Philadelphia Refining Complex
Environmental Department

Philadelphia Energy Solutions Refining and Marketing LLC
3144 W Passyunk Ave.
Philadelphia, PA 19145-5208
215-339-2000

June 14, 2019

Certified Mail Number: 7007 3020 0001 5159 6381
Dr. Kassahun Sellassie
Air Management Services
321 S University Avenue #2
Philadelphia, PA 19104-4543

Certified Mail Number: 7007 3020 0001 5159 6398
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards, Sector Policies and Program Division
U.S. EPA Mailroom (E143-01)
Attn: Refinery Sector Lead
109 T.W. Alexander Drive
Research Triangle Park, NC 27711

Re: Refinery Sector Rule Fenceline Monitoring Requirements
Root Cause Analysis and Corrective Action Plan
Philadelphia Energy Solutions Refining and Marketing

To Whom It May Concern:

Enclosed please find the Root Cause Analysis and Corrective Action Plan for Philadelphia Energy Solutions Refining and Marketing (PES) as required by40 CFR 63 Subpart CC, §63.658(g).

If there are any questions or concerns, please contact Janet Ferris at 215-339-7146 or via email at Janet.Ferris@pes-companies.com or Shereen Guirguess at 215.339.7053 or via email at Shereen.Guirguess@pes-companies.com.

Sincerely,

Daniel J Statile
VP GM, Refining Complex

JF/sg

Enclosures: Root Cause Analysis and Corrective Action Plan

Benzene Fenceline Root Cause Analysis and Corrective Action Plan

Date of Report:	1) June 11, 2019	

Description:

The Philadelphia Energy Solutions Refining and Marketing LLC (PES) Philadelphia Refinery ΔC for benzene fenceline is above the EPA action level of 9 $\mu g/m^3$.

Root Cause:

Below are the stations that had caused the action level of 9 $\mu g/m^3$ to be exceeded along with their nearby sources.

1) Station 14: this station has multiple nearby sources as shown below:

   a) #2 Separator and associated equipment: used to separate oil and solids from the incoming refinery and chemical unit process wastewater. The separator is covered, sealed, and vented through carbon canisters. Oil skimmed from the separator is stored in an adjacent 42,000-gallon tank before being transferred for reprocessing in the crude unit. Wastewater effluent from the separator is pumped into an adjacent 420,0000-gallon external floating roof tank before being sent to the Wastewater Treatment Plant.

   b) An offsite release of gasoline to the soil and into the Schuylkill River from a third-party petroleum terminal to the west of the Refinery on the other side of the River. Ongoing soil and groundwater remediation activities have also contributed to benzene in air.

2) Station 16: this station has multiple nearby sources as shown below:

   a) #4 Separator and associated equipment: used to separate oil and solids from the incoming wastewater plant. The separator is covered, sealed, and vented through carbon canisters. Wastewater effluent from the separator is pumped into an adjacent 336,0000-gallon external floating roof tank before being sent to the Wastewater Treatment Plant.

   b) Skimmed Oil tanks: Oil from the #4 separator is transferred to two adjacent 21,000-gallon tanks using manually operated pumps. Emissions from the tanks during transfer of oil is piped back to the separator. Oil from these tanks is removed by vacuum truck for reprocessing in the crude unit.

   c) The offsite source mentioned for Station 14 above although further away, likely also contributed to benzene levels at Station 16.

3) Stations 7/8:

a) A nearby source to those two stations are four benzene aboveground storage tanks and a benzene railcar unloading area.

4) Station 13:

a) A nearby source to this station is an offsite release adjacent to and into the Schuylkill River as described for Station 14 above.

5) Station 33:

a) A nearby source to this station is an offsite release adjacent to and into the Schuylkill River as described for Station 14 above.

Action taken to reduce benzene levels

1) Station 14:

a) 2 Separator:

i. Operators were retrained with emphasis on conducting dedicated inspections to ensure the separator cover hatches are being kept closed and latched.
ii. Additional VOC monitoring above the required quarterly BWON was performed starting in early 2018. Additional monitoring includes determining benzene concentrations with a hand held PID monitor (Ultra-RAE with benzene tube) twice per week and checking for VOC leaks using the FLIR infrared camera once per week. A new PID (Tiger Select with benzene tube) was purchased and benzene monitoring using this PID was initiated in February 2019. The Tiger Select can detect benzene at lower concentrations (ppb vs. ppm).
iii. Seal repairs of the separators covers are now being completed more frequently based on the weekly results of the FLIR camera and the PID Tiger Select monitor. In 2017 through early 2019, over $400,000 was spent on repairs for separator covers (2 separator and 4 separator combined). These included replacing packing and caulking, and asphalt sealing around the separator wall at the soil surface.
iv. Additional Separator effluent sampling for benzene was initiated in June 2018. Samples are collected three times a week to look for changes in wastewater benzene concentrations. Further upstream sampling is performed, as necessary, to identify the source of the benzene
v. Additional monitoring stations were installed within the refinery, closer to source areas, to assist in understanding possible benzene sources impacting the fenceline. These samples are collected on a weekly frequency instead of a biweekly frequency to better identify the time period of benzene emissions.
vi. In April 2019, the sewer lid upstream of the 2 separator was replaced with a new concrete air sealed lid for a better sealing system. Soils were excavated around the

sewer box and associated piping to inspect it for leaks. No visible leaks were observed and the area was backfilled with flowable fill.

vii. A meeting was held with the neighboring terminal to discuss methods they could use to reduce benzene emissions associated with their remediation activities.

2) Station 16:

a) 4 Separator:

i. Operators were retrained with emphasis on conducting dedicated inspections to ensure the separator cover hatches are being kept closed and latched.

ii. Additional VOC monitoring above the required quarterly BWON was performed starting in early 2018. Additional monitoring determining benzene concentrations with a hand held PID monitor (Ultra-RAE with benzene tube) twice per week and checking for VOC leaks using the FLIR camera once per week. A new PID (Tiger Select with benzene tube) was purchased and monitoring using this PID was initiated in February 2019. The Tiger Select can detect benzene at lower concentrations (ppb vs. ppm).

iii. Seal repairs of the separators covers are now being completed more frequently based on the weekly results of the FLIR camera and the PID monitor. In 2017 through early 2019, over $400,000 was spent on repairs and improvements for separator covers (2 separator and 4 separator combined). These included replacing packing and caulking, and asphalt sealing around the separator wall at the soil surface.

iv. An analysis of the carbon canister system was completed in 2018 to ensure that the flow from the separator is going through the carbon canisters. Carbon was replaced prior to breakthrough to minimize possible backpressure from older or wetter carbon.

v. Additional Separator effluent sampling for benzene was initiated in June 2018. Samples are collected three times a week to look for changes in wastewater benzene concentrations. Further upstream sampling is performed, as necessary, to identify the source of the benzene.

vi. Additional monitoring stations were installed within the refinery, closer to source areas, to assist in understanding possible benzene sources impacting the fenceline. These samples are collected on a weekly frequency instead of a biweekly frequency to better identify the time period of benzene emissions.

vii. PES recoated the separator cover with a new sealant on May 31, 2019. This should reduce benzene emissions from the concrete cover from non-visible minor cracks. (Any visible cracks are routinely sealed.)

b) Skimmed Oil tanks:

i. Operators were retrained to ensure hatches are closed and latched.
ii. One of the Tanks was replaced in 2018.
iii. Like for the separator, weekly monitoring using the FLIR camera and ultra- Rae to identify leak points for repair was initiated in late 2017.
iv. Starting in mid-2018, a scrubber system has been used on the vacuum truck exhaust when emptying the tanks.

3) Stations 7/8:

i. An engineering analysis was completed on each of the benzene tanks venting system to ensure that there are no extra vents present. It was determined that one tank had extra vents. Sealing of the extra vents was completed.
ii. An inspection of the tank secondary seals was completed for each of those tanks to ensure that that there are no gaps that could cause benzene emissions. No inspection deficiencies were found.
iii. The benzene tanks and benzene unloading operations are part of non-refinery operations and therefore not sources to be controlled for benzene fenceline monitoring required by 40 CFR Part 63 Subpart CC. As discussed in more detail below, PES submitted a request to EPA and AMS for approval of a Site-Specific Monitoring Plan that would adjust the fenceline results from emissions that are caused by these non-refinery operations sources.

4) Station 13:

i. Installed AIHR sharks to determine the benzene source that caused a significant increase in benzene levels in the fourth quarter of 2018.
ii. Shark results clearly indicated that the source of the significantly higher benzene levels was from the remediation activities at the nearby petroleum terminal. PES had a meeting with the terminal company environmental management to discuss ongoing remediation activities and potential controls.

5) Station 33:

i. Installed AIHR sharks to determine the benzene source that caused a significant increase in benzene levels in the fourth quarter of 2018.
ii. See ii above for Station 13.

Along with the actions discussed above, PES submitted a site specific fenceline monitoring plan in March 2019 per Title 40 of the Code of Federal Regulations (CFR) Part 63, Subpart CC (MACT CC). Per 40 CFR §63.658(i), an owner or operation requires approval for a site-specific monitoring plan to account for offsite or onsite sources excluded under §63.640(g). The PES Refinery has non-MACT CC applicable onsite sources and offsite sources contributing to fenceline benzene concentrations; therefore, a site-specific monitoring plan was prepared in accordance with the requirements of 40 CFR §63.658.

Path forward:

i. Continue the additional sampling and inspection frequencies in the 2/4 separator areas and vacuum truck controls
ii. Continue to have discussions with the neighboring facility to discuss remediation activities and potential controls.
iii. Continue with inspection and repairs for inlet piping at the 2 separator.

Approval Section		
Name/Title	**Signature**	**Date**
Janet Ferris **Environmental Manager**	Janet Ferris	6/11/19
James Demes **Executive Director, Maintenance**	J. V. Demes	6/11/19
Michael Reed **Executive Director, Operation**	Michael J Reed	6/13/19