



Region 6 - Enforcement & Compliance Assurance Division
INSPECTION REPORT

Inspection Date(s):	04/25/23 to 04/27/23	
Media Program:	Air	
Regulatory Program(s)	NESHAP	
Company Name:	LyondellBasell Industries	
Facility Name:	Houston Refining LP	
Facility Physical Location:	12000 Lawndale Street	
(city, state, zip code)	Houston, TX 77017	
Mailing address:	12000 Lawndale Street	
(city, state, zip code)	Houston, TX 77017	
County/Parish:	Harris County	
Facility Phone Number	713-321-4111	713-321-4111
Facility Contact:	Roel Muñoz	Roel Muñoz
	roel.munoz@lyb.com	
FRS Number:	110058113704	
Identification/Permit Number:	RN100218130	
Media Identifier Number:	AFS 48-20100040	
NAICS:	324110, Petroleum Refineries	
SIC:	2911, Petroleum Refining	
Personnel participating in inspection:		
Sarah Frey	EPA R6, ECDAT	Physical Scientist
Ken McPherson	EPA R6, ECDAT	Life Scientist
Nicholas Bobbs	EPA AED, OECA	Environmental Engineer
Alexia Scott	EPA/Eastern Research Group	Contractor
Elizabeth Hubbard	EPA/Eastern Research Group	Contractor
Michael Miller	TCEQ	Investigator
Tiara Edwards	TCEQ	Investigator
Kaylyn Erskins	TCEQ	Investigator
Roel Muñoz	Houston Refining (HRO)	Environmental Issues Manager
Chris Towe	HRO	Environmental Team Leader
Tyler Wysocki	HRO	Environmental Engineer
Jason Graves	HRO/Waid Environmental	Contractor
Chris Supan	HRO/Waid Environmental	Contractor
EPA Lead Inspector Signature/Date	<i>Sarah Frey</i> Sarah Frey	10/10/2025 Date
Supervisor Signature/Date	 James Leathers	 Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

EPA Region 6 inspectors Dr. Sarah Frey and Mr. Ken McPherson and EPA OECA-AED inspector Mr. Nicholas Bobbs arrived at LyondellBasell Houston Refining Operations ("HRO" or "Facility" or "refinery") at 8am on April 25, 2023, for an announced inspection. They were accompanied by Ms. Tiara Edwards, Ms. Kaylyn Erskins, and Mr. Michael Miller from the Texas Commission on Environmental Quality ("TCEQ"), and Ms. Alexia Scott and Ms. Elizabeth Hubbard from Eastern Research Group ("ERG"), contractors for EPA. We met with Mr. Roel Muñoz/Environmental Issues Manager, Mr. Chris Towe/Environmental Team Leader, Mr. Tyler Wysocki/Environmental Engineer, and other facility personnel. We presented our credentials to Mr. Muñoz and informed him that this was an EPA inspection to determine compliance with the Facility's Title V Air Permit and the Clean Air Act ("CAA"). The scope of the inspection is a partial compliance evaluation ("PCE") and includes evaluation of the compliance of the Facility with its Title V operating permit and the applicable CAA regulations, focusing particularly on the National Emissions Standards for Hazardous Air Pollutants ("NESHAP") Subpart CC Fenceline Monitoring regulations (40 CFR 63.658). The inspection was prompted by the Facility's reported benzene fenceline monitoring concentrations, in which the 12-month rolling average exceeded the action level of 9 micrograms per cubic meter (" $\mu\text{g}/\text{m}^3$ ") for at least six consecutive calendar quarters. Photographs and videos taken during the inspection can be found in Appendix 1. The sign-in sheet for the Opening Conference is attached as Appendix 2.

FACILITY DESCRIPTION

At the time of inspection HRO operated under Federal Operating Permit (FOP) O-1372, initially issued on March 14, 2005, and last renewed on January 31, 2018, and under New Source Review (NSR) Permit 2167, last amended on March 29, 2017. The refinery began operating in 1918 and was operated by Sinclair Oil. The refinery was acquired by ARCO in 1968, by Lyondell in 1985, and operated under joint ownership of Lyondell-Citgo in 1993. In 2006, the refinery became a wholly owned subsidiary of Lyondell, then LyondellBasell Industries.

The refinery is a full conversion fuels refinery with some petrochemical and lubricants production that spans over 700 acres. The Facility consists of crude and vacuum distillation units, delayed coking units, hydrodesulfurization units, reforming units, a fluid catalytic cracking unit, sulfur recovery units, solvent extraction and aromatics recovery units, lube oil treating units, and light-ends fractionation units. The refinery also has blending facilities for gasoline, caustic treating units, and various utility systems. Some of the units are currently idled. This manned facility operates 24 hours a day, 7 days a week, and employs approximately 675 full time employees.

HRO is subject to 40 CFR Part 63 Subpart CC, which requires all refineries to implement a fenceline monitoring program for benzene emissions. The regulatory requirements of the program can be found in 40 CFR 63.658 and the reporting requirement can be found in 40 CFR 63.655(h)(8). Fenceline

monitoring is required to be performed in accordance with Methods 325A and 325B of 40 CFR Part 63 Appendix A.

To meet the requirements for benzene fenceline monitoring in 40 CFR 63.658, the Facility installed 24 passive sampling sites for biweekly analysis of benzene concentrations. The Facility also installed three real-time fenceline gas chromatograph analyzers (“eGCs”) to measure benzene concentrations every 10 minutes.

Section II - OBSERVATIONS

On April 25, 2023, after credentials and identification were presented to the responsible officials, the inspection team discussed our plans for the inspection, including the intent to deploy real-time benzene analyzers to investigate potential sources of benzene impacting the Facility’s fenceline. Details about the eGCs used and the resulting data can be found in Appendix 3. EPA and TCEQ also shared that we would conduct screenings using optical gas imaging (“OGI”) cameras and photoionization detectors (“PIDs”). After discussions about safety, scheduling, photographs, videos, and confidential business information (“CBI”), we discussed the status of the records requested on April 20, 2022 (Appendix 4, Document Request).

The inspection team broke into two groups. Mr. Bobbs was accompanied by ERG in the field, and Mr. McPherson and I were accompanied by TCEQ in the conference room. EPA’s real-time analyzer, an eGC labeled “eGC EPA 1”, was assembled and placed on the eastern fenceline of the Facility between passive monitoring sites HRO4 and HRO5. EPA’s “eGC EPA 2” was assembled and placed next to Dock B near passive monitoring site HRO1.

We discussed recent exceedance events, corrective action plans, and current procedures with Mr. Jason Graves, a contractor for HRO, Mr. Wysoki, and Mr. Muñoz. HRO staff identified potential off-site sources impacting the fenceline, including a Superfund site east of the refinery, multiple tank farms north of Buffalo Bayou, and barge traffic.

The Facility operates three eGCs co-located with passive sampling sites HRO1, HRO2, and HRO3. The data from these analyzers are used to calculate off-site impacts and adjust reported benzene concentrations per the guidelines of the Site-Specific Monitoring Plan (“SSMP”) approved by EPA’s Office of Air Quality Planning and Standards on April 18, 2019. The SSMP allows for adjustments to the benzene concentrations at HRO1, HRO2, HRO3, and HRO24 if specific data quality, wind speeds, and wind directions are present.

We discussed the events related to elevated benzene from December 21, 2022, to January 5, 2023. Mr. Graves and Mr. Wysocki explained that Winter Storm Elliott destroyed the meteorological station associated with the eGC co-located with HRO3. The benzene concentrations at this location are typically adjusted downward per the SSMP, as the eGC indicates off-site impacts. However, without validated meteorological data, the passive concentrations were not eligible for correction. These details were not included in the Root Cause Analyses submitted to TCEQ and EPA, dated January 17, 2023. [AOC 1]

The Root Cause Analyses provided to EPA and TCEQ do not discuss the most recent period exceedances. Mr. Graves explained that the Facility applies a “But For...” Analysis. Using this analysis, it appears the facility does not address specific causes of period exceedances. [AOC 1] Mr. Graves and Mr. Wysocki described the routine actions taken on a biweekly basis, including evaluation of real-time analyzer data, using an OGI camera and flame-ionization detector to locate fugitive emissions, communicating with operations about maintenance activities, and reviewing Leak Detection and Repair (“LDAR”) records. I requested to review any written procedures that describe these routine actions and was told that no written procedures exist. [AOC 2]

HRO has submitted two Corrective Action Plans (“CAPs”), dated September 30, 2022, and October 21, 2022. In both CAPs corrective action was deemed completed, even though the subsequent period still exceeded the action level, and no additional steps were proposed. Additionally, the CAPs only addressed an episodic event, failing to discuss how HRO planned on actively working toward bringing their fenceline concentrations below the action level. [AOC 3]

The CAP dated October 21, 2022, points to routine tank maintenance and tank cleaning for elevated benzene concentrations. The plan does not identify a corrective action or plans for future prevention. [AOC 4] The inspection team reviewed the procedures for tank cleanings.

In the afternoon, the entire inspection team went into the field. We observed sample site HRO3 and the co-located eGC. Next, we went to Dock D and observed sample site HRO2 and the co-located eGC. We observed sample site HRO1 and the co-located eGC. We observed sample site HRO24. All sample sites and eGCs were observed to be operational.

The inspection team departed the facility at 4pm.

On April 26, 2023, the inspection team arrived at the facility at 8:15am. We shared the overnight data collected by eGC EPA 1 and eGC EPA 2. No readings over 5 parts per billion (“ppb”) benzene were measured (See Appendix 3). eGC EPA 1 was relocated to the base of Flare 1, northwest of Tank 835. eGC EPA 2 was relocated near HRO24, north of Tank 855.

The inspection team went into the field to observe potential sources of benzene. We observed Tank 4002 being cleaned. We climbed Tank 835 and observed some puddles on the top of the external floating roof, but no volatile organic compound (“VOC”) emissions were detected. Using an OGI camera, Ms. Edwards observed vents on top of Tanks 4002, 811, and 838. No visible emissions were observed. We climbed tank 811, and no VOC emissions were detected.

The inspection team observed steam strippers 438 T0001A and T0001B (out of service) and surrounding piping, and LDAR components. No VOC emissions were detected. Non-condensable gases from the steam stripper are routed to flare gas recovery. The stripped liquid from the strippers goes to Tanks 835 and 838.

The inspection team observed Tanks 855 (Photo 1) and 854 (Photo 2). Mr. Miller observed hydrocarbon emissions from both tanks (Video 3). [AOC 5] The tanks contain benzene wastewater and are equipped with internal floating roofs. The contents of the tank settle and are routed to the steam stripper. Oil is manually skimmed off the top layer and sent to Tank 412 (slop oil), according to Mr. Muñoz. The inspection team observed the area around Tank 412 and detected up to 232 ppb VOC, but the source was not located. No hydrocarbons were observed with the OGI camera.

The inspection team returned to the conference room and discussed how Tanks 854 and 855 operate and reviewed the most recent tank inspection records from November 10, 2022.

The inspection team departed the facility at 3:30pm.

On April 27, 2023, the inspection team arrived at the facility at 8:15am. We shared the overnight data collected by eGC EPA 1 and eGC EPA 2. No readings over 5 ppb benzene were measured at eGC EPA 1. eGC EPA 2 measured concentrations of benzene as high as 6.1 ppb when the winds were from the south and as high as 7.3 ppb when the winds were from the north (See Appendix 3).

Mr. Bobbs requested access to the top of Tanks 854 and 855, however Mr. Muñoz cautioned that a self-contained breathing apparatus ("SCBA") is required at the top of the tanks and access would be denied.

The inspection team broke into two groups. Mr. Bobbs was accompanied by ERG and Mr. Miller in the field, and Mr. McPherson and I were accompanied by Ms. Edwards and Ms. Erskins in the conference room. The inspection team continued discussions with HRO staff about Root Cause Analyses and CAPs.

The field team visited the Sulfur Recovery Area and API Separator. Low levels of VOCs were detected from the API Separator hatch cover. While in the field, Mr. Bobbs observed HRO employees on top of Tanks 854 and 855 with no SCBA equipment. Facility staff informed Mr. Bobbs that SCBA equipment was needed to go inside the tank but was not required to go up to the tank platform. Mr. Bobbs was then permitted to climb both tanks and use the handheld PID monitor with a benzene separation tube to monitor for benzene.

Mr. Bobbs climbed Tank 855 and detected up to 10 parts per million ("ppm") benzene emitting from the tank's perimeter vent. Mr. Bobbs climbed Tank 854 and detected up to 59 ppm benzene emitting from the tank's perimeter vent. [AOC 5]

Around 2:30pm, the field team disassembled eGCs EPA 1 and 2.

Section III – AREAS OF CONCERN

- 1) Root Cause Analyses, required by 40 CFR 63.658, do not document actions taken to identify and correct period concentrations in excess of $9 \mu\text{g}/\text{m}^3$. Examples of action are provided in 40 CFR 63.658(g)(1)-(4). Inspectors observed that actions were being taken but not recorded and provided to regulators.

- 2) Inspectors observed a lack of written procedures for how the Facility responds to elevated benzene concentrations detected by real-time monitors or passive monitors. Creating a standard operating procedure, flow chart, or standardized process could be beneficial.
- 3) Inspectors observed submitted Corrective Action Plans, required by 40 CFR 63.658(h), do not explain why subsequent two-week periods are above the action level when corrective actions have been deemed effective and complete. Additionally, the CAPs may not be identifying additional measures proposed to reduce fenceline concentrations below the action level, as required by 40 CFR 63.658(h).
- 4) The CAP dated October 21, 2022, points to routine tank maintenance and tank cleaning for elevated benzene concentrations. The plan does not identify a corrective action or plans for future prevention. The Facility may need to consider updating written procedures for tank cleanings to prevent benzene from reaching the fenceline.
- 5) Inspectors observed emissions of VOC and benzene from Tanks 854 and 855 via OGI and PID. Concentrations of up to 59 ppm benzene were detected at the vents of Tank 854. The eGC EPA 2 had concentrations of up to 6.1 ppb benzene when the wind was from the direction of Tanks 854 and 855. The emissions from these tanks could be impacting the fenceline during specific wind conditions.

Closing Conference

EPA inspectors Sarah Frey, Nicholas Bobbs, and Ken McPherson conducted a closing conference at LyondellBasell Houston Refining Operations at 4:30pm on April 27, 2023, for the inspection. During the closing conference, we reviewed the five Areas of Concern noted during the inspection, fielded questions from facility personnel, and provided information about the next steps in the inspection process. The sign-in sheet for the closing conference is included in Appendix 2. We discussed CBI procedures, and the Facility will provide documentation for claiming CBI on specific documents. We departed the facility around 5pm.

Section IV – FOLLOW UP

The following information was received by EPA after exiting the Facility on April 27, 2023:

- May 9, 2023 – Mr. Muñoz sent an email with a signed CBI notice.
- May 30, 2023 – Mr. Muñoz sent an email with follow-up information related to wind data at their eGCs.

Section V – LIST OF APPENDICES

Appendix 1 – Photograph/Video Log – 2 photos, 1 Video

Appendix 2 – Opening and Closing Conference Sign-In Sheets

Appendix 3 – ERG eGC Report

Appendix 4 – Document Request

Appendix 1

Photograph/Video Log



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph/Video Log

Photo No. 1

Location: LyondelBasell Industries – Houston Refining LP		
City: Houston	County/Parish: Harris	State: Texas



Photo File Name: DSCN1152.JPG

Date of Photo: 4/27/2023

Time of Photo: 11:17 am

Photographer: N. Bobbs

Description: Photograph of Tank 855, containing benzene wastewater. Concentrations of up to 10 ppm benzene were detected with a PID.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph/Video Log

Photo No. 2

Location: LyondelBasell Industries – Houston Refining LP		
City: Houston	County/Parish: Harris	State: Texas



Photo File Name: TK 054 visible photo.jpg

Date of Photo: 4/26/2023

Time of Photo: 11:09 am

Photographer: M. Miller

Description: Photograph of Tank 854, containing benzene wastewater. Concentrations of up to 59 ppm benzene were detected with a PID.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph/Video Log

Photo No. 3

Location: LyondelBasell Industries – Houston Refining LP		
City: Houston	County/Parish: Harris	State: Texas



Video File Name: TK 0854.2.mp4

Date of Video: 4/27/25

Time of Video: 11:05am

Photographer: M. Miller

Description: Hydrocarbon emissions emitting from vents on Tank 854. The tank contains benzene wastewater.

Appendix 2

Opening and Closing Conference Sign-In Sheets

EPA Project/Facility ID _____

Project/Facility Name Houston Refining**Opening/Pre-Inspection Meeting**Commence opening/pre-inspection meeting 4/25 Time: 9am 8:50am

Name	Title	Representing	Telephone No.
Elizabeth Hubbard	contractor	ERG	919-468-7784
Tiara Edwards	TCEQ Investigator	TCEQ	713-767-3578
Haylyn Erskins	TCEQ Investigator	TCEQ	713-767-3758
Mike Miller	TCEQ Investigator	TCEQ	912-238-0516
Nicholas Bobbs	EPA Inspector	EPA	202-564-0426
Kenneth McPherson	EPA Inspector	EPA	214-665-6754
Alexia Scott	contractor	ERG	919-468-7784
Sarah Frey	Lead Inspector	EPA R6	214-665-6499
Rod A. Muñoz	Env. Issues Mng.	HRO	713-321-4094
Jason Graves	Contractor	HRO/Waid	832-483-7702
Tyler Wysocki	Environmental Engineer	HRO	713-321-4703
Chris Tome	Environmental Team Leader	HRO	713-321-5946
Chris Supan	Contractor	HRO/Waid	713-548-6392
Mike Miller	TCEQ Tech spec	TCEQ	912-238-0516

Conclude opening/pre-inspection meeting _____ Time: 9:15 amInitials / Date: 82 / 4/25/23

EPA Project/Facility ID _____

Project/Facility Name Houston Refinery

Exit interview / Out-briefing Meeting

Commenced meeting Time: 4:30 pm

Name	Title	Representing	Telephone No.
Tiara Edwards	Environmental Investigator	TCEQ	713-767-3578
Haylyn Ershins	Environmental Investigator	TCEQ	713-767-3758
Kenneth McPherson	Inspector / Enforcement	EPA R6	214-665-6754
Mike Miller	Technical Specialist	TCEQ	512-239-0516
Nicholas Bobbs	Inspector	EPA	202-564-0726
Elizabeth Hubbard	Contractor	ERG	919-468-7784
Alexia Scott	contractor	ERG	919-468-7784
Joe R. Cantu	Environmental Manager	HRO	713-321-4258
Tyler Wysocki	Environmental Engineer	HRO	713-321-4703
Rod A. Muñoz	Env. Issues Mng.	HRO	713-321-4093
Chris Supan	Contractor	HRO/Waid Env.	713-548-6392
Jason Graves	Contractor	HRO/Waid Env.	832-483-7702
Chris Tower	Environmental Team Lead	HRO	713-321-5946
Sarah Freg	Lead inspector	EPA R6	214-665-6499

Conclude meeting Time: 4:55 pmInitials / Date: 82 / 4/27/2023

Appendix 3

ERG eGC Report

**eGC Air Monitoring
TARGETING/INSPECTION REPORT**

Inspection Date(s):	April 25, 2023 – April 27, 2023	Inspection Announced: {Yes}
Name	Email	
ERG Staff		
Alexia Scott	Alexia.Scott@erg.com	
Liz Hubbard	Elizabeth.Hubbard@erg.com	
EPA Staff		
Nick Bobbs	Bobbs.Nicholas@epa.gov	
Sarah Frey	Frey.Sarah@epa.gov	

Facilities Inspected:

Name	Address	On Site?	eGC Target Compound	eGC No.	Canister Sample Collected
Houston Refining	12000 Lawndale St, Houston, TX 77017	Yes	Benzene	EPA 1, EPA 2	No

SECTION I – INTRODUCTION

Background Information

From April 25, 2023 through April 27, 2023, Alexia Scott and Liz Hubbard of ERG performed mobile air monitoring using the ENMET environmental Gas Chromatograph (eGC) at the Houston Refining LP facility in Houston, TX. ERG was joined by several staff members from the EPA and TCEQ, who provided direction on eGC placement. The purpose of the inspection was to investigate high levels of fence-line benzene and identify possible sources. The eGCs were deployed to aid in source detection.

ERG deployed both eGCs, EPA 1 and EPA 2, in the facility on April 25th. Both eGCs were left in the facility overnight on April 25th and then moved to several different locations within the facility during the inspection.

SECTION II – OBSERVATIONS

Quality Assurance

The eGCs are capable of detecting benzene through a semi-continuous 10-minute sample cycle. Enmet advertises the analysis range of the eGCs to be between 0.3 – 200 ppb. A pre-deployment calibration curve was independently generated by ERG to verify the eGCs performance. Both eGCs were independently tested and verified at a range of 0.5 – 50 ppb. The results of this pre-deployment testing are available as Appendix 2.

The eGCs are also equipped with a one-point auto calibration feature, which produces a calibration factor (CalFactor). The eGCs were calibrated with this feature upon initial set up at the site and when they were moved from site to site. All calibrations performed during the inspection are collated in the “Calibration” tab in the data sheet, which is available as Appendix 1. The calibrations were also judged for quality based on the QAPP criteria. The QAPP criteria for calibrations stated that calibrations must have a relative percent difference (RPD) of within 15% when compared to the calibration cylinder concentration. Calibration quality fell into three categories:

- Good - Good calibrations satisfied the QAPP criteria, and the subsequent data was not flagged;
- Tentative - tentative calibrations did not satisfy the QAPP criteria but the CalFactors produced were reasonable therefore data was flagged but not corrected. Data flagged after a tentative calibration have their corresponding CalFactors flagged with a yellow highlight.
- Bad - bad calibrations did not satisfy the QAPP criteria and the CalFactor produced was unreasonable therefore data was flagged and post-corrected. Data flagged from a bad calibration was corrected using the nearest reasonable CalFactor. The corrected data's CalFactors have been flagged in the dataset with an orange highlight. The data was corrected using a Concentration Calculator provided by Enmet, which is Appendix 3.

The eGCs are also equipped with wind sensors, and these sensors must be directionally oriented to provide accurate data. The wind sensors were appropriately oriented at the initial eGC sites and reoriented whenever the eGCs were moved.

eGC Site Observations

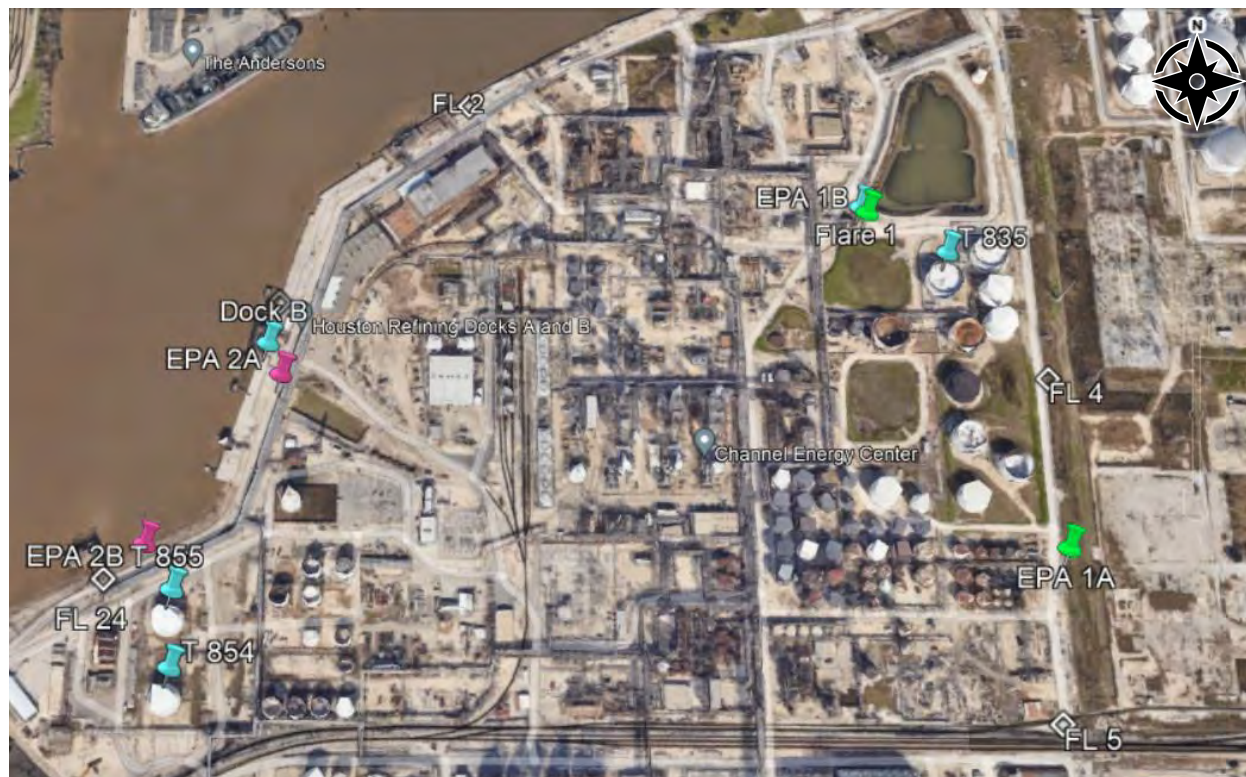


Figure 1. Houston Refining eGC Sites

EPA 1 Sites – Waste Water

Table 1. Summary of EPA 1 Sites

Site Code	GPS Location	Start Date/Time	End Date/Time	Highest Reading
EPA 1A	29.7176, -95.2284	4/25/2023 10:56 AM	4/26/2023 9:16 AM	2.77 ppb
EPA 1B	29.7208, -95.2302	4/26/2023 9:56 AM	4/27/2023 2:36 PM	4.77 ppb



Figure 2. EPA 1 eGC Site Overview

EPA 1A

Site EPA 1A was the first site that EPA 1 was positioned at; the site was located on the Eastern fence line of Houston Refining between fence line monitors 4 and 5. EPA 1 was set up at approximately 10:56 AM on April 25, 2023 and ran at site EPA 1A until 9:16 AM on April 26, 2023. The wind during this time frame came predominantly from the southeast and east and varied from 1 mph to 4 mph.

Notable eGC Activity

- There were no eGC readings over 5.0 ppb.

EPA 1B

Site EPA 1B was the second site of EPA 1, this site was northeast of EPA 1A and at the base of Flare 1. EPA 1 was set up at this site at approximately 9:56 AM on April 26, 2023 and stayed there until 9:34 am on April 27, 2023. During the first half of this time period the wind was very erratic and there was no clear wind direction trend overall, wind speed averaged at around 1.0 – 3.0 mph.

Notable eGC Activity

- There were no eGC readings over 5 ppb.

EPA 2 Sites – Loading Docks

Table 2. Summary of EPA 2 Sites

Site Code	GPS Location	Start Date/Time	End Date/Time	Highest Reading
EPA 2A	29.7191, -95.2363	4/25/2023 12:16 PM	4/26/2023 11:36AM	4.09 ppb
EPA 2B	29.7175, -95.2377	4/26/2023 11:56 AM	4/27/2023 3:16 PM	7.29 ppb



Figure 5. EPA 2 eGC Site Overview

EPA 2A

Site EPA 2A was the first location EPA 2 was deployed at during the inspection. The site was located next to Dock B and southeast of fence line monitor 1. EPA 2 was set up at approximately 12:16 PM on April 25, 2023 and stayed at this site until approximately 11:36AM on April 26, 2023. The wind was coming from the east at a speed of approximately 2.0 – 5.0 mph.

Notable eGC Activity

- There were no eGC readings over 5 ppb.

EPA 2B

Site EPA 2B was located southwest of EPA 2A and North of T855 and T854. EPA 2 was set up at this site at approximately 11:56 AM on April 26, 2023 and stayed at this site until approximately 3:16 PM on April 27, 2023. The wind shifted a lot during this time frame and had a speed of 1.5 – 4.0 mph.

Notable eGC Events

- A significant benzene reading of 6.07 ppb occurred at 3:26 pm on April 26, 2023.
- A significant benzene reading of 7.29 ppb occurred at 2:26 am on April 27, 2023.

Calibration Discussion

By default, the eGCs calibrate every 6 hours and the 15% RPD QA requirement was designed for that calibration schedule. The eGCs were calibrated upon setup in addition to their scheduled 6 hours calibration routine. Tentative calibrations followed bad calibrations because eGCs can take several calibrations before they produce “good” calibrations after a bad calibration is performed. Calibration runs display the concentration based off the last previous CalFactor but display the newly generated CalFactor, this means tentative calibrations can look erroneous because of a previously bad calibration even if that tentative calibration generates a good CalFactor. The generated CalFactor is what the subsequent data will be calculated with; therefore, if the CalFactor is reasonable then the subsequent data is also reasonable.

SECTION III – Results

The data collected by EPA 1 and EPA 2 are included as Appendix 1. The data was downloaded from the Enmet eGC webserver and has been divided into tabs based on site. There are also tabs for the collated calibrations and for the raw corrected data. Table 3 provides a description of each column of the data.

Table 3. Summary of Data Column Labels

Column	Description
DATESTAMP	Universal Time Zone Date and Time
TIMESTAMP	Central Time Zone Date and Time – This time marks the end of the analytical cycle of the device. The sample time starts at the top of every 10-minute mark. Ex: TIMESTAMP 05:26:16 am means a sample was collected starting at 05:20:00 am and the analytical period ended at 05:26:16 am.
RECORD	Number label assigned to that specific data point
RunType	“MEAS” – data point represents a measurement made by the eGC. “CAL” – data point represents a calibration made by the eGC
Vapor	Describes the target compound of that eGC
Concentration	This is the calculated concentration produced from the eGC integration results. This value is based off peak height, the pre-programed linearization coefficients and the r-factor. Reports in part-per-billion, ppb. Orange cells signify corrected data. Yellow cells signify data which follows a Tentative calibration run.
PeakHeight	Reports the height of the target peak for that run
PeakLocation	Reports retention time of the target peak for that run
CalFactor	For MEAS runs, reports the calibration factor used when calculating the concentration for that run, For CAL, reports the new calibration factor generated from the calibration run.
ColTemp	Report the column temperature at the time of reporting
Baseline	Reports the baseline for that run
Ver	Reports the eGC software version
RunCount	Reports the number label of that run
Status	Reports the status of the run, if OK the run was acceptable.
Latitude	Reports the latitude of the eGC at the time of reporting
Longitude	Reports the longitude of the eGC at the time of reporting

WS_ms	WS_ms is a snapshot of the wind speed m/sec when the analysis is complete and is sent to the data logger. The end of the analysis run may vary depending on the application.
WS_avg	WS_avg is the average wind speed during the “sampling” time of the GC. It is during the first two minutes of the cycle.
WindDir	WindDir is in degrees, data is collected every one second for 120 seconds, and the average is displayed example (ENE 76°)
WS10avg	WS10avg is the average wind speed during 5 to 15 minutes of the analysis cycle. Units are m/sec
WD10avg	WD10avg is the average wind direction during 5 to 15 minutes of the analysis cycle. Units are Degrees
WD10sd	WD10sd is the deviation during the 10 minutes average of both the Wind Speed and Wind Direction during the measured 10-minute period.
Battery_Voltage	Reports battery voltage at the time of reporting
EnclosureTemp	Reports enclosure temperature in Celsius at the time of reporting
EngineTemp	Reports engine temperature in Celsius at the time of reporting
AlarmLevel	Reports the alarm level based on the reported concentration.

SECTION IV – Conclusions

As of the completion of this report, ERG was not aware of any follow-up activities from the EPA pertaining to any of these facilities. All conclusions and decisions to follow-up on the findings presented here will be solely at the determination of the U.S. EPA.

SECTION V – Appendix

Attachment 1 – Houston Refining eGC Data (.xlsx file)

Attachment 2 – Pre-deployment eGC Benzene Curves (.xlsx file)

Attachment 3 – eGC Benzene Concentration Calculator (.xlsx file)

Appendix 4

Document Request

**Houston Refining LP
HOUSTON, TEXAS
EPA REGION 6 RECORDS/DOCUMENTS REQUEST**

GENERAL PROCEDURE

During the Clean Air Act (CAA) compliance investigation at Houston Refining LP ("Refinery") inspectors will be reviewing records kept for your facility. To expedite this portion of the investigation, EPA is providing you advanced notification of the records that will likely be reviewed on-site. For most documents, EPA will review the records on-site and request copies, as needed. In certain cases, document copies, either electronic or paper, will be requested for later review by EPA.

In preparation for this compliance investigation, EPA has divided this record and document request into two sections. The first section consists of documents that EPA would like available, and copies prepared (as noted) on April 25, 2023. The second section consists of documents that EPA would like available electronically (through a shared OneDrive Folder) no later than April 27, 2023. Additional documents may also be requested that are not listed below. During the investigation, EPA will work with the Refinery to develop a schedule to review these documents.

PART 1 - Please have these documents available on April 25, 2023

1. Provide all benzene air monitoring data in an electronic searchable and editable spreadsheet, for samples taken within and outside the Refinery between February 15, 2023 and receipt of this Request. This includes both passive and real-time air monitoring locations.
2. Provide barge loading and unloading schedule for week of April 25, 2023 including
 - a. Type of product being loaded or unloaded
 - b. The dock location of the barge loading/unloading, if known
 - c. The tanks being filled/drawn from
 - d. Benzene concentration of product
3. Provide an inventory of all tanks located at the Refinery. Include tank contents, benzene concentration of tank contents, roof type, and whether the tanks are controlled or atmospheric.
4. Provide 2 printed copies of the detailed map of the facility layout provided in Response 3 of the CAA Information Request received April 17, 2023.

PART 2 - Please have these documents available by April 27, 2023

1. Provide the SOP for vacuum truck operations, relating the prevention of benzene from being released to the atmosphere.
2. Provide the SOP, or written procedures, for the degassing and cleaning of tanks, especially those related to the prevention of air pollutant emissions from being released to the atmosphere.

3. Identify all pressure relief valves that are or may be in contact with benzene containing streams. Describe how the valves are monitored and where the benzene is released to (e.g. atmosphere or to closed vent system).
4. Provide a description of the actions taken in response to elevated concentrations at GC#3 during period 2022-26.