



**Marathon Petroleum Company LP**

**VIA FEDERAL EXPRESS**

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February 22, 2024

Mr. Stephen Weis  
EGLE, AQD, Detroit District  
3058 W. Grand Boulevard  
Suite 2-300  
Detroit, MI 48202



**RE: Response to 02/01/2024 Violation Notice Regarding North Plant Sulfur Recovery Unit; Marathon Petroleum Company LP, Michigan Refining Division**

Dear Mr. Weis:

This letter is in response to the February 01, 2024, Violation Notice (VN) issued to Marathon Petroleum Company LP, Michigan Refining Division (MPC). In the VN, Michigan Department of Environmental Quality, Air Quality Division (AQD), alleged that the following violations occurred January 14, 2024.

Process Description	Rule/Permit Condition Violated	Comments
Sulfur Block 2, Area 72, removes hydrogen sulfide from acid gas and converts it to elemental sulfur. The exhaust tail gas from the process is routed to a thermal oxidizer. Designated in the facility's ROP and PTI No. 113-22 as EU72-SULRBLOCK2-S1	PTI No. 113-22, EU72-SULRBLOCK2-S1, Special Condition (SC) I.2:  ROP No. MI-TOP-A9831-2012c, EU72-SULRBLOCK2-S1, SC I.2:  40 CFR 60.102a(f)(1)(i)	The thermal oxidizer exhaust for EU72-SULRBLOCK2-S1 exceeded the sulfur dioxide (SO <sub>2</sub> ) limit of 250 ppm, based on a 12-hour average. The Rule 912 report provides that the exceedance lasted for a duration of 35 hours between 9:00 PM on January 14, 2024, through 8:00 AM on January 16, 2024.

The remainder of this letter provides information requested in the VN, including: (1) the date(s) the alleged violation occurred; (2) an explanation of the causes and duration of the alleged violation; (3) whether the violation is ongoing; (4) a summary of the actions that have been taken and are proposed to be taken to correct the alleged violation and the dates by which these actions will take place; and (5) what steps are being taken to prevent a reoccurrence.

Date the Violation Occurred: The alleged violation occurred at 9:00 PM on January 14, 2024 and lasted until 8:00 AM on January 16, 2024. The alleged violation is not ongoing and ended at 8:00 AM on January 16, 2024.

### Explanation of the Causes and Duration of the Violation:

MPC is currently investigating the causes of the alleged violation in accordance with the 45-day timeline specified in 40 CFR 60.103 and, at this point, has identified the following:

1. Amine contamination with hydrocarbon – Rich amine generated at the Gas Oil Hydrotreating Unit (GOHT) was contaminated with hydrocarbon after an unplanned shutdown. It is believed that the combination of cold ambient temperatures and high wind gusts contributed to level instrumentation issues within the GOHT that resulted in the shutdown. The hydrocarbon level in the Cold Separator increased at 3:00 AM on January 14, 2024, when it is believed to have carried over to the GOHT high-pressure absorber and contaminated rich amine leaving the bottom of the tower. Rich amine from the GOHT high pressure absorber is routed to the North Plant Amine Regeneration Unit where amine salts are steam stripped to form amine acid gas feed for the North Plant Sulfur Recovery Unit (NP SRU).

Flow control to the North Plant Amine Regenerator is based on level in the Rich Amine Flash Drum and the level is determined by differential pressure. Hydrocarbon contamination in the amine contributed to increased pressure in the Rich Amine Flash Drum that was not relieved when the Coker Blowdown Vent Gas Compressor tripped offline due to level taps freezing during low ambient temperatures and high wind gusts. The combination of hydrocarbon in the amine and the loss of the Blowdown Vent Gas Compressor resulted in significant swings in rich amine flow to the amine regenerator.

Note that the Thermal Reactors in the North Plant Sulfur Recovery Unit are designed to combust a portion of the hydrogen sulfide (H<sub>2</sub>S) in the acid gas feed to SO<sub>2</sub> in order to achieve stoichiometric amounts of each in accordance with the balanced Claus Reaction. This ratio is two parts H<sub>2</sub>S to one part SO<sub>2</sub> and maximizes the efficiency of the Claus reactors in the NP SRU. The significant swings in rich amine flow to the amine regenerator resulted in similar swings in amine acid gas flow to the NP SRU. This resulted in nonstoichiometric amounts of H<sub>2</sub>S and SO<sub>2</sub> in the Claus reactors yielding less conversion to elemental sulfur and increased loading to the Tail Gas Treating Unit (TGTU).

2. Plugging in the Quench Section of TGTU 1 – SO<sub>2</sub> breakthrough to the quench section of TGTU 1 resulted in an acidic environment and the formation of elemental sulfur which caused plugging in the unit. The pH of the circulating water in the quench section of the unit decreased at around 9:00 AM on January 14, 2024, indicating SO<sub>2</sub> breakthrough to the quench section and ultimately to the amine absorber. The increased pressure differential through the quench section due to the formation of elemental sulfur resulted in a reduction in circulating quench water which increased the temperature of the gas routed to the amine absorber. This increased temperature shifted the vapor liquid equilibrium enough to reduce the effectiveness of the amine to react with H<sub>2</sub>S to form amine salts. Consequently, increased amounts of H<sub>2</sub>S was routed to the incinerator.
3. Plugging in the transfer line from the NP SRU Train-B Pit to the Sulfur Tank – Reduced amine acid gas feed to the NP SRU throughout the morning of January 14, 2024, resulted in the B-Train being placed on “hot standby” such that it would be available if needed. This occurred at approximately 9:20 AM on January 14, 2024. When the plugged quench section of TGTU 1 prevented the NP SRU A-Train from reducing the SO<sub>2</sub> concentration at the incinerator, a portion of the amine acid gas feed

was shifted to the NP SRU B-Train. This occurred at 7:55 PM on January 14, 2024. Immediately upon increasing the load to the NP SRU B-Train, the sulfur level in the B-Train Sulfur Pit began to rise and it was discovered that the transfer line from the B-Train Sulfur Pit to the Sulfur Tank was plugged. It is believed that the combination of cold ambient temperatures and high wind gusts contributed to sulfur freezing in the transfer line and causing the plug. The NP SRU B-Train operated until the pit level was full and then amine acid gas feed was shifted back to the NP SRU A-Train.

Summary of Corrective/Preventative Actions Taken:

In order to minimize emissions during this event, the sulfur shedding plan was initiated and feed to multiple units was reduced while also managing the risks related to unplanned unit shutdowns.

The Blowdown Vent Gas Compressor was able to be restarted at approximately 6:20 PM on January 14, 2024. This helped to alleviate the rich amine flow swings to the amine regenerator and allowed stoichiometric ratios of H<sub>2</sub>S and SO<sub>2</sub> to be consistently maintained in the NP SRU.

The plugged quench section in the NP SRU TGTU 1 was mitigated by a caustic flush. The caustic flush was initiated at approximately 11:55 PM on January 15, 2024. The pressure drop across the quench section was reduced, quench water circulation was increased, and the temperature of the gas routed to the amine absorber was reduced, resulting in normal SO<sub>2</sub> concentrations at the incinerator. The SO<sub>2</sub> concentration at the incinerator was below 50 ppm at approximately 3:15 AM on January 16, 2024, and continued dropping to below 10 ppm later in the day.

The plugged transfer line from the NP SRU B-Train Pit to the sulfur tank was resolved by routing a higher pressure steam source to the line in order to increase the temperature enough to liquify the sulfur plug.

If you have questions concerning this submittal, please feel free to contact Christopher Abshire at 734-933-0224.

Sincerely,

Marathon Petroleum Company LP

By: MPC Investment LLC, General Partner



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John S. Stefko, Deputy Assistant Secretary

Attachments

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