_Blk) concentration in µg/filter

Method Blank is in control if Method Blank results are <10% of sample results

### Calibration QC

Analyte	Sample ID	Standard Conc. mg/L	Measured Conc. mg/L	Percent Recovery
F	ICV	0.500	0.501	100.2
F	LL-LCS	0.030	0.029	96.7
F	CCV	0.500	0.516	103.2
F	CCV	0.500	0.508	101.6
F	CCV	0.500	0.526	105.2
F	CCV	0.500	0.504	100.8
F	CCV	0.500	0.530	106.0
Cl	ICV	0.500	0.524	104.8
Cl	LL-LCS	0.030	0.030	100.0
Cl	CCV	0.500	0.538	107.6
Cl	CCV	0.500	0.522	104.4
Cl	CCV	0.500	0.524	104.8
Cl	CCV	0.500	0.518	103.6
Cl	CCV	0.500	0.525	105.0

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification

Calibration Verification Limits: 90% - 110% Recovery

Low Level-LCS Limits: 50% - 150% Recovery

LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

## QA/QC Report

Client Name: Alliance Source Testing  
Project Number: A085  
Analytical Technique: Ion Chromatography  
Instrument: Thermo ICS-5000  
Sample Description: EPA Method 26A  
Report Number: 24-226

### Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

### Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. mg/L	Spike Conc. mg/L	Spike Amount mg/L	Percent Recovery
F	24-S1004	0.255	0.736	0.500	96.2
Cl	24-S1004	0.472	1.01	0.500	108.

LCS Limit: 80% - 120% Recovery

Spike Limit: 75% - 125% Recovery

\*: per EPA CLP protocol, control limits do not apply if spike concentration is less than 25% of the sample concentration

# Alliance Technical Group

## SOURCE SAMPLE RECEIPT CHECKLIST

Client	Alliance Source Testing	Date	4/30/2024
# Runs	6 + blanks	Report #	24-226

Package intact? ✓

Chain-of-Custody form inspected	✓
CoC present with samples?	✓
CoC indicates analytical methodology to be used? (eg M29, etc.)	M26A !!
Has CoC been signed by client?	✓
Custody release date and time noted on CoC?	✓

All sample containers inspected	✓
Does number of samples match number on CoC form?	✓ !!
Do all sample ID numbers match those on the CoC form?	✓ !!
Did client mark sample volumes prior to shipment?	None
Sample temperature recorded?	Ambient
Are the sample containers intact?	✓ !!
If present, Audit Sample intact?	n/a !!
Are signs of leakage present?	None *

Chain-of-Custody form signed and dated by CLN ✓

Corrective actions	
Client contacted due to mismatching sample ID numbers	
Client contacted due to broken sample container(s)	
Client contacted due to leaking sample container(s)	
Client contacted for verification of methodology?	✓
Corrective actions documented?	
Corrective actions accomplished?	

Items marked **!!** shall be addressed **prior to any analytical work being started**.  
 Items marked **\*** shall be **noted in case narrative** upon reporting of results to client.

Signed 

Notes Client contacted to clarify if samples are  
aliquots, and if containers were to be run combined/seperately

# Alliance Analytical Services

12242 SW Garden Place ♦ Tigard, OR 97223 ♦ (503) 624-2183 ♦ www.alliancecg.com ♦ ChesterLabNet@AllianceIG.com

## CHAIN-OF-CUSTODY RECORD

For use by Lab:  
 Report #: 24-226

CLIENT INFORMATION				Analysis Requested				Turn Around Time Requested		Page 1 of 1 COCs	
Company Name: Marathon Petroleum Company Contact: Jason Myers Email: jasonmyers@stacktest.com Phone #: (512) 658-4211 Office: HOU Billing Address: Report To: hourreports@stacktest.com				M26 Container 1: H2SO4 + Rinse M26 Container 2: H2SO4 + Rinse M26 Container 3: NaOH + Rinse M26 Container 4: NaOH + Rinse Blank				<input type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)		Date/Time Temp: 4/30/24 15:50 Date/Time Temp:	
Lab/Net ID	Field Sample ID	Site	Sample Date	Volume (m <sup>3</sup> )	Particle Size	Sample Specific Notes:					
24-S1004	Natural Gas Line Run 1	Texas City, TX	4/24/2024	40 ml		HCL & HF; hold NaOH Sample					
24-S1005	Natural Gas Line Run 1	Texas City, TX	4/24/2024	40 ml							
24-S1006	Natural Gas Line Run 2	Texas City, TX	4/24/2024	40 ml							
24-S1007	Natural Gas Line Run 2	Texas City, TX	4/24/2024	40 ml							
24-S1008	Natural Gas Line Run 3	Texas City, TX	4/24/2024	40 ml							
24-S1009	Natural Gas Line Run 3	Texas City, TX	4/24/2024	40 ml							
24-S1010	Refinery Gas Line Inlet - Run 1	Texas City, TX	4/24/2024	40 ml							
24-S1011	Refinery Gas Line Inlet - Run 2	Texas City, TX	4/24/2024	40 ml							
24-S1012	Refinery Gas Line Inlet - Run 3	Texas City, TX	4/24/2024	40 ml							
24-S1013	Refinery Gas Line Inlet - Run 4	Texas City, TX	4/24/2024	40 ml							
24-S1014	Refinery Gas Line Inlet - Run 5	Texas City, TX	4/24/2024	40 ml							
24-S1015	Refinery Gas Line Inlet - Run 6	Texas City, TX	4/24/2024	40 ml							
24-S1016	SHGP Cogen Unit Outlet - Run 1	Texas City, TX	4/24/2024	40 ml		HCL & HF; hold NaOH Sample					
24-S1017	SHGP Cogen Unit Outlet - Run 2	Texas City, TX	4/24/2024	40 ml							
24-S1018	SHGP Cogen Unit Outlet - Run 3	Texas City, TX	4/24/2024	40 ml							
24-S1019	SHGP Cogen Unit Outlet - Run 4	Texas City, TX	4/24/2024	40 ml							
24-S1020	SHGP Cogen Unit Outlet - Run 5	Texas City, TX	4/24/2024	40 ml							
24-S1021	SHGP Cogen Unit Outlet - Run 6	Texas City, TX	4/24/2024	40 ml							
24-S1022	0.1 N H2SO4 Blank	NA	4/24/2024	200 ml							
24-S1023	0.1 N NaOH Blank	NA	4/24/2024	200 ml							
24-S1024	DI Water Blank	NA	4/24/2024	200 ml							
Do the samples pose any potential hazards? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>											
Are samples for compliance? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>											
Special Instructions/QC Requirements & Comments:											
Relinquished by: [Signature] Date/Time: 4/25-24											
Relinquished by: [Signature] Date/Time: 4/25-24											
Laboratory Receipt Comments:											

## **RAW DATA**

Available upon request

## Appendix D




**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX

**Source** SHGP Cogeneration Unit

**Project No.** AST-2024-1845

**Parameters** HCl, HF

Date	Pitot ID	Evidence of damage?	Evidence of mis-alignment?	Calibration or Repair required?	
4/24/24	M5-9-1	no	no	no	
Date	Probe or Thermocouple ID	Reference Temp. (°F)	Indicated Temp. (°F)	Difference	Criteria
4/24/24	M5-9-1	NO	274.0	--	± 1.5 % (absolute)
Date	Barometric Pressure	Evidence of damage?	Reading Verified	Calibration or Repair required?	Weather Station Location
4/24/24	Weather Station	NA	NA	NA	Texas City, TX
Date	Meter Box ID	Positive Pressure Leak Check			
4/24/24	VOST 11	Pass			
Reagent	Lot#	Field Prep performed	Field Lot	Date	By
0.1N NAOH	3010504				
0.1N H2SO4	3062224				
Deionized H2O	30821102				

	DGM Calibration-Orifices	Document ID	620.004
		Revision	23.1
		Effective Date	8/29/23
Issuing Department	Tech Services	Page	1 of 1

#### Equipment Detail - Dry Gas Meter

Console ID: MB 510  
Meter S/N:  
Critical Orifice S/N: CO-1789

#### Calibration Detail

Initial Barometric Pressure, in. Hg	(P <sub>b</sub> )	29.91					
Final Barometric Pressure, in. Hg	(P <sub>b</sub> <sub>f</sub> )	29.97					
Average Barometric Pressure, in. Hg	(P <sub>b</sub> )	29.94					
Critical Orifice ID	(Y)	12	12	17	17	20	20
K' Factor, ft <sup>3</sup> ·R <sup>1/2</sup> / in. WC·min	(K')	0.3307	0.3307	0.4530	0.453	0.5506	0.551
Vacuum Pressure, in. Hg	(V <sub>p</sub> )	19.0	19.0	17.0	17.0	15.0	15.0
Initial DGM Volume, ft <sup>3</sup>	(V <sub>m</sub> )	27.700	34.151	15.200	21.201	0.500	7.696
Final DGM Volume, ft <sup>3</sup>	(V <sub>m</sub> <sub>f</sub> )	34.151	40.645	21.201	27.209	7.696	14.904
Total DGM Volume, ft <sup>3</sup>	(V <sub>m</sub> )	6.451	6.494	6.001	6.008	7.196	7.208
Ambient Temperature, °F	(T <sub>a</sub> )	71	71	71	71	71	71
Initial DGM Temperature, °F	(T <sub>m</sub> )	81	80	80	81	76	78
Final DGM Temperature, °F	(T <sub>m</sub> <sub>f</sub> )	80	80	81	81	78	80
Average DGM Temperature, °F	( T <sub>m</sub> )	81	80	81	81	77	79
Elapsed Time	(Θ)	15.00	15.00	10.00	10.00	10.00	10.00
Meter Orifice Pressure, in. WC	(ΔH)	0.65	0.65	1.20	1.20	1.75	1.75
Standard Meter volume, ft <sup>3</sup>	(V <sub>m</sub> std)	6.3172	6.3652	5.8844	5.8859	7.1118	7.0972
Standard Critical Orifice Volume, ft <sup>3</sup>	(V <sub>cr</sub> )	6.4470	6.4470	5.8875	5.8875	7.1560	7.1560
Meter Correction Factor	(Y)	1.021	1.013	1.001	1.000	1.006	1.008
Tolerance	--	0.012	0.005	0.008	0.008	0.002	0.000
Orifice Calibration Value	(ΔH @)	1.938	1.940	1.910	1.908	1.900	1.893
Tolerance	--	0.024	0.025	0.005	0.007	0.015	0.022
Orifice Cal Check	--	1.63		1.60		0.93	
Meter Correction Factor	(Y)	1.008					
Orifice Calibration Value	(ΔH @)	1.915					
Positive Pressure Leak Check		Yes					

#### Equipment Detail - Thermocouple Sensor


Reference Calibrator Make: Environmental Supply  
Reference Calibrator Model: CL3512A  
Reference Calibrator S/N: 18000594

#### Calibration Detail

Reference Temp.		Display Temp.		Accuracy	Absolute Difference
°F	°R	°F	°R	%	°F
0	460	1	461	-0.2	1
68	528	67	527	0.2	1
100	560	100	560	0.0	0
223	683	222	682	0.1	1
248	708	248	708	0.0	0
273	733	273	733	0.0	0
300	760	298	758	0.3	2
400	860	403	863	-0.3	3
500	960	502	962	-0.2	2
600	1,060	600	1,060	0.0	0
700	1,160	699	1,159	0.1	1
800	1,260	803	1,263	-0.2	3
900	1,360	902	1,362	-0.1	2
1,000	1,460	1,001	1,461	-0.1	1
1,100	1,560	1,104	1,564	-0.3	4
1,200	1,660	1,205	1,665	-0.3	5

#### Personnel

Calibration By: Matt Brumley  
Calibration Date: 3/21/2024  
Reviewed By: Bryan Johnson


	Low Volume DGM Calibration-Orifices						Document ID	620.005		
							Revision	23.0		
							Effective Date	8/29/23		
Issuing Department	Tech Services						Page	1 of 1		
Low Volume Dry Gas Meter Calibration										
Console ID	--	VOST 11								
Meter S/N	--	1572								
Critical Orifice S/N	--	CO2731								
Initial Barometric Pressure, in. Hg	(P <sub>b</sub> )	30.06								
Final Barometric Pressure, in. Hg	(P <sub>b</sub> <sub>F</sub> )	30.02								
Average Barometric Pressure, in. Hg	(P <sub>b</sub> )	30.04								
Orifice Nominal Flow, lpm	(Q)	2.18			1.00			0.57		
Run No.	--	1	2	3	1	2	3	1	2	3
K' Factor, L·R <sup>1/2</sup> / in. WC·min	(K')	1.6754	1.6754	1.6754	0.7678	0.7678	0.7678	0.4343	0.4343	0.4343
Vacuum Pressure, in. Hg	(V <sub>P</sub> )	18.0	18.0	18.0	19.0	19.0	20.0	19.0	19.0	19.0
Initial DGM Volume, L	(V <sub>m</sub> ) <sub>i</sub>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Final DGM Volume, L	(V <sub>m</sub> ) <sub>F</sub>	13.268	13.274	13.308	11.168	11.248	11.198	6.338	6.345	6.321
Total DGM Volume, L	(V <sub>m</sub> )	13.268	13.274	13.308	11.168	11.248	11.198	6.338	6.345	6.321
Ambient Temperature, °F	(T <sub>a</sub> )	74	75	76	76	77	77	78	78	78
Initial Inlet DGM Temperature, °F	(T <sub>m</sub> ) <sub>i</sub>	75	76	76	77	77	77	77	78	78
Final Inlet DGM Temperature, °F	(T <sub>m</sub> ) <sub>F</sub>	75	76	77	77	77	77	77	78	78
Initial Outlet DGM Temperature, °F	(T <sub>m</sub> ) <sub>o</sub>	74	76	76	77	77	77	77	78	78
Final Outlet DGM Temperature, °F	(T <sub>m</sub> ) <sub>o</sub>	74	76	77	77	77	77	77	78	78
Average Outlet DGM Temperature, °F	(T <sub>m</sub> )	75	76	76.5	77	77	77	77	78	78
Elapsed Time	(Θ)	6.00	6.00	6.00	11.00	11.00	11.00	11.00	11.00	11.00
Meter Orifice Pressure, in. WC	(ΔH)	5.00	5.00	5.00	2.40	2.40	2.40	1.60	1.60	1.60
Standard Meter volume, L	(V <sub>mstd</sub> )	13.3227	13.2914	13.3130	11.0916	11.1711	11.1214	6.2824	6.2776	6.2539
Standard Critical Orifice Volume, L	(V <sub>cr</sub> )	13.0715	13.0593	13.0471	10.9619	10.9516	10.9516	6.1889	6.1889	6.1889
Meter Correction Factor	(Y)	0.9811	0.9825	0.9800	0.9883	0.9804	0.9847	0.9851	0.9859	0.9896
Tolerance	--	-0.01%	0.13%	-0.12%	0.39%	-0.42%	0.03%	-0.18%	-0.10%	0.28%
Orifice Cal Check	--	0.57			0.33			0.57		
Average Meter Correction Factor	(Y)	0.9812			0.9845			0.9869		
Meter Correction Factor	(Y)	0.9842								

Reference Calibrator Make		OMEGA			
Reference Calibrator Model		CL3512A			
Reference Calibrator S/N		1800594			
Reference Temp.		Display Temp.		Accuracy	Absolute Difference
°F	°R	°F	°R	%	°F
0	460	1	461	-0.2	1
68	528	67	527	0.2	1
100	560	99	559	0.2	1
223	683	225	685	-0.3	2
248	708	250	710	-0.3	2
273	733	275	735	-0.3	2
300	760	302	762	-0.3	2
400	860	401	861	-0.1	1
500	960	501	961	-0.1	1
600	1,060	602	1,062	-0.2	2
700	1,160	704	1,164	-0.3	4
800	1,260	804	1,264	-0.3	4
900	1,360	904	1,364	-0.3	4
1,000	1,460	1,005	1,465	-0.3	5
1,100	1,560	1,106	1,566	-0.4	6
1,200	1,660	1,206	1,666	-0.4	6

Calibration Performed By: OMAR JOSEPH

Date Conducted: 11/6/23

Reviewed By: Stacey Cunningham

	Low Volume DGM Calibration-Orifices	Document ID		620.005						
		Revision		23.0						
		Effective Date		8/29/23						
Issuing Department	Tech Services	Page		1 of 1						
Low Volume Dry Gas Meter Calibration										
Console ID	--	20								
Meter S/N	--	1623								
Critical Orifice S/N	--	CO-2731								
Initial Barometric Pressure, in. Hg	(Pb <sub>i</sub> )	30.00								
Final Barometric Pressure, in. Hg	(Pb <sub>f</sub> )	30.00								
Average Barometric Pressure, in. Hg	(Pb)	30								
Orifice Nominal Flow, lpm	(Q)	1.00		1.52		0.57				
Run No.	--	1	2	3	1	2	3	1	2	3
K' Factor, L·R <sup>1/2</sup> / in. WC·min	(K')	0.7678	0.7678	0.7678	1.1686	1.1686	1.1686	0.4343	0.4343	0.4343
Vacuum Pressure, in. Hg	(V <sub>p</sub> )	19.0	19.0	19.0	17.0	17.0	17.0	22.0	22.0	22.0
Initial DGM Volume, L	(V <sub>m<sub>i</sub></sub> )	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Final DGM Volume, L	(V <sub>m<sub>f</sub></sub> )	12.338	12.358	12.341	9.329	9.303	9.345	6.405	6.410	6.412
Total DGM Volume, L	(V <sub>m</sub> )	12.338	12.358	12.341	9.329	9.303	9.345	6.405	6.410	6.412
Ambient Temperature, °F	(T <sub>a</sub> )	77	78	79	79	79	79	79	79	79
Initial Inlet DGM Temperature, °F	(T <sub>m<sub>ii</sub></sub> )	78	79	79	79	79	79	79	79	79
Final Inlet DGM Temperature, °F	(T <sub>m<sub>fi</sub></sub> )	78	79	79	79	79	79	79	79	79
Initial Outlet DGM Temperature, °F	(T <sub>m<sub>io</sub></sub> )	78	79	79	79	79	79	79	79	79
Final Outlet DGM Temperature, °F	(T <sub>m<sub>fo</sub></sub> )	78	79	79	79	79	79	79	79	79
Average Outlet DGM Temperature, °F	( T <sub>m</sub> )	78	79	79.0	79	79	79	79	79	79
Elapsed Time	(θ)	12.00	12.00	12.00	6.00	6.00	6.00	11.00	11.00	11.00
Meter Orifice Pressure, in. WC	(ΔH)	0.20	0.20	0.20	1.20	1.20	1.20	0.10	0.10	0.00
Standard Meter volume, L	(V <sub>mstd</sub> )	12.1491	12.1462	12.1295	9.1916	9.1660	9.2074	6.2937	6.2986	6.2990
Standard Critical Orifice Volume, L	(V <sub>cr</sub> )	11.9313	11.9202	11.9092	9.0629	9.0629	9.0629	6.1750	6.1750	6.1750
Meter Correction Factor	(Y)	0.9821	0.9814	0.9818	0.9860	0.9888	0.9843	0.9811	0.9804	0.9803
Tolerance	--	0.03%	-0.04%	0.01%	-0.04%	0.24%	-0.21%	0.05%	-0.02%	-0.03%
Orifice Cal Check	--	0.47			0.59			0.58		
Average Meter Correction Factor	(Y)	0.9818			0.9864			0.9806		
Meter Correction Factor	(Y)	0.9829								

Reference Calibrator Make	OMEGA				
Reference Calibrator Model	CL3512A				
Reference Calibrator S/N	1800594				
Reference Temp.		Display Temp.		Accuracy	Absolute Difference
°F	°R	°F	°R	%	°F
0	460	2	462	-0.4	2
68	528	67	527	0.2	1
100	560	99	559	0.2	1
223	683	224	684	-0.1	1
248	708	249	709	-0.1	1
273	733	274	734	-0.1	1
300	760	301	761	-0.1	1
400	860	399	859	0.1	1
500	960	498	958	0.2	2
600	1,060	599	1,059	0.1	1
700	1,160	700	1,160	0.0	0
800	1,260	799	1,259	0.1	1
900	1,360	899	1,359	0.1	1
1,000	1,460	999	1,459	0.1	1
1,100	1,560	1,099	1,559	0.1	1
1,200	1,660	1,198	1,658	0.1	2

Calibration Performed By: OMAR JOSEPH

Date Conducted: 11/6/23

Reviewed By: Stacey Cunningham

**Location** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source** SHGP Cogeneration Unit  
**Project No.** AST-2024-1845

Parameter	O <sub>2</sub> - Outlet	CO <sub>2</sub> - Outlet
<b>Make</b>	CAI	CAI
<b>Model</b>	700	700
<b>S/N</b>	3010200	3010200
<b>Operating Range</b>	25	25
<b>Cylinder ID</b>		
<b>Zero</b>	NA	NA
<b>Mid</b>	EB0072880	EB0072880
<b>High</b>	EB0069838	EB0069838
<b>Cylinder Certified Values</b>		
<b>Zero</b>	NA	NA
<b>Mid</b>	11.00	10.97
<b>High</b>	22.07	21.9
<b>Cylinder Expiration Date</b>		
<b>Zero</b>	NA	NA
<b>Mid</b>	11/1/31	11/1/31
<b>High</b>	12/3/31	12/3/31
<b>Type of Sample Line</b>	Heated Sample Line	

**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX

**Source:** SHGP Cogeneration Unit

**Project No.:** AST-2024-1845

Response Times, seconds		
Parameter	O <sub>2</sub> - Outlet	CO <sub>2</sub> - Outlet
Zero	85	87
Low	NA	NA
Mid	85	87
High	85	87
Average	85.0	87.0

**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source:** SHGP Cogeneration Unit  
**Project No.:** AST-2024-1845  
**Date:** 4/23/24

Parameter	O <sub>2</sub> - Outlet	CO <sub>2</sub> - Outlet
<b>Expected Average Concentration</b>	15.00	15.00
<b>Span Between</b>		
Low	15.00	15.00
High	75.00	75.00
<b>Desired Span</b>	22.07	21.90
<b>Low Range Gas</b>		
Low	NA	NA
High	NA	NA
<b>Mid Range Gas</b>		
Low	8.83	8.76
High	13.24	13.14
<b>High Range Gas</b>		
Low	NA	NA
High	NA	NA
<b>Actual Concentration (% or ppm)</b>		
Zero	0.00	0.00
Low	NA	NA
Mid	11.00	10.97
High	22.07	21.90
<b>Response Time (seconds)</b>	85.00	87.00
<b>Upscale Calibration Gas (C<sub>MA</sub>)</b>	Mid	Mid
<b>Instrument Response (% or ppm)</b>		
Zero	-0.04	-0.01
Low	NA	NA
Mid	11.05	10.99
High	22.10	21.85
<b>Performance (% of Span or Cal. Gas Conc.)</b>		
Zero	0.18	0.05
Low	NA	NA
Mid	0.23	0.09
High	0.14	0.23
<b>Status</b>		
Zero	PASS	PASS
Low	NA	NA
Mid	PASS	PASS
High	PASS	PASS

**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX  
**Source:** SHGP Cogeneration Unit  
**Project No.:** AST-2024-1845  
**Date:** 4/24/24

Parameter	O <sub>2</sub> - Outlet	CO <sub>2</sub> - Outlet
<b>Expected Average Concentration</b>	12.37	4.88
<b>Span Between</b>		
Low	12.37	4.88
High	61.86	24.40
<b>Desired Span</b>	22.07	21.90
<b>Low Range Gas</b>		
Low	NA	NA
High	NA	NA
<b>Mid Range Gas</b>		
Low	8.83	8.76
High	13.24	13.14
<b>High Range Gas</b>		
Low	NA	NA
High	NA	NA
<b>Actual Concentration (% or ppm)</b>		
Zero	0.00	0.00
Low	NA	NA
Mid	11.00	10.97
High	22.07	21.90
<b>Upscale Calibration Gas (C<sub>MA</sub>)</b>	Mid	Mid
<b>Instrument Response (% or ppm)</b>		
Zero	-0.03	-0.01
Low	NA	NA
Mid	11.04	11.09
High	22.07	21.98
<b>Performance (% of Span or Cal. Gas Conc.)</b>		
Zero	0.14	0.05
Low	NA	NA
Mid	0.18	0.55
High	0.00	0.37
<b>Status</b>		
Zero	PASS	PASS
Low	NA	NA
Mid	PASS	PASS
High	PASS	PASS



## Bias/Drift Determinations

**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX

**Source:** SHGP Cogeneration Unit

**Project No.:** AST-2024-1845

Parameter	O <sub>2</sub> - Outlet	CO <sub>2</sub> - Outlet
<b>Run 1    Date    4/23/24</b>		
Span Value	22.07	21.90
Initial Instrument Zero Cal Response	-0.04	-0.01
Initial Instrument Upscale Cal Response	11.05	10.99
Pretest System Zero Response	0.05	0.05
Posttest System Zero Response	-0.04	0.10
Pretest System Upscale Response	11.03	11.00
Posttest System Upscale Response	10.96	11.13
Bias (%)		
Pretest Zero	0.41	0.27
Posttest Zero	0.00	0.50
Pretest Span	-0.09	0.05
Posttest Span	-0.41	0.64
Drift (%)		
Zero	-0.41	0.23
Mid	-0.32	0.59
<b>Run 2    Date    4/24/24</b>		
Span Value	22.07	21.90
Instrument Zero Cal Response	-0.03	-0.01
Instrument Upscale Cal Response	11.04	11.09
Pretest System Zero Response	0.00	-0.03
Posttest System Zero Response	0.00	-0.03
Pretest System Upscale Response	10.98	11.10
Posttest System Upscale Response	10.99	11.28
Bias (%)		
Pretest Zero	0.14	-0.09
Posttest Zero	0.14	-0.09
Pretest Span	-0.27	0.05
Posttest Span	-0.23	0.87
Drift (%)		
Zero	0.00	0.00
Mid	0.05	0.82
<b>Run 3    Date    4/24/24</b>		
Span Value	22.07	21.90
Instrument Zero Cal Response	-0.03	-0.01
Instrument Upscale Cal Response	11.04	11.09
Pretest System Zero Response	0.00	-0.03
Posttest System Zero Response	-0.04	-0.03
Pretest System Upscale Response	10.99	11.28
Posttest System Upscale Response	11.02	11.01
Bias (%)		
Pretest Zero	0.14	-0.09
Posttest Zero	-0.05	-0.09
Pretest Span	-0.23	0.87
Posttest Span	-0.09	-0.37
Drift (%)		
Zero	-0.18	0.00
Mid	0.14	-1.23



Red Ball Technical Gas Service  
555 Craig Kennedy Way  
Shreveport, LA 71107  
800-551-8150  
PGVP Vendor ID # G12023

## EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	EB0069838	Certification Date:	12/05/2023
Product ID Number:	123956	Expiration Date:	12/03/2031
Cylinder Pressure:	1900 PSIG	MFG Facility:	- Shreveport - LA
COA #	EB0069838.20231128-0	Lot Number:	EB0069838.20231128
Customer PO. NO.:		Tracking Number:	084210634
Customer:		Previous Certification Dates:	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G2.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

### Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle	Assayed On
Carbon Dioxide	21.9 %	±0.15 %	FTIR	12/05/2023
Oxygen	22.07 %	±0.05 %	MPA	12/05/2023
Nitrogen	Balance			

Analytical Measurement Data Available Online.

### Reference Standard(s)

Serial Number	Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
CC749243	CC749243.20230228	07/09/2031	GMIS	N2	O2	20.01 %	0.112	SRM 2659a
EB0004315	EB0004315.20201022	04/05/2030	GMIS	N2	CO2	24.75 %	0.237	C2190301.03

### Analytical Instrumentation

Component	Principle	Make	Model	Serial	MPC Date
O2	MPA	Thermo	410i	1162980025	11/24/2023
CO2	FTIR	MKS	MKS 2031DJG2EKVS13T	017146467	12/05/2023

### SMART-CERT



This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

*Jasmine Godfrey*

Jasmine Godfrey  
Analytical Chemist  
Assay Laboratory: Red Ball TGS  
Version 02-J, Revised on 2018-09-17



Red Ball Technical Gas Service  
555 Craig Kennedy Way  
Shreveport, LA 71107  
800-551-8150  
PGVP Vendor ID # G12023

## EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	EB0072880	Certification Date:	11/03/2023
Product ID Number:	125371	Expiration Date:	11/01/2031
Cylinder Pressure:	1900 PSIG	MFG Facility:	- Shreveport - LA
COA #	EB0072880.20231024-0	Lot Number:	EB0072880.20231024
Customer PO. NO.:		Tracking Number:	084248293
Customer:		Previous Certification Dates:	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

### Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle	Assayed On
Carbon Dioxide	10.97 %	±0.05 %	NDIR	11/02/2023
Oxygen	11.00 %	±0.03 %	MPA	11/03/2023
Nitrogen	Balance			

Analytical Measurement Data Available Online.

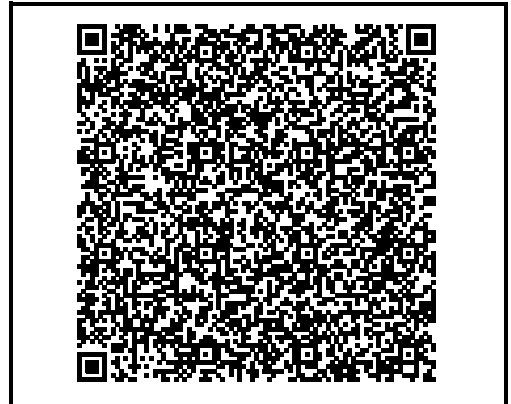
### Reference Standard(s)

Serial Number	Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
CC716408	CC716408.20230109	07/09/2031	GMIS	N2	O2	12.003 %	0.122	SRM 2659a
CC749243	CC749243.20230228	07/09/2031	GMIS	N2	O2	20.01 %	0.112	SRM 2659a
EB0004315	EB0004315.20201022	04/05/2030	GMIS	N2	CO2	24.75 %	0.237	C2190301.03
EB0022021	EB0022021.20180323	07/15/2026	GMIS	N2	CO2	14.9 %	0.777	101001

### Analytical Instrumentation

Component	Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Thermo	410i	1162980025	10/17/2023
O2	MPA	Thermo	410i	1162980025	10/31/2023

### SMART-CERT



This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

*Hayden Hartley*

Hayden Hartley  
Analyst

Assay Laboratory: Red Ball TGS  
Version 02-J, Revised on 2018-09-17

**Location:** Marathon Petroleum Corporation - Galveston Bay Refinery - Texas City, TX

**Source:** SHGP Cogeneration Unit

**Project No.:** AST-2024-1845

**Date:** 4/26/2024

Traverse Point	Time	O <sub>2</sub> (%)	CO <sub>2</sub> (%)
A-1	9:27	12.51	4.81
2	9:30	12.42	4.86
3	9:33	12.42	4.85
Average		12.5	4.8
Criteria Met		Single Point	Single Point

## Appendix E

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 8:25	11.87	4.88	
4/23/24 8:26	7.50	2.73	
4/23/24 8:27	-0.04	-0.01	Cal
4/23/24 8:28	10.01	9.47	
4/23/24 8:29	22.15	21.89	
4/23/24 8:30	22.10	21.85	
4/23/24 8:31	22.11	21.83	
4/23/24 8:32	20.83	20.41	
4/23/24 8:33	11.05	10.99	
4/23/24 8:34	11.43	9.39	
4/23/24 8:35	5.84	1.26	
4/23/24 8:36	0.05	0.05	Bias
4/23/24 8:37	-0.01	0.09	
4/23/24 8:38	10.34	10.55	
4/23/24 8:39	11.03	11.00	
4/23/24 8:40	11.32	9.60	
4/23/24 8:41	17.62	1.94	
4/23/24 8:42	20.94	0.23	
4/23/24 8:43	20.96	0.23	
4/23/24 8:44	20.96	0.23	
4/23/24 8:45	20.97	0.23	
4/23/24 8:46	20.97	0.24	
4/23/24 8:47	14.65	1.14	
4/23/24 8:48	10.38	3.89	
4/23/24 8:49	12.37	4.57	
4/23/24 8:50	12.71	4.69	
4/23/24 8:51	12.75	4.71	
4/23/24 8:52	12.76	4.70	
4/23/24 8:53	12.82	4.67	
4/23/24 8:54	12.78	4.69	
4/23/24 8:55	12.78	4.69	
4/23/24 8:56	12.77	4.70	
4/23/24 8:57	12.78	4.69	
4/23/24 8:58	12.81	4.67	
4/23/24 8:59	12.80	4.67	
4/23/24 9:00	12.80	4.67	
4/23/24 9:01	12.81	4.67	
4/23/24 9:02	12.76	4.69	
4/23/24 9:03	12.74	4.70	
4/23/24 9:04	12.74	4.70	
4/23/24 9:05	12.73	4.70	
4/23/24 9:06	12.75	4.68	
4/23/24 9:07	12.74	4.70	
4/23/24 9:08	12.69	4.72	
4/23/24 9:09	12.69	4.73	
4/23/24 9:10	12.70	4.72	
4/23/24 9:11	12.67	4.73	
4/23/24 9:12	12.64	4.74	
4/23/24 9:13	12.61	4.76	
4/23/24 9:14	12.60	4.77	
4/23/24 9:15	12.57	4.79	
4/23/24 9:16	12.56	4.79	
4/23/24 9:17	12.56	4.79	
4/23/24 9:18	12.60	4.77	
4/23/24 9:19	12.59	4.77	
4/23/24 9:20	12.57	4.78	
4/23/24 9:21	12.56	4.79	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 9:22	12.54	4.80	
4/23/24 9:23	12.54	4.80	
4/23/24 9:24	12.53	4.80	
4/23/24 9:25	12.54	4.79	
4/23/24 9:26	12.55	4.79	
4/23/24 9:27	12.51	4.81	
4/23/24 9:28	12.47	4.83	
4/23/24 9:29	12.44	4.85	
4/23/24 9:30	12.42	4.86	
4/23/24 9:31	12.40	4.86	
4/23/24 9:32	12.41	4.85	
4/23/24 9:33	12.42	4.85	
4/23/24 9:34	12.46	4.82	
4/23/24 9:35	12.46	4.82	
4/23/24 9:36	12.46	4.81	
4/23/24 9:37	12.46	4.81	
4/23/24 9:38	12.45	4.81	
4/23/24 9:39	12.45	4.82	
4/23/24 9:40	12.41	4.83	
4/23/24 9:41	12.48	4.80	
4/23/24 9:42	12.47	4.79	
4/23/24 9:43	12.46	4.80	
4/23/24 9:44	12.42	4.81	
4/23/24 9:45	12.39	4.83	
4/23/24 9:46	12.38	4.83	
4/23/24 9:47	12.41	4.83	
4/23/24 9:48	12.44	4.81	
4/23/24 9:49	12.42	4.83	
4/23/24 9:50	12.45	4.81	
4/23/24 9:51	12.46	4.81	
4/23/24 9:52	12.43	4.84	
4/23/24 9:53	12.39	4.85	
4/23/24 9:54	12.42	4.84	
4/23/24 9:55	12.45	4.82	
4/23/24 9:56	12.44	4.83	
4/23/24 9:57	12.41	4.84	
4/23/24 9:58	12.41	4.84	
4/23/24 9:59	12.41	4.84	
4/23/24 10:00	12.45	4.87	
4/23/24 10:01	12.46	4.79	
4/23/24 10:02	12.17	4.71	
4/23/24 10:03	12.06	4.71	
4/23/24 10:04	12.02	4.72	
4/23/24 10:05	12.00	4.73	
4/23/24 10:06	12.00	4.73	
4/23/24 10:07	11.99	4.73	
4/23/24 10:08	12.01	4.72	
4/23/24 10:09	11.98	4.74	
4/23/24 10:10	11.99	4.73	
4/23/24 10:11	12.03	4.71	
4/23/24 10:12	11.98	4.66	
4/23/24 10:13	11.93	4.65	
4/23/24 10:14	11.89	4.67	
4/23/24 10:15	11.89	4.67	
4/23/24 10:16	11.91	4.66	
4/23/24 10:17	11.91	4.66	
4/23/24 10:18	11.88	4.68	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 10:19	11.88	4.68	
4/23/24 10:20	11.90	4.67	
4/23/24 10:21	11.90	4.66	
4/23/24 10:22	11.87	4.67	
4/23/24 10:23	11.84	4.70	
4/23/24 10:24	11.84	4.70	
4/23/24 10:25	11.87	4.69	
4/23/24 10:26	11.86	4.68	
4/23/24 10:27	11.90	4.65	
4/23/24 10:28	11.89	4.66	
4/23/24 10:29	11.84	4.69	
4/23/24 10:30	11.84	4.69	
4/23/24 10:31	11.85	4.68	
4/23/24 10:32	11.89	4.67	
4/23/24 10:33	11.88	4.68	
4/23/24 10:34	11.85	4.70	
4/23/24 10:35	11.90	4.67	
4/23/24 10:36	11.91	4.66	
4/23/24 10:37	11.91	4.65	
4/23/24 10:38	11.88	4.66	
4/23/24 10:39	11.89	4.67	
4/23/24 10:40	11.86	4.67	
4/23/24 10:41	11.84	4.68	
4/23/24 10:42	11.86	4.66	
4/23/24 10:43	11.84	4.68	
4/23/24 10:44	11.87	4.66	
4/23/24 10:45	11.86	4.66	
4/23/24 10:46	11.88	4.66	
4/23/24 10:47	11.86	4.67	
4/23/24 10:48	11.86	4.66	
4/23/24 10:49	11.91	4.64	
4/23/24 10:50	11.91	4.64	
4/23/24 10:51	11.88	4.65	
4/23/24 10:52	11.89	4.64	
4/23/24 10:53	11.93	4.63	
4/23/24 10:54	16.95	2.08	
4/23/24 10:55	21.03	0.18	
4/23/24 10:56	21.03	0.18	
4/23/24 10:57	21.03	0.18	
4/23/24 10:58	21.03	0.18	
4/23/24 10:59	21.02	0.19	
4/23/24 11:00	21.02	0.19	
4/23/24 11:01	21.02	0.19	
4/23/24 11:02	21.02	0.19	
4/23/24 11:03	21.01	0.19	
4/23/24 11:04	21.00	0.20	
4/23/24 11:05	20.99	0.20	
4/23/24 11:06	21.00	0.20	
4/23/24 11:07	20.99	0.19	
4/23/24 11:08	20.99	0.20	
4/23/24 11:09	20.99	0.21	
4/23/24 11:10	20.99	0.19	
4/23/24 11:11	20.99	0.19	
4/23/24 11:12	20.99	0.19	
4/23/24 11:13	20.99	0.19	
4/23/24 11:14	20.99	0.20	
4/23/24 11:15	20.98	0.19	



Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 11:16	20.97	0.20	
4/23/24 11:17	20.97	0.20	
4/23/24 11:18	20.92	0.20	
4/23/24 11:19	20.91	0.20	
4/23/24 11:20	20.91	0.20	
4/23/24 11:21	20.91	0.20	
4/23/24 11:22	20.91	0.20	
4/23/24 11:23	20.91	0.20	
4/23/24 11:24	20.91	0.20	
4/23/24 11:25	20.92	0.19	
4/23/24 11:26	20.91	0.19	
4/23/24 11:27	20.91	0.20	
4/23/24 11:28	20.92	0.20	
4/23/24 11:29	20.92	0.20	
4/23/24 11:30	20.91	0.20	
4/23/24 11:31	20.90	0.20	
4/23/24 11:32	20.90	0.20	
4/23/24 11:33	20.90	0.20	
4/23/24 11:34	20.89	0.20	
4/23/24 11:35	20.89	0.20	
4/23/24 11:36	20.88	0.21	
4/23/24 11:37	20.88	0.21	
4/23/24 11:38	20.89	0.21	
4/23/24 11:39	20.87	0.21	
4/23/24 11:40	20.87	0.21	
4/23/24 11:41	20.87	0.20	
4/23/24 11:42	20.87	0.21	
4/23/24 11:43	20.85	0.21	
4/23/24 11:44	20.86	0.21	
4/23/24 11:45	19.35	0.21	
4/23/24 11:46	5.04	2.24	
4/23/24 11:47	10.84	4.45	
4/23/24 11:48	12.07	4.86	
4/23/24 11:49	12.29	4.92	
4/23/24 11:50	12.33	4.93	Run 1
4/23/24 11:51	12.37	4.91	
4/23/24 11:52	12.35	4.92	
4/23/24 11:53	12.35	4.92	
4/23/24 11:54	12.35	4.93	
4/23/24 11:55	12.33	4.93	
4/23/24 11:56	12.33	4.92	
4/23/24 11:57	12.34	4.92	
4/23/24 11:58	12.33	4.92	
4/23/24 11:59	12.32	4.92	
4/23/24 12:00	12.32	4.92	
4/23/24 12:01	12.31	4.92	
4/23/24 12:02	12.30	4.93	
4/23/24 12:03	12.30	4.94	
4/23/24 12:04	12.34	4.91	
4/23/24 12:05	12.34	4.92	
4/23/24 12:06	12.35	4.92	
4/23/24 12:07	12.36	4.91	
4/23/24 12:08	12.35	4.91	
4/23/24 12:09	12.35	4.91	
4/23/24 12:10	12.35	4.91	
4/23/24 12:11	12.36	4.90	
4/23/24 12:12	12.36	4.90	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 12:13	12.34	4.92	
4/23/24 12:14	12.34	4.91	
4/23/24 12:15	12.36	4.90	
4/23/24 12:16	12.35	4.90	
4/23/24 12:17	12.36	4.89	
4/23/24 12:18	12.38	4.88	
4/23/24 12:19	12.37	4.89	
4/23/24 12:20	12.36	4.89	
4/23/24 12:21	12.36	4.88	
4/23/24 12:22	12.37	4.88	
4/23/24 12:23	12.36	4.88	
4/23/24 12:24	12.36	4.88	
4/23/24 12:25	12.36	4.87	
4/23/24 12:26	12.43	4.82	
4/23/24 12:27	12.31	4.91	
4/23/24 12:28	12.13	5.01	
4/23/24 12:29	12.23	4.95	
4/23/24 12:30	12.40	4.86	
4/23/24 12:31	12.49	4.81	
4/23/24 12:32	12.46	4.81	
4/23/24 12:33	12.45	4.81	
4/23/24 12:34	12.42	4.83	
4/23/24 12:35	12.38	4.86	
4/23/24 12:36	12.34	4.87	
4/23/24 12:37	12.39	4.85	
4/23/24 12:38	12.44	4.82	
4/23/24 12:39	12.48	4.80	
4/23/24 12:40	12.47	4.81	
4/23/24 12:41	12.44	4.83	
4/23/24 12:42	12.42	4.83	
4/23/24 12:43	12.44	4.82	
4/23/24 12:44	12.47	4.81	
4/23/24 12:45	12.47	4.81	
4/23/24 12:46	12.48	4.80	
4/23/24 12:47	12.46	4.81	
4/23/24 12:48	12.45	4.81	
4/23/24 12:49	12.43	4.82	
4/23/24 12:50	12.40	4.84	
4/23/24 12:51	12.39	4.84	
4/23/24 12:52	12.39	4.84	
4/23/24 12:53	12.39	4.84	
4/23/24 12:54	12.36	4.86	
4/23/24 12:55	12.36	4.85	
4/23/24 12:56	12.37	4.85	
4/23/24 12:57	12.38	4.85	
4/23/24 12:58	12.42	4.83	
4/23/24 12:59	12.40	4.84	
4/23/24 13:00	12.37	4.86	
4/23/24 13:01	12.37	4.86	
4/23/24 13:02	12.37	4.86	
4/23/24 13:03	12.39	4.85	
4/23/24 13:04	12.41	4.85	
4/23/24 13:05	12.41	4.84	
4/23/24 13:06	12.40	4.85	
4/23/24 13:07	12.38	4.85	
4/23/24 13:08	12.37	4.86	
4/23/24 13:09	12.37	4.86	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 13:10	12.40	4.85	
4/23/24 13:11	12.41	4.85	
4/23/24 13:12	12.38	4.86	
4/23/24 13:13	12.37	4.86	
4/23/24 13:14	12.40	4.85	
4/23/24 13:15	12.40	4.85	
4/23/24 13:16	12.38	4.86	
4/23/24 13:17	12.37	4.86	
4/23/24 13:18	12.41	4.84	
4/23/24 13:19	12.40	4.84	
4/23/24 13:20	12.35	4.87	
4/23/24 13:21	12.34	4.88	
4/23/24 13:22	12.37	4.87	
4/23/24 13:23	12.39	4.86	
4/23/24 13:24	12.38	4.85	
4/23/24 13:25	12.38	4.85	
4/23/24 13:26	12.39	4.84	
4/23/24 13:27	12.43	4.83	
4/23/24 13:28	12.43	4.82	
4/23/24 13:29	12.40	4.84	
4/23/24 13:30	12.41	4.84	
4/23/24 13:31	12.43	4.84	
4/23/24 13:32	12.43	4.84	
4/23/24 13:33	12.39	4.86	
4/23/24 13:34	12.34	4.90	
4/23/24 13:35	12.26	4.95	
4/23/24 13:36	12.21	4.97	
4/23/24 13:37	12.29	4.92	
4/23/24 13:38	12.32	4.91	
4/23/24 13:39	12.29	4.92	
4/23/24 13:40	12.24	4.95	
4/23/24 13:41	12.35	4.88	
4/23/24 13:42	12.49	4.81	
4/23/24 13:43	12.54	4.80	
4/23/24 13:44	12.57	4.77	
4/23/24 13:45	12.51	4.80	
4/23/24 13:46	12.52	4.80	
4/23/24 13:47	12.53	4.80	
4/23/24 13:48	12.49	4.82	
4/23/24 13:49	12.51	4.80	
4/23/24 13:50	12.52	4.79	
4/23/24 13:51	12.51	4.80	
4/23/24 13:52	12.46	4.83	
4/23/24 13:53	12.42	4.85	
4/23/24 13:54	12.41	4.84	
4/23/24 13:55	12.49	4.81	
4/23/24 13:56	12.47	4.82	
4/23/24 13:57	12.47	4.82	
4/23/24 13:58	12.51	4.80	
4/23/24 13:59	12.53	4.80	
4/23/24 14:00	12.52	4.80	
4/23/24 14:01	12.50	4.80	
4/23/24 14:02	12.49	4.80	
4/23/24 14:03	12.46	4.83	
4/23/24 14:04	12.45	4.85	
4/23/24 14:05	12.50	4.82	
4/23/24 14:06	12.54	4.80	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 14:07	12.57	4.77	
4/23/24 14:08	12.55	4.79	
4/23/24 14:09	12.53	4.80	
4/23/24 14:10	12.51	4.82	
4/23/24 14:11	12.52	4.81	
4/23/24 14:12	12.50	4.81	
4/23/24 14:13	<u>12.54</u>	4.80	
4/23/24 14:14	12.53	4.80	
4/23/24 14:15	12.49	4.83	
4/23/24 14:16	12.52	4.81	
4/23/24 14:17	12.51	4.82	
4/23/24 14:18	12.50	4.83	
4/23/24 14:19	12.46	4.85	
4/23/24 14:20	12.47	4.85	
4/23/24 14:21	12.48	4.85	
4/23/24 14:22	12.45	4.86	
4/23/24 14:23	12.47	4.84	
4/23/24 14:24	12.46	4.85	
4/23/24 14:25	12.43	4.86	
4/23/24 14:26	12.43	4.86	
4/23/24 14:27	12.43	4.86	
4/23/24 14:28	12.43	4.87	
4/23/24 14:29	12.45	4.85	
4/23/24 14:30	12.43	4.86	
4/23/24 14:31	12.41	4.87	
4/23/24 14:32	12.41	4.87	
4/23/24 14:33	12.41	4.87	
4/23/24 14:34	12.40	4.87	
4/23/24 14:35	12.38	4.88	
4/23/24 14:36	12.38	4.88	
4/23/24 14:37	12.40	4.86	
4/23/24 14:38	12.39	4.87	
4/23/24 14:39	12.42	4.86	
4/23/24 14:40	12.41	4.87	
4/23/24 14:41	12.42	4.86	
4/23/24 14:42	12.40	4.87	
4/23/24 14:43	12.39	4.88	
4/23/24 14:44	12.41	4.87	
4/23/24 14:45	12.42	4.86	
4/23/24 14:46	12.40	4.88	
4/23/24 14:47	12.40	4.88	
4/23/24 14:48	12.43	4.85	
4/23/24 14:49	12.42	4.86	
4/23/24 14:50	12.44	4.85	
4/23/24 14:51	12.41	4.86	
4/23/24 14:52	12.40	4.87	
4/23/24 14:53	12.38	4.87	
4/23/24 14:54	12.41	4.85	
4/23/24 14:55	12.41	4.85	
4/23/24 14:56	12.40	4.85	
4/23/24 14:57	12.40	4.85	
4/23/24 14:58	12.42	4.84	
4/23/24 14:59	12.41	4.84	
4/23/24 15:00	12.40	4.84	
4/23/24 15:01	12.38	4.85	
4/23/24 15:02	12.37	4.86	
4/23/24 15:03	12.38	4.85	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 15:04	12.41	4.83	
4/23/24 15:05	12.41	4.83	
4/23/24 15:06	12.40	4.83	
4/23/24 15:07	12.41	4.83	
4/23/24 15:08	12.40	4.83	
4/23/24 15:09	12.42	4.82	
4/23/24 15:10	12.41	4.82	
4/23/24 15:11	12.41	4.82	
4/23/24 15:12	12.39	4.83	
4/23/24 15:13	12.41	4.83	
4/23/24 15:14	12.40	4.82	
4/23/24 15:15	12.40	4.83	
4/23/24 15:16	12.36	4.86	
4/23/24 15:17	12.31	4.88	
4/23/24 15:18	12.29	4.90	
4/23/24 15:19	12.34	4.89	
4/23/24 15:20	12.37	4.86	
4/23/24 15:21	12.40	4.85	
4/23/24 15:22	12.41	4.84	
4/23/24 15:23	12.43	4.82	
4/23/24 15:24	12.42	4.84	
4/23/24 15:25	12.43	4.83	
4/23/24 15:26	12.44	4.83	
4/23/24 15:27	12.44	4.83	
4/23/24 15:28	12.44	4.83	
4/23/24 15:29	12.41	4.84	
4/23/24 15:30	12.42	4.84	
4/23/24 15:31	12.42	4.84	
4/23/24 15:32	12.42	4.85	
4/23/24 15:33	12.46	4.83	
4/23/24 15:34	12.45	4.85	
4/23/24 15:35	12.43	4.86	
4/23/24 15:36	12.44	4.86	
4/23/24 15:37	12.41	4.87	
4/23/24 15:38	12.45	4.85	
4/23/24 15:39	12.46	4.83	
4/23/24 15:40	12.45	4.84	
4/23/24 15:41	12.42	4.85	
4/23/24 15:42	12.42	4.84	
4/23/24 15:43	12.48	4.80	
4/23/24 15:44	12.44	4.81	
4/23/24 15:45	12.38	4.85	
4/23/24 15:46	12.34	4.86	
4/23/24 15:47	12.35	4.87	
4/23/24 15:48	12.42	4.83	
4/23/24 15:49	12.43	4.83	
4/23/24 15:50	12.44	4.83	
4/23/24 15:51	12.42	4.85	
4/23/24 15:52	12.42	4.85	
4/23/24 15:53	12.43	4.84	
4/23/24 15:54	12.41	4.85	
4/23/24 15:55	12.39	4.86	
4/23/24 15:56	12.41	4.85	
4/23/24 15:57	12.36	4.88	
4/23/24 15:58	12.36	4.88	
4/23/24 15:59	12.36	4.88	End
4/23/24 16:00	12.36	4.88	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/23/24 16:01	12.34	4.90	
4/23/24 16:02	15.50	3.09	
4/23/24 16:03	10.84	0.20	
4/23/24 16:04	-0.04	0.10	
4/23/24 16:05	-0.04	0.10	
4/23/24 16:06	9.16	8.41	
4/23/24 16:07	10.95	11.13	
4/23/24 16:08	10.96	11.13	
4/23/24 16:09	12.58	9.17	
4/23/24 16:10	21.03	0.20	
4/23/24 16:11	20.98	0.22	
4/23/24 16:12	20.96	0.23	
4/23/24 16:13	20.95	0.23	
4/24/24 7:29	21.00	0.22	
4/24/24 7:30	5.44	0.13	
4/24/24 7:31	-0.03	-0.01	Cal
4/24/24 7:32	12.18	11.93	
4/24/24 7:33	22.07	21.98	
4/24/24 7:34	22.04	21.99	
4/24/24 7:35	13.51	13.32	
4/24/24 7:36	11.04	11.09	
4/24/24 7:37	6.64	5.93	
4/24/24 7:38	0.00	-0.03	Bias
4/24/24 7:39	7.96	8.09	
4/24/24 7:40	10.98	11.10	
4/24/24 7:41	16.72	4.40	
4/24/24 7:42	20.63	0.09	
4/24/24 7:43	20.61	0.10	
4/24/24 7:44	20.60	0.11	
4/24/24 7:45	20.60	0.11	
4/24/24 7:46	20.60	0.11	
4/24/24 7:47	20.61	0.11	
4/24/24 7:48	20.61	0.12	
4/24/24 7:49	20.61	0.11	
4/24/24 7:50	20.62	0.11	
4/24/24 7:51	20.62	0.11	
4/24/24 7:52	20.63	0.11	
4/24/24 7:53	20.63	0.11	
4/24/24 7:54	20.63	0.11	
4/24/24 7:55	20.63	0.11	
4/24/24 7:56	20.64	0.11	
4/24/24 7:57	20.64	0.11	
4/24/24 7:58	20.64	0.11	
4/24/24 7:59	20.65	0.11	
4/24/24 8:00	20.65	0.11	
4/24/24 8:01	20.65	0.11	
4/24/24 8:02	20.64	0.11	
4/24/24 8:03	20.64	0.11	
4/24/24 8:04	20.64	0.11	
4/24/24 8:05	20.65	0.11	
4/24/24 8:06	20.64	0.10	
4/24/24 8:07	20.64	0.10	
4/24/24 8:08	20.64	0.10	
4/24/24 8:09	20.64	0.10	
4/24/24 8:10	20.65	0.10	
4/24/24 8:11	20.65	0.10	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 8:12	20.66	0.10	
4/24/24 8:13	20.67	0.10	
4/24/24 8:14	20.67	0.10	
4/24/24 8:15	20.68	0.10	
4/24/24 8:16	20.67	0.10	
4/24/24 8:17	20.68	0.10	
4/24/24 8:18	17.95	0.10	
4/24/24 8:19	5.02	2.04	
4/24/24 8:20	11.71	4.24	
4/24/24 8:21	12.64	4.57	
4/24/24 8:22	12.44	4.80	
4/24/24 8:23	12.40	4.84	
4/24/24 8:24	12.38	4.85	
4/24/24 8:25	12.36	4.86	
4/24/24 8:26	12.35	4.86	
4/24/24 8:27	12.37	4.84	Run 2
4/24/24 8:28	12.37	4.84	
4/24/24 8:29	12.37	4.84	
4/24/24 8:30	12.39	4.83	
4/24/24 8:31	12.39	4.83	
4/24/24 8:32	12.41	4.81	
4/24/24 8:33	12.40	4.82	
4/24/24 8:34	12.39	4.83	
4/24/24 8:35	12.38	4.84	
4/24/24 8:36	12.37	4.84	
4/24/24 8:37	12.37	4.84	
4/24/24 8:38	12.39	4.83	
4/24/24 8:39	12.40	4.82	
4/24/24 8:40	12.38	4.83	
4/24/24 8:41	12.39	4.82	
4/24/24 8:42	12.40	4.82	
4/24/24 8:43	12.37	4.83	
4/24/24 8:44	12.37	4.84	
4/24/24 8:45	12.37	4.83	
4/24/24 8:46	12.36	4.84	
4/24/24 8:47	12.37	4.84	
4/24/24 8:48	12.39	4.83	
4/24/24 8:49	12.38	4.84	
4/24/24 8:50	12.38	4.84	
4/24/24 8:51	12.40	4.83	
4/24/24 8:52	12.39	4.83	
4/24/24 8:53	12.40	4.82	
4/24/24 8:54	12.40	4.82	
4/24/24 8:55	12.38	4.83	
4/24/24 8:56	12.38	4.83	
4/24/24 8:57	12.40	4.82	
4/24/24 8:58	12.38	4.84	
4/24/24 8:59	12.36	4.84	
4/24/24 9:00	12.35	4.85	
4/24/24 9:01	12.38	4.83	
4/24/24 9:02	12.37	4.83	
4/24/24 9:03	12.37	4.83	
4/24/24 9:04	12.37	4.83	
4/24/24 9:05	12.40	4.81	
4/24/24 9:06	12.41	4.80	
4/24/24 9:07	12.41	4.80	
4/24/24 9:08	12.39	4.81	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 9:09	12.39	4.81	
4/24/24 9:10	12.38	4.82	
4/24/24 9:11	12.37	4.82	
4/24/24 9:12	12.39	4.81	
4/24/24 9:13	12.40	4.81	
4/24/24 9:14	12.38	4.82	
4/24/24 9:15	12.37	4.82	
4/24/24 9:16	12.38	4.82	
4/24/24 9:17	12.38	4.82	
4/24/24 9:18	12.37	4.82	
4/24/24 9:19	12.37	4.82	
4/24/24 9:20	12.41	4.80	
4/24/24 9:21	12.39	4.81	
4/24/24 9:22	12.39	4.81	
4/24/24 9:23	12.39	4.82	
4/24/24 9:24	12.41	4.81	
4/24/24 9:25	12.42	4.81	
4/24/24 9:26	12.43	4.80	
4/24/24 9:27	12.42	4.80	
4/24/24 9:28	12.40	4.82	
4/24/24 9:29	12.37	4.83	
4/24/24 9:30	12.37	4.84	
4/24/24 9:31	12.41	4.82	
4/24/24 9:32	12.40	4.82	
4/24/24 9:33	12.43	4.80	
4/24/24 9:34	12.41	4.81	
4/24/24 9:35	12.41	4.81	
4/24/24 9:36	12.42	4.81	
4/24/24 9:37	12.39	4.82	
4/24/24 9:38	12.39	4.82	
4/24/24 9:39	12.44	4.79	
4/24/24 9:40	12.43	4.80	
4/24/24 9:41	12.43	4.80	
4/24/24 9:42	12.41	4.80	
4/24/24 9:43	12.40	4.81	
4/24/24 9:44	12.40	4.81	
4/24/24 9:45	12.39	4.82	
4/24/24 9:46	12.41	4.81	
4/24/24 9:47	12.41	4.80	
4/24/24 9:48	12.39	4.81	
4/24/24 9:49	12.40	4.80	
4/24/24 9:50	12.42	4.79	
4/24/24 9:51	12.40	4.81	
4/24/24 9:52	12.39	4.81	
4/24/24 9:53	12.36	4.83	
4/24/24 9:54	12.35	4.83	
4/24/24 9:55	12.39	4.81	
4/24/24 9:56	12.40	4.81	
4/24/24 9:57	12.42	4.79	
4/24/24 9:58	12.41	4.79	
4/24/24 9:59	12.40	4.79	
4/24/24 10:00	12.41	4.80	
4/24/24 10:01	12.41	4.80	
4/24/24 10:02	12.41	4.80	
4/24/24 10:03	12.40	4.80	
4/24/24 10:04	12.40	4.79	
4/24/24 10:05	12.42	4.78	



Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 10:06	12.41	4.79	
4/24/24 10:07	12.37	4.81	
4/24/24 10:08	12.38	4.81	
4/24/24 10:09	12.41	4.81	
4/24/24 10:10	12.41	4.80	
4/24/24 10:11	12.41	4.80	
4/24/24 10:12	12.40	4.80	
4/24/24 10:13	12.38	4.81	
4/24/24 10:14	12.41	4.80	
4/24/24 10:15	12.43	4.79	
4/24/24 10:16	12.42	4.80	
4/24/24 10:17	12.41	4.80	
4/24/24 10:18	12.40	4.81	
4/24/24 10:19	12.41	4.80	
4/24/24 10:20	12.43	4.79	
4/24/24 10:21	12.39	4.81	
4/24/24 10:22	12.39	4.80	
4/24/24 10:23	12.43	4.78	
4/24/24 10:24	12.42	4.79	
4/24/24 10:25	12.44	4.77	
4/24/24 10:26	12.43	4.78	
4/24/24 10:27	12.40	4.79	
4/24/24 10:28	12.42	4.78	
4/24/24 10:29	12.42	4.78	
4/24/24 10:30	12.38	4.80	
4/24/24 10:31	12.41	4.79	
4/24/24 10:32	12.42	4.79	
4/24/24 10:33	12.39	4.81	
4/24/24 10:34	12.38	4.82	
4/24/24 10:35	12.38	4.82	
4/24/24 10:36	12.39	4.81	
4/24/24 10:37	12.42	4.80	
4/24/24 10:38	12.40	4.81	
4/24/24 10:39	12.40	4.81	
4/24/24 10:40	12.40	4.81	
4/24/24 10:41	12.39	4.82	
4/24/24 10:42	12.37	4.82	
4/24/24 10:43	12.40	4.81	
4/24/24 10:44	12.37	4.83	
4/24/24 10:45	12.38	4.83	
4/24/24 10:46	12.39	4.81	
4/24/24 10:47	12.38	4.82	
4/24/24 10:48	12.36	4.83	
4/24/24 10:49	12.35	4.84	
4/24/24 10:50	12.35	4.84	
4/24/24 10:51	12.36	4.83	
4/24/24 10:52	12.39	4.81	
4/24/24 10:53	12.35	4.83	
4/24/24 10:54	12.39	4.81	
4/24/24 10:55	12.39	4.81	
4/24/24 10:56	12.40	4.81	
4/24/24 10:57	12.41	4.80	
4/24/24 10:58	12.44	4.79	
4/24/24 10:59	12.41	4.80	
4/24/24 11:00	12.44	4.79	
4/24/24 11:01	12.44	4.79	
4/24/24 11:02	12.42	4.80	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 11:03	12.44	4.80	
4/24/24 11:04	12.43	4.80	
4/24/24 11:05	12.40	4.82	
4/24/24 11:06	12.42	4.80	
4/24/24 11:07	12.41	4.81	
4/24/24 11:08	12.40	4.82	
4/24/24 11:09	12.42	4.81	
4/24/24 11:10	12.40	4.82	
4/24/24 11:11	12.37	4.83	
4/24/24 11:12	12.37	4.83	
4/24/24 11:13	12.37	4.83	
4/24/24 11:14	12.36	4.83	
4/24/24 11:15	12.37	4.83	
4/24/24 11:16	12.41	4.80	
4/24/24 11:17	12.37	4.82	
4/24/24 11:18	12.38	4.82	
4/24/24 11:19	12.38	4.82	
4/24/24 11:20	12.39	4.81	
4/24/24 11:21	12.41	4.80	
4/24/24 11:22	12.41	4.80	
4/24/24 11:23	12.41	4.80	
4/24/24 11:24	12.38	4.81	
4/24/24 11:25	12.42	4.79	
4/24/24 11:26	12.40	4.80	
4/24/24 11:27	12.42	4.79	
4/24/24 11:28	12.42	4.79	
4/24/24 11:29	12.38	4.81	
4/24/24 11:30	12.39	4.81	
4/24/24 11:31	12.41	4.80	
4/24/24 11:32	12.42	4.80	
4/24/24 11:33	12.42	4.80	
4/24/24 11:34	12.44	4.79	
4/24/24 11:35	12.42	4.80	
4/24/24 11:36	12.43	4.80	
4/24/24 11:37	12.41	4.80	
4/24/24 11:38	12.45	4.79	
4/24/24 11:39	12.44	4.79	
4/24/24 11:40	12.41	4.81	
4/24/24 11:41	12.40	4.81	
4/24/24 11:42	12.40	4.82	
4/24/24 11:43	12.39	4.82	
4/24/24 11:44	12.40	4.81	
4/24/24 11:45	12.41	4.81	
4/24/24 11:46	12.42	4.80	
4/24/24 11:47	12.43	4.80	
4/24/24 11:48	12.43	4.81	
4/24/24 11:49	12.41	4.81	
4/24/24 11:50	12.42	4.80	
4/24/24 11:51	12.41	4.81	
4/24/24 11:52	12.42	4.80	
4/24/24 11:53	12.40	4.81	
4/24/24 11:54	12.41	4.80	
4/24/24 11:55	12.43	4.79	
4/24/24 11:56	12.43	4.79	
4/24/24 11:57	12.44	4.78	
4/24/24 11:58	12.43	4.79	
4/24/24 11:59	12.43	4.79	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 12:00	12.46	4.77	
4/24/24 12:01	12.44	4.78	
4/24/24 12:02	12.47	4.77	
4/24/24 12:03	12.47	4.77	
4/24/24 12:04	12.44	4.79	
4/24/24 12:05	12.43	4.80	
4/24/24 12:06	12.44	4.79	
4/24/24 12:07	12.45	4.78	
4/24/24 12:08	12.45	4.79	
4/24/24 12:09	12.47	4.77	
4/24/24 12:10	12.46	4.77	
4/24/24 12:11	12.44	4.79	
4/24/24 12:12	12.46	4.77	
4/24/24 12:13	12.45	4.77	
4/24/24 12:14	12.45	4.78	
4/24/24 12:15	12.44	4.78	
4/24/24 12:16	12.43	4.78	
4/24/24 12:17	12.44	4.78	
4/24/24 12:18	12.44	4.78	
4/24/24 12:19	12.48	4.76	
4/24/24 12:20	12.45	4.78	
4/24/24 12:21	12.44	4.78	
4/24/24 12:22	12.45	4.78	
4/24/24 12:23	12.46	4.77	
4/24/24 12:24	12.46	4.77	
4/24/24 12:25	12.46	4.77	
4/24/24 12:26	12.44	4.79	
4/24/24 12:27	12.46	4.78	
4/24/24 12:28	12.44	4.79	
4/24/24 12:29	12.43	4.79	
4/24/24 12:30	12.44	4.80	
4/24/24 12:31	12.46	4.78	
4/24/24 12:32	12.45	4.79	
4/24/24 12:33	12.45	4.79	
4/24/24 12:34	12.45	4.79	
4/24/24 12:35	12.49	4.77	
4/24/24 12:36	12.96	4.03	
4/24/24 12:37	6.09	-0.02	
4/24/24 12:38	0.00	-0.03	
4/24/24 12:39	0.00	-0.03	
4/24/24 12:40	-0.01	-0.03	
4/24/24 12:41	4.33	4.07	
4/24/24 12:42	10.99	11.29	
4/24/24 12:43	10.99	11.28	
4/24/24 12:44	10.65	10.98	
4/24/24 12:45	12.99	7.98	
4/24/24 12:46	20.46	0.01	
4/24/24 12:47	20.40	0.04	
4/24/24 12:48	20.38	0.04	
4/24/24 12:49	20.39	0.04	
4/24/24 12:50	20.38	0.05	
4/24/24 12:51	20.38	0.05	
4/24/24 12:52	20.38	0.05	
4/24/24 12:53	20.37	0.06	
4/24/24 12:54	20.37	0.06	
4/24/24 12:55	20.39	0.05	
4/24/24 12:56	20.39	0.05	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 12:57	17.91	0.05	
4/24/24 12:58	5.20	2.19	
4/24/24 12:59	10.80	4.30	
4/24/24 13:00	11.93	4.70	
4/24/24 13:01	12.12	4.74	
4/24/24 13:02	12.13	4.75	
4/24/24 13:03	12.12	4.76	Run 3
4/24/24 13:04	12.14	4.74	
4/24/24 13:05	12.14	4.74	
4/24/24 13:06	12.13	4.75	
4/24/24 13:07	12.13	4.75	
4/24/24 13:08	12.12	4.75	
4/24/24 13:09	12.11	4.75	
4/24/24 13:10	12.12	4.74	
4/24/24 13:11	12.10	4.76	
4/24/24 13:12	12.10	4.75	
4/24/24 13:13	12.11	4.75	
4/24/24 13:14	12.13	4.74	
4/24/24 13:15	12.12	4.74	
4/24/24 13:16	12.10	4.75	
4/24/24 13:17	12.07	4.77	
4/24/24 13:18	12.08	4.76	
4/24/24 13:19	12.09	4.76	
4/24/24 13:20	12.10	4.75	
4/24/24 13:21	12.11	4.74	
4/24/24 13:22	12.09	4.76	
4/24/24 13:23	12.11	4.75	
4/24/24 13:24	12.12	4.75	
4/24/24 13:25	12.11	4.75	
4/24/24 13:26	12.12	4.75	
4/24/24 13:27	12.11	4.75	
4/24/24 13:28	12.10	4.76	
4/24/24 13:29	12.13	4.75	
4/24/24 13:30	12.13	4.75	
4/24/24 13:31	12.11	4.76	
4/24/24 13:32	12.13	4.75	
4/24/24 13:33	12.11	4.76	
4/24/24 13:34	12.12	4.76	
4/24/24 13:35	12.12	4.76	
4/24/24 13:36	12.11	4.76	
4/24/24 13:37	12.10	4.77	
4/24/24 13:38	12.10	4.76	
4/24/24 13:39	12.11	4.76	
4/24/24 13:40	12.12	4.75	
4/24/24 13:41	12.10	4.76	
4/24/24 13:42	12.10	4.76	
4/24/24 13:43	12.11	4.77	
4/24/24 13:44	12.16	4.74	
4/24/24 13:45	12.14	4.74	
4/24/24 13:46	12.16	4.73	
4/24/24 13:47	12.15	4.75	
4/24/24 13:48	12.16	4.74	
4/24/24 13:49	12.13	4.76	
4/24/24 13:50	12.11	4.76	
4/24/24 13:51	12.11	4.77	
4/24/24 13:52	12.10	4.77	
4/24/24 13:53	12.09	4.78	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 13:54	12.11	4.77	
4/24/24 13:55	12.12	4.77	
4/24/24 13:56	12.10	4.78	
4/24/24 13:57	12.05	4.81	
4/24/24 13:58	12.05	4.81	
4/24/24 13:59	12.08	4.79	
4/24/24 14:00	12.09	4.78	
4/24/24 14:01	12.09	4.79	
4/24/24 14:02	12.12	4.78	
4/24/24 14:03	12.11	4.78	
4/24/24 14:04	12.10	4.79	
4/24/24 14:05	12.10	4.79	
4/24/24 14:06	12.11	4.78	
4/24/24 14:07	12.12	4.78	
4/24/24 14:08	12.10	4.79	
4/24/24 14:09	12.13	4.77	
4/24/24 14:10	12.12	4.77	
4/24/24 14:11	12.13	4.76	
4/24/24 14:12	12.12	4.76	
4/24/24 14:13	12.14	4.75	
4/24/24 14:14	12.14	4.75	
4/24/24 14:15	12.08	4.79	
4/24/24 14:16	12.04	4.81	
4/24/24 14:17	12.07	4.80	
4/24/24 14:18	12.11	4.78	
4/24/24 14:19	12.14	4.76	
4/24/24 14:20	12.11	4.78	
4/24/24 14:21	12.08	4.79	
4/24/24 14:22	12.07	4.79	
4/24/24 14:23	12.06	4.80	
4/24/24 14:24	12.06	4.80	
4/24/24 14:25	12.05	4.80	
4/24/24 14:26	12.06	4.81	
4/24/24 14:27	12.06	4.80	
4/24/24 14:28	12.05	4.80	
4/24/24 14:29	12.05	4.80	
4/24/24 14:30	12.05	4.79	
4/24/24 14:31	12.10	4.77	
4/24/24 14:32	12.08	4.77	
4/24/24 14:33	12.09	4.77	
4/24/24 14:34	12.07	4.77	
4/24/24 14:35	12.08	4.76	
4/24/24 14:36	12.06	4.77	
4/24/24 14:37	12.05	4.78	
4/24/24 14:38	12.04	4.79	
4/24/24 14:39	12.05	4.78	
4/24/24 14:40	12.04	4.79	
4/24/24 14:41	12.05	4.78	
4/24/24 14:42	12.04	4.78	
4/24/24 14:43	12.02	4.79	
4/24/24 14:44	12.05	4.78	
4/24/24 14:45	12.05	4.78	
4/24/24 14:46	12.03	4.79	
4/24/24 14:47	12.03	4.79	
4/24/24 14:48	12.06	4.76	
4/24/24 14:49	12.05	4.77	
4/24/24 14:50	12.05	4.78	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 14:51	12.03	4.79	
4/24/24 14:52	12.02	4.80	
4/24/24 14:53	12.03	4.80	
4/24/24 14:54	12.05	4.79	
4/24/24 14:55	12.04	4.79	
4/24/24 14:56	12.03	4.79	
4/24/24 14:57	12.06	4.78	
4/24/24 14:58	12.04	4.79	
4/24/24 14:59	12.03	4.79	
4/24/24 15:00	12.03	4.79	
4/24/24 15:01	12.06	4.77	
4/24/24 15:02	12.06	4.76	
4/24/24 15:03	12.07	4.76	
4/24/24 15:04	12.05	4.77	
4/24/24 15:05	12.07	4.75	
4/24/24 15:06	12.08	4.75	
4/24/24 15:07	12.09	4.74	
4/24/24 15:08	12.10	4.73	
4/24/24 15:09	12.11	4.73	
4/24/24 15:10	12.05	4.77	
4/24/24 15:11	12.08	4.75	
4/24/24 15:12	12.07	4.76	
4/24/24 15:13	12.06	4.76	
4/24/24 15:14	12.08	4.75	
4/24/24 15:15	12.07	4.75	
4/24/24 15:16	12.05	4.76	
4/24/24 15:17	12.05	4.77	
4/24/24 15:18	12.05	4.77	
4/24/24 15:19	12.07	4.76	
4/24/24 15:20	12.03	4.79	
4/24/24 15:21	12.07	4.77	
4/24/24 15:22	12.11	4.74	
4/24/24 15:23	12.12	4.74	
4/24/24 15:24	12.12	4.74	
4/24/24 15:25	12.10	4.75	
4/24/24 15:26	12.10	4.75	
4/24/24 15:27	12.07	4.76	
4/24/24 15:28	12.07	4.75	
4/24/24 15:29	12.07	4.76	
4/24/24 15:30	12.05	4.77	
4/24/24 15:31	12.04	4.77	
4/24/24 15:32	12.03	4.78	
4/24/24 15:33	12.03	4.77	
4/24/24 15:34	12.05	4.77	
4/24/24 15:35	12.04	4.77	
4/24/24 15:36	12.04	4.77	
4/24/24 15:37	12.04	4.76	
4/24/24 15:38	12.05	4.75	
4/24/24 15:39	12.04	4.77	
4/24/24 15:40	12.04	4.77	
4/24/24 15:41	12.05	4.77	
4/24/24 15:42	12.08	4.75	
4/24/24 15:43	12.04	4.78	
4/24/24 15:44	12.06	4.76	
4/24/24 15:45	12.08	4.75	
4/24/24 15:46	12.05	4.76	
4/24/24 15:47	12.06	4.75	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 15:48	12.05	4.76	
4/24/24 15:49	12.02	4.78	
4/24/24 15:50	12.03	4.77	
4/24/24 15:51	12.02	4.78	
4/24/24 15:52	12.02	4.79	
4/24/24 15:53	12.05	4.77	
4/24/24 15:54	12.02	4.79	
4/24/24 15:55	12.03	4.79	
4/24/24 15:56	12.09	4.76	
4/24/24 15:57	12.08	4.77	
4/24/24 15:58	12.06	4.78	
4/24/24 15:59	12.05	4.79	
4/24/24 16:00	12.06	4.78	
4/24/24 16:01	12.06	4.79	
4/24/24 16:02	12.05	4.79	
4/24/24 16:03	12.06	4.79	
4/24/24 16:04	12.03	4.80	
4/24/24 16:05	12.06	4.78	
4/24/24 16:06	12.09	4.76	
4/24/24 16:07	12.06	4.77	
4/24/24 16:08	12.05	4.78	
4/24/24 16:09	12.06	4.77	
4/24/24 16:10	12.05	4.78	
4/24/24 16:11	12.05	4.78	
4/24/24 16:12	12.05	4.79	
4/24/24 16:13	12.02	4.81	
4/24/24 16:14	12.02	4.81	
4/24/24 16:15	12.00	4.81	
4/24/24 16:16	12.01	4.80	
4/24/24 16:17	12.05	4.78	
4/24/24 16:18	12.03	4.80	
4/24/24 16:19	12.04	4.80	
4/24/24 16:20	12.07	4.77	
4/24/24 16:21	12.06	4.78	
4/24/24 16:22	12.11	4.75	
4/24/24 16:23	12.14	4.73	
4/24/24 16:24	12.13	4.73	
4/24/24 16:25	12.17	4.71	
4/24/24 16:26	12.18	4.71	
4/24/24 16:27	12.16	4.73	
4/24/24 16:28	12.17	4.72	
4/24/24 16:29	12.15	4.73	
4/24/24 16:30	12.13	4.75	
4/24/24 16:31	12.09	4.77	
4/24/24 16:32	12.07	4.78	
4/24/24 16:33	12.03	4.81	
4/24/24 16:34	12.03	4.80	
4/24/24 16:35	12.03	4.80	
4/24/24 16:36	12.05	4.79	
4/24/24 16:37	12.07	4.77	
4/24/24 16:38	12.05	4.77	
4/24/24 16:39	12.05	4.78	
4/24/24 16:40	12.10	4.75	
4/24/24 16:41	12.16	4.71	
4/24/24 16:42	12.23	4.67	
4/24/24 16:43	12.39	4.58	
4/24/24 16:44	12.23	4.66	

Marathon - Texas City, TX  
SHGP Cogeneration Unit CSV Data

Date/Time	O2	CO2	Notes
4/24/24 16:45	12.18	4.69	
4/24/24 16:46	12.21	4.67	
4/24/24 16:47	12.26	4.65	
4/24/24 16:48	12.29	4.63	
4/24/24 16:49	12.30	4.62	
4/24/24 16:50	12.30	4.63	
4/24/24 16:51	12.30	4.63	
4/24/24 16:52	12.29	4.63	
4/24/24 16:53	12.25	4.65	
4/24/24 16:54	12.20	4.68	
4/24/24 16:55	12.16	4.70	
4/24/24 16:56	12.13	4.72	
4/24/24 16:57	12.11	4.73	
4/24/24 16:58	12.13	4.72	
4/24/24 16:59	12.16	4.70	
4/24/24 17:00	12.15	4.71	
4/24/24 17:01	12.16	4.71	
4/24/24 17:02	12.15	4.71	
4/24/24 17:03	12.20	4.68	
4/24/24 17:04	12.16	4.70	
4/24/24 17:05	12.20	4.68	
4/24/24 17:06	12.19	4.68	
4/24/24 17:07	12.22	4.66	
4/24/24 17:08	12.19	4.68	
4/24/24 17:09	12.23	4.66	
4/24/24 17:10	12.21	4.68	
4/24/24 17:11	12.21	4.68	
4/24/24 17:12	12.18	4.69	
4/24/24 17:13	12.21	4.68	
4/24/24 17:14	12.18	4.68	
4/24/24 17:15	12.21	4.67	
4/24/24 17:16	12.21	4.67	
4/24/24 17:17	12.20	4.68	
4/24/24 17:18	12.34	4.59	
4/24/24 17:19	10.31	0.16	
4/24/24 17:20	-0.04	-0.03	
4/24/24 17:21	2.74	2.77	
4/24/24 17:22	9.90	10.98	
4/24/24 17:23	9.92	11.03	
4/24/24 17:24	9.92	11.02	
4/24/24 17:25	12.94	11.01	
4/24/24 17:26	11.02	11.01	



## Appendix F

Marathon - Texas City  
SHGP Congeneration Unit - Process Data

Description Units	Fuel Flow mscfh	Turbine Firing Rate MMBTUH	Generator Watts MW	Percent Capacity	
24-Apr-24 11:25:00	1788.28	1830.94	166.78	96%	Run 1 Start
24-Apr-24 11:26:00	1795.21	1838.04	167.20	97%	
24-Apr-24 11:27:00	1792.27	1835.03	166.58	96%	
24-Apr-24 11:28:00	1785.67	1828.27	166.51	96%	
24-Apr-24 11:29:00	1781.13	1823.62	166.39	96%	
24-Apr-24 11:30:00	1791.00	1833.73	166.94	97%	
24-Apr-24 11:31:00	1784.38	1826.95	166.59	96%	
24-Apr-24 11:32:00	1786.94	1829.57	166.74	96%	
24-Apr-24 11:33:00	1786.34	1828.95	166.57	96%	
24-Apr-24 11:34:00	1785.80	1828.40	167.03	97%	
24-Apr-24 11:35:00	1792.11	1834.86	167.38	97%	
24-Apr-24 11:36:00	1791.33	1834.06	166.84	96%	
24-Apr-24 11:37:00	1782.31	1824.83	166.15	96%	
24-Apr-24 11:38:00	1787.32	1829.96	167.04	97%	
24-Apr-24 11:39:00	1791.94	1834.69	166.95	97%	
24-Apr-24 11:40:00	1791.13	1833.86	166.94	97%	
24-Apr-24 11:41:00	1783.21	1825.75	166.35	96%	
24-Apr-24 11:42:00	1785.49	1828.09	166.63	96%	
24-Apr-24 11:43:00	1788.56	1831.23	166.78	96%	
24-Apr-24 11:44:00	1783.79	1826.34	166.34	96%	
24-Apr-24 11:45:00	1783.30	1825.84	166.45	96%	
24-Apr-24 11:46:00	1784.43	1827.00	166.56	96%	
24-Apr-24 11:47:00	1782.26	1824.78	166.52	96%	
24-Apr-24 11:48:00	1787.04	1829.67	166.70	96%	
24-Apr-24 11:49:00	1782.00	1824.51	166.05	96%	
24-Apr-24 11:50:00	1782.88	1825.41	166.32	96%	
24-Apr-24 11:51:00	1783.13	1825.67	166.59	96%	
24-Apr-24 11:52:00	1777.77	1820.18	166.13	96%	
24-Apr-24 11:53:00	1774.48	1816.81	165.67	96%	
24-Apr-24 11:54:00	1779.14	1821.59	166.13	96%	
24-Apr-24 11:55:00	1785.85	1828.46	166.31	96%	
24-Apr-24 11:56:00	1776.19	1818.56	165.56	96%	
24-Apr-24 11:57:00	1776.14	1818.51	165.79	96%	
24-Apr-24 11:58:00	1784.98	1827.56	166.94	97%	
24-Apr-24 11:59:00	1779.02	1821.46	166.46	96%	
24-Apr-24 12:00:00	1778.27	1820.69	165.96	96%	
24-Apr-24 12:01:00	1786.20	1828.81	166.85	97%	
24-Apr-24 12:02:00	1786.12	1828.73	166.62	96%	
24-Apr-24 12:03:00	1782.45	1824.97	165.76	96%	
24-Apr-24 12:04:00	1787.00	1829.63	166.58	96%	
24-Apr-24 12:05:00	1781.04	1823.53	166.32	96%	
24-Apr-24 12:06:00	1780.07	1822.54	166.18	96%	
24-Apr-24 12:07:00	1774.95	1817.29	166.33	96%	
24-Apr-24 12:08:00	1783.77	1826.32	166.56	96%	
24-Apr-24 12:09:00	1781.03	1823.51	165.92	96%	
24-Apr-24 12:10:00	1783.33	1825.87	166.61	96%	
24-Apr-24 12:11:00	1783.82	1826.37	166.44	96%	
24-Apr-24 12:12:00	1783.51	1826.05	166.16	96%	
24-Apr-24 12:13:00	1782.51	1825.03	165.94	96%	

Marathon - Texas City  
SHGP Congeneration Unit - Process Data

Description Units	Fuel Flow mscfh	Turbine Firing Rate MMBTUH	Generator Watts MW	Percent Capacity	
24-Apr-24 12:14:00	1780.48	1822.95	166.17	96%	
24-Apr-24 12:15:00	1782.51	1825.03	166.39	96%	
24-Apr-24 12:16:00	1778.78	1821.22	165.91	96%	
24-Apr-24 12:17:00	1776.13	1818.50	165.69	96%	
24-Apr-24 12:18:00	1783.24	1825.78	166.52	96%	
24-Apr-24 12:19:00	1789.26	1831.94	167.01	97%	
24-Apr-24 12:20:00	1787.15	1829.78	166.45	96%	
24-Apr-24 12:21:00	1784.32	1826.89	166.29	96%	
24-Apr-24 12:22:00	1779.18	1821.62	166.53	96%	
24-Apr-24 12:23:00	1784.55	1827.12	166.82	96%	
24-Apr-24 12:24:00	1777.65	1820.06	166.06	96%	
24-Apr-24 12:25:00	1781.57	1824.07	166.72	96%	Run 1 End
24-Apr-24 12:55:00	1786.02	1828.62	166.31	96%	Run 2 Start
24-Apr-24 12:56:00	1780.74	1823.22	166.10	96%	
24-Apr-24 12:57:00	1783.15	1825.69	166.21	96%	
24-Apr-24 12:58:00	1779.07	1821.51	165.73	96%	
24-Apr-24 12:59:00	1779.02	1821.46	165.84	96%	
24-Apr-24 13:00:00	1777.40	1819.80	165.97	96%	
24-Apr-24 13:01:00	1777.97	1820.38	165.64	96%	
24-Apr-24 13:02:00	1781.27	1823.76	166.42	96%	
24-Apr-24 13:03:00	1780.98	1823.47	166.27	96%	
24-Apr-24 13:04:00	1782.70	1825.23	166.24	96%	
24-Apr-24 13:05:00	1776.00	1818.37	165.78	96%	
24-Apr-24 13:06:00	1784.73	1827.31	166.65	96%	
24-Apr-24 13:07:00	1786.79	1829.42	166.50	96%	
24-Apr-24 13:08:00	1773.29	1815.59	165.17	96%	
24-Apr-24 13:09:00	1773.87	1816.18	165.81	96%	
24-Apr-24 13:10:00	1776.97	1819.36	166.22	96%	
24-Apr-24 13:11:00	1780.01	1822.47	166.07	96%	
24-Apr-24 13:12:00	1782.08	1824.59	166.36	96%	
24-Apr-24 13:13:00	1776.29	1818.66	165.62	96%	
24-Apr-24 13:14:00	1781.76	1824.26	166.22	96%	
24-Apr-24 13:15:00	1781.87	1824.38	165.98	96%	
24-Apr-24 13:16:00	1775.40	1817.75	165.79	96%	
24-Apr-24 13:17:00	1774.55	1816.88	165.55	96%	
24-Apr-24 13:18:00	1779.25	1821.69	165.67	96%	
24-Apr-24 13:19:00	1776.41	1818.79	165.29	96%	
24-Apr-24 13:20:00	1773.29	1815.59	165.31	96%	
24-Apr-24 13:21:00	1780.82	1823.30	165.83	96%	
24-Apr-24 13:22:00	1782.83	1825.36	165.86	96%	
24-Apr-24 13:23:00	1778.42	1820.85	165.81	96%	
24-Apr-24 13:24:00	1775.51	1817.87	165.35	96%	
24-Apr-24 13:25:00	1767.42	1809.58	165.00	95%	
24-Apr-24 13:26:00	1767.33	1809.49	165.09	95%	
24-Apr-24 13:27:00	1776.60	1818.98	165.58	96%	
24-Apr-24 13:28:00	1771.60	1813.86	164.99	95%	
24-Apr-24 13:29:00	1776.17	1818.54	165.54	96%	
24-Apr-24 13:30:00	1768.65	1810.84	165.13	96%	
24-Apr-24 13:31:00	1775.09	1817.44	165.66	96%	
24-Apr-24 13:32:00	1775.19	1817.54	165.12	96%	

Marathon - Texas City  
SHGP Cogeneration Unit - Process Data

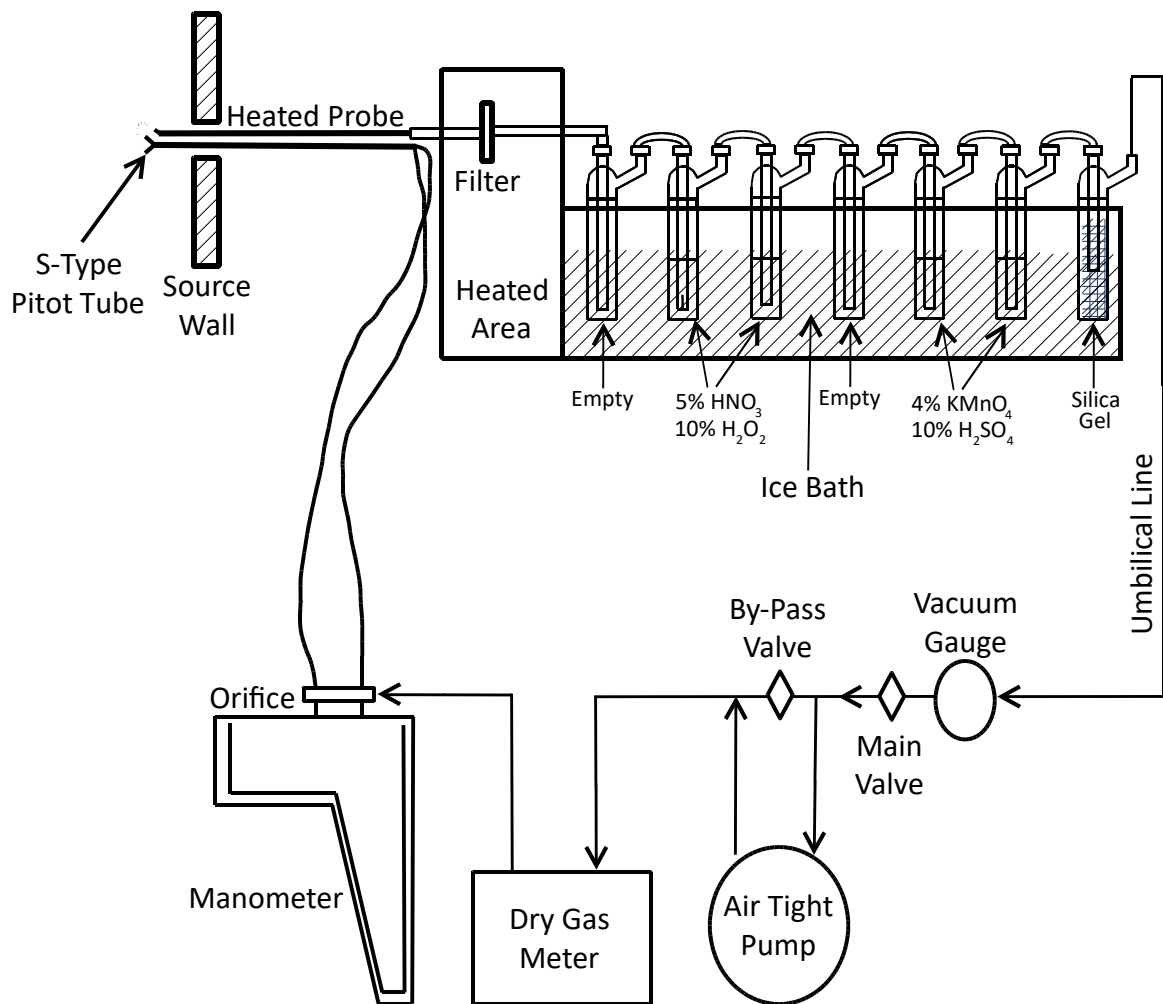
Description Units	Fuel Flow mscfh	Turbine Firing Rate MMBTUH	Generator Watts MW	Percent Capacity	
24-Apr-24 13:33:00	1776.03	1818.40	165.15	96%	
24-Apr-24 13:34:00	1773.12	1815.42	165.45	96%	
24-Apr-24 13:35:00	1768.34	1810.52	165.12	96%	
24-Apr-24 13:36:00	1775.36	1817.72	165.78	96%	
24-Apr-24 13:37:00	1774.20	1816.52	165.35	96%	
24-Apr-24 13:38:00	1778.46	1820.88	165.54	96%	
24-Apr-24 13:39:00	1774.73	1817.07	165.31	96%	
24-Apr-24 13:40:00	1769.27	1811.48	164.79	95%	
24-Apr-24 13:41:00	1776.76	1819.15	166.17	96%	
24-Apr-24 13:42:00	1774.21	1816.53	165.72	96%	
24-Apr-24 13:43:00	1767.34	1809.50	165.34	96%	
24-Apr-24 13:44:00	1769.03	1811.23	165.25	96%	
24-Apr-24 13:45:00	1769.72	1811.94	164.84	95%	
24-Apr-24 13:46:00	1767.94	1810.11	164.72	95%	
24-Apr-24 13:47:00	1774.02	1816.34	164.64	95%	
24-Apr-24 13:48:00	1769.58	1811.80	164.84	95%	
24-Apr-24 13:49:00	1778.90	1821.34	165.72	96%	
24-Apr-24 13:50:00	1771.60	1813.86	165.32	96%	
24-Apr-24 13:51:00	1769.84	1812.06	165.47	96%	
24-Apr-24 13:52:00	1775.61	1817.97	165.25	96%	
24-Apr-24 13:53:00	1772.03	1814.31	164.75	95%	
24-Apr-24 13:54:00	1776.10	1818.47	165.94	96%	
24-Apr-24 13:55:00	1769.39	1811.60	165.15	96%	Run 2 End
24-Apr-24 14:01:00	1773.89	1816.21	164.55	95%	Run 3 Start
24-Apr-24 14:02:00	1763.86	1805.94	164.40	95%	
24-Apr-24 14:03:00	1763.88	1805.96	165.36	96%	
24-Apr-24 14:04:00	1767.44	1809.60	164.96	95%	
24-Apr-24 14:05:00	1760.51	1802.51	164.75	95%	
24-Apr-24 14:06:00	1765.41	1807.52	164.19	95%	
24-Apr-24 14:07:00	1766.72	1808.87	164.69	95%	
24-Apr-24 14:08:00	1775.35	1817.70	165.37	96%	
24-Apr-24 14:09:00	1764.80	1806.90	164.85	95%	
24-Apr-24 14:10:00	1768.84	1811.04	165.62	96%	
24-Apr-24 14:11:00	1765.15	1807.26	164.73	95%	
24-Apr-24 14:12:00	1763.94	1806.02	164.74	95%	
24-Apr-24 14:13:00	1768.85	1811.05	164.50	95%	
24-Apr-24 14:14:00	1766.59	1808.73	164.75	95%	
24-Apr-24 14:15:00	1770.86	1813.11	165.01	95%	
24-Apr-24 14:16:00	1765.06	1807.17	165.36	96%	
24-Apr-24 14:17:00	1762.04	1804.07	164.54	95%	
24-Apr-24 14:18:00	1765.52	1807.63	164.94	95%	
24-Apr-24 14:19:00	1772.09	1814.36	165.57	96%	
24-Apr-24 14:20:00	1765.06	1807.17	164.60	95%	
24-Apr-24 14:21:00	1764.13	1806.22	164.67	95%	
24-Apr-24 14:22:00	1774.95	1817.30	165.37	96%	
24-Apr-24 14:23:00	1769.05	1811.25	164.64	95%	
24-Apr-24 14:24:00	1762.91	1804.97	164.44	95%	
24-Apr-24 14:25:00	1761.94	1803.97	164.24	95%	
24-Apr-24 14:26:00	1766.36	1808.50	164.12	95%	
24-Apr-24 14:27:00	1766.02	1808.15	164.15	95%	

Marathon - Texas City  
SHGP Cogeneration Unit - Process Data

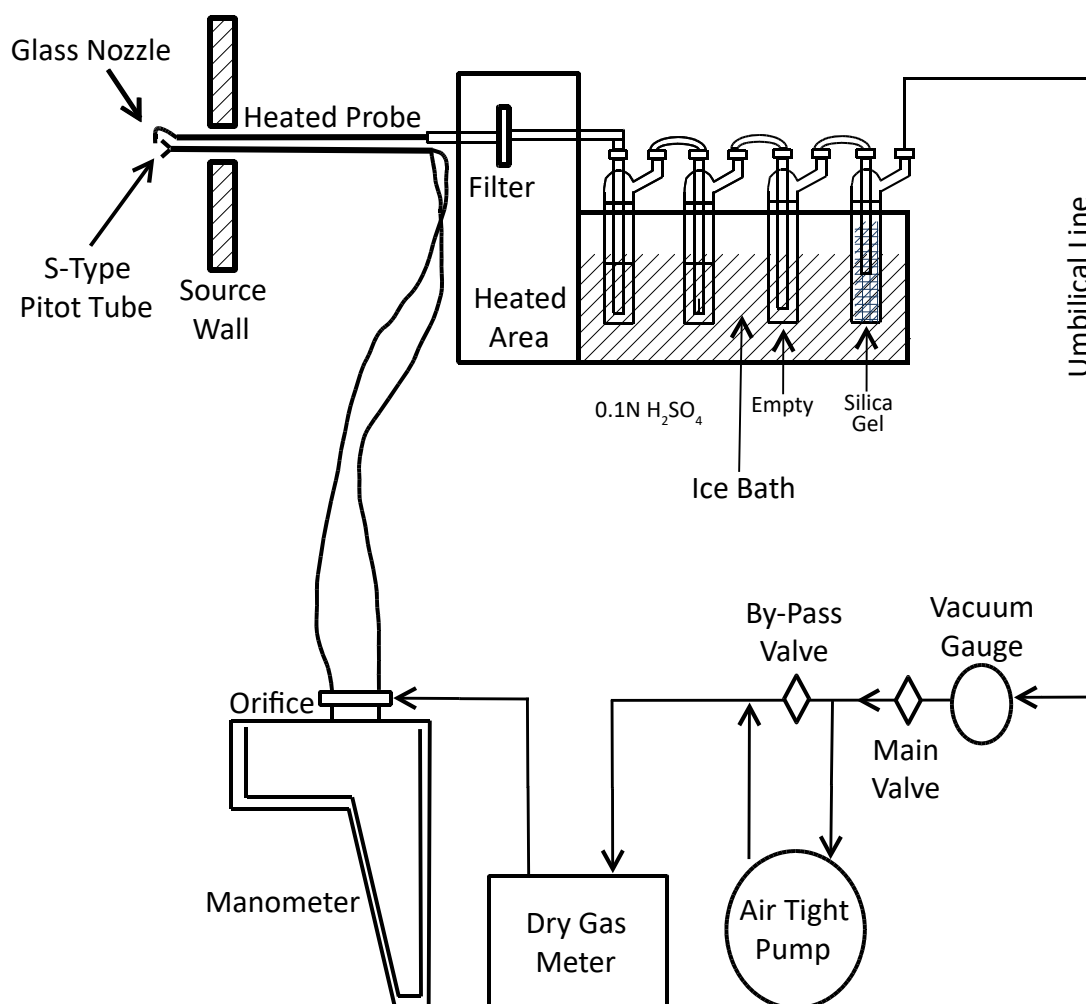
Description Units	Fuel Flow mscfh	Turbine Firing Rate MMBTUH	Generator Watts MW	Percent Capacity	
24-Apr-24 14:28:00	1761.26	1803.28	164.07	95%	
24-Apr-24 14:29:00	1764.36	1806.45	164.92	95%	
24-Apr-24 14:30:00	1762.87	1804.92	164.35	95%	
24-Apr-24 14:31:00	1764.29	1806.37	164.57	95%	
24-Apr-24 14:32:00	1772.69	1814.97	165.07	95%	
24-Apr-24 14:33:00	1766.56	1808.71	164.51	95%	
24-Apr-24 14:34:00	1772.48	1814.76	165.13	96%	
24-Apr-24 14:35:00	1768.17	1810.35	165.15	96%	
24-Apr-24 14:36:00	1767.29	1809.45	165.12	96%	
24-Apr-24 14:37:00	1769.86	1812.08	165.28	96%	
24-Apr-24 14:38:00	1772.28	1814.56	164.90	95%	
24-Apr-24 14:39:00	1770.16	1812.39	164.61	95%	
24-Apr-24 14:40:00	1765.32	1807.44	163.92	95%	
24-Apr-24 14:41:00	1765.16	1807.27	164.49	95%	
24-Apr-24 14:42:00	1767.21	1809.36	164.68	95%	
24-Apr-24 14:43:00	1762.03	1804.07	164.44	95%	
24-Apr-24 14:44:00	1775.82	1818.18	165.05	95%	
24-Apr-24 14:45:00	1768.70	1810.90	164.68	95%	
24-Apr-24 14:46:00	1764.17	1806.25	165.00	95%	
24-Apr-24 14:47:00	1772.69	1814.98	165.61	96%	
24-Apr-24 14:48:00	1776.02	1818.38	165.56	96%	
24-Apr-24 14:49:00	1776.65	1819.03	165.33	96%	
24-Apr-24 14:50:00	1769.76	1811.98	164.69	95%	
24-Apr-24 14:51:00	1760.23	1802.22	164.03	95%	
24-Apr-24 14:52:00	1766.07	1808.20	164.58	95%	
24-Apr-24 14:53:00	1768.73	1810.93	164.70	95%	
24-Apr-24 14:54:00	1767.72	1809.89	164.45	95%	
24-Apr-24 14:55:00	1766.35	1808.49	164.37	95%	
24-Apr-24 14:56:00	1772.52	1814.80	165.08	95%	
24-Apr-24 14:57:00	1772.74	1815.03	165.19	96%	
24-Apr-24 14:58:00	1773.89	1816.21	165.04	95%	
24-Apr-24 14:59:00	1777.41	1819.81	164.93	95%	
24-Apr-24 15:00:00	1769.12	1811.33	163.99	95%	
24-Apr-24 15:01:00	1766.77	1808.91	164.63	95%	Run 3 End

## Appendix G

## Schematic Diagram of the Combined Methods 1 & 2 Sampling Train (for VFR)



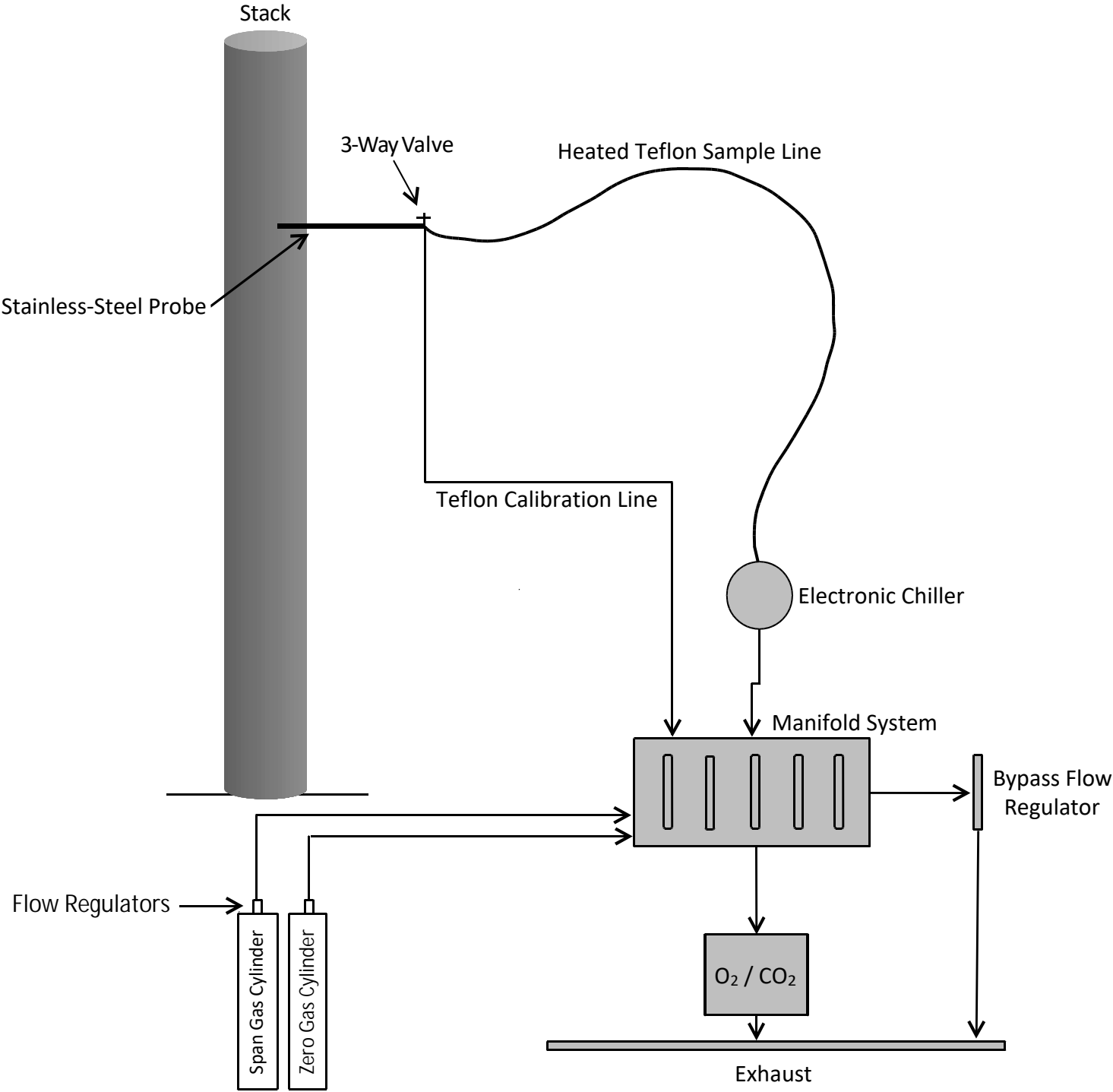
## Schematic Diagram of the EPA Method 26 Sampling Train (for HCl & HF)



NaOH impingers were added in place of the "empty" impinger shown above but were archived with the laboratory.



Reference Method Monitors Sampling System  
(EPA Method 3A)



**Last Page of Report**