UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

In the Matter of:	)	
	)	
Marathon Petroleum Company LP	)	**NOTICE AND FINDING**
Canton, Ohio	)	**OF VIOLATION**
	)	
Proceedings Pursuant to	)	**EPA-5-24-OH-3**
Section 113(a)(1) and (3) of the	)	
Clean Air Act, 42 U.S.C.	)	
§ 7413(a)(1) and (3)	)	

NOTICE AND FINDING OF VIOLATION

The U.S. Environmental Protection Agency (EPA) is issuing this Notice and Finding of Violation under Section 113(a)(1) and (3) of the Clean Air Act (CAA), 42 U.S.C. § 7413(a)(1) and (3). Based on available information and as explained below, EPA finds that Marathon Petroleum Company LP (MPC) has violated the Ohio State Implementation Plan (SIP) and Sections 111 and 112 of the CAA, 42 U.S.C. §§ 7411–7412, at its petroleum refinery in Canton, Ohio. Specifically, MPC has violated the Ohio construction permit program at Ohio Administrative Code (OAC) Chapter 3745-31, the Standards of Performance for Petroleum Refineries at 40 C.F.R. Part 60, Subpart J (Refinery NSPS Subpart J), the Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007 at 40 C.F.R. Part 60, Subpart Ja (Refinery NSPS Subpart Ja), and the National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units at 40 C.F.R. Part 63, Subpart UUU (Refinery MACT 2). The violations are set forth as follows:

Statutory and Regulatory Authority

Refinery NSPS Subparts J and Ja

1. Section 111 of the CAA, 42 U.S.C. § 7411, requires EPA to implement a New Source Performance Standards (NSPS) program for the control of air pollutant emissions. EPA's NSPS regulations promulgated pursuant to Section 111 impose nationally uniform emission standards on new or modified stationary sources falling within industrial categories that significantly contribute to air pollution.

2. On March 15, 1978, EPA promulgated Standards of Performance for New Stationary Sources: Petroleum Refinery Claus Sulfur Recovery Plants at Refinery NSPS Subpart J. 43 Fed. Reg. 10866 (Mar. 15, 1978), as amended at 44 Fed. Reg. 61542 (Oct. 25, 1979).

3. On June 24, 2008, EPA amended Refinery NSPS Subpart J and promulgated separate standards of performance for new, modified, or reconstructed process units at petroleum refineries at Refinery NSPS Subpart Ja. 73 Fed. Reg. 35867 (June 24, 2008), as amended at 77 Fed. Reg. 56464 (Sept. 12, 2012).

4. Refinery NSPS Subpart J applies to affected facilities in petroleum refineries including, among other affected facilities, fuel gas combustion devices that commenced construction, reconstruction, or modification after June 11, 1973, and on or before May 14, 2007, and all Claus sulfur recovery plants that commenced construction, reconstruction, or modification after October 4, 1976, and on or before May 14, 2007, except Claus plants with a design capacity for sulfur feed of 20 long tons per day (LTD) or less. *See* 40 C.F.R. § 60.100.

5. Refinery NSPS Subpart Ja applies to affected facilities in petroleum refineries including, among other affected facilities, fuel gas combustion devices (including process heaters) that commenced construction, modification, or reconstruction after May 14, 2007. *See* 40 C.F.R. § 60.100a.

6. Refinery NSPS Subpart J at 40 C.F.R. § 60.101(g) defines "fuel gas combustion device" as any equipment, such as process heaters, boilers, and flares used to combust fuel gas, except facilities in which gases are combusted to produce sulfur or sulfuric acid.

7. Refinery NSPS Subpart Ja at 40 C.F.R. § 60.101a defines "fuel gas combustion device" as any equipment, such as process heaters and boilers, used to combust fuel gas. For the purposes of Refinery NSPS Subpart Ja, fuel gas combustion device does not include flares or facilities in which gases are combusted to produce sulfur or sulfuric acid.

8. Refinery NSPS Subpart J at 40 C.F.R. § 60.104(a)(1) provides, in part, that no owner or operator of an affected fuel gas combustion device shall burn any fuel gas that contains hydrogen sulfide (H_2S) in excess of 230 milligrams per dry standard cubic meter (mg/dscm).

9. Refinery NSPS Subpart J at 40 C.F.R. § 60.105(e)(3)(ii) provides that, for the purpose of excess emissions and monitoring systems performance reports required by 40 C.F.R. § 60.7(c), periods of excess sulfur dioxide (SO_2) emissions from fuel gas combustion shall be determined and reported as all rolling 3-hour periods during which the average concentration of H_2S as measured by the H_2S continuous monitoring system (CMS) under 40 C.F.R. § 60.105(a)(4) exceeds 230 mg/dscm.

10. Refinery NSPS Subpart Ja at 40 C.F.R. § 60.102a(g)(1)(ii) provides, in part, that the owner or operator of an affected fuel gas combustion device shall not burn in any fuel gas combustion device any fuel gas that contains H_2S in excess of 162 parts per million by volume (ppmv) determined hourly on a 3-hour rolling average basis.

11. Refinery NSPS Subpart Ja at 40 C.F.R. § 60.107a(i)(1)(ii) provides, in part, that, for the purpose of excess emissions and monitoring systems performance reports required by 40 C.F.R. § 60.7(c), periods of excess SO_2 emissions from fuel gas combustion devices are defined as each rolling 3-hour period during which the average concentration of H_2S as measured by the H_2S CMS required under 40 C.F.R. § 60.107a(a)(2) exceeds 162 ppmv.

12. Based on the definition of "standard conditions" at 40 C.F.R. § 60.2, the 162 ppmv H_2S limit specified by Refinery NSPS Subpart Ja is equivalent to the 230 mg/dscm H_2S limit specified by Refinery NSPS Subpart J.

13. Refinery NSPS Subpart J at 40 C.F.R. § 60.101(i) defines "Claus sulfur recovery plant" as a process unit which recovers sulfur from H_2S by a vapor-phase catalytic reaction of SO_2 and H_2S.

14. Refinery NSPS Subpart J at 40 C.F.R. § 60.104(a)(2)(i) provides, in part, that no owner or operator shall discharge or cause the discharge of any gases into the atmosphere containing in excess of 250 ppmv on a dry basis (ppmvd) SO_2 at zero percent excess air from any affected Claus sulfur recovery plant with an oxidation control system.

15. Refinery NSPS Subpart J at 40 C.F.R. § 60.105(e)(4)(i) provides that, for the purpose of reports under 40 C.F.R. § 60.7(c), periods of excess SO_2 emissions from Claus sulfur recovery plants shall be determined and reported as all 12-hour periods during which the average concentration of SO_2 as measured by the SO_2 continuous monitoring system under 40 C.F.R. § 60.105(a)(5) exceeds 250 ppmvd at zero percent excess air.

16. 40 C.F.R. § 60.7(c) provides, in part, that an owner or operator required to install a continuous monitoring device by any NSPS shall submit excess emissions and monitoring systems performance report and/or summary report form to the Administrator of EPA or his authorized representative. Written reports of excess emissions shall include, among other information, specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility, along with the nature and cause of any malfunction (if known) and the corrective action taken or preventative measures adopted.

17. Section 111(e) of the CAA, 42 U.S.C. § 7411(e), prohibits any owner or operator of any new source to operate such source in violation of any standard of performance applicable to such source.

Refinery MACT 2

18. Section 112(c) of the CAA, 42 U.S.C. § 7412(c), requires EPA to promulgate a list of all categories and subcategories of major sources and area sources of hazardous air pollutants (HAPs).

19. Section 112(d) of the CAA, 42 U.S.C. § 7412(d), requires EPA to establish emission standards for each category or subcategory of major sources and area sources of HAPs listed for regulation under Section 112(c). These emission standards are known as the National Emission Standards for Hazardous Air Pollutants (NESHAP). The purpose of the NESHAP is to apply maximum achievable control technology (MACT) to each source category for the reduction of HAP emissions.

20. On April 11, 2002, EPA promulgated Refinery MACT 2 at 40 C.F.R. Part 63, Subpart UUU. 67 Fed. Reg. 17762 (Apr. 11, 2002).

21. Refinery MACT 2 applies to "affected sources" at petroleum refineries and establishes emission standards to reduce HAP emissions from petroleum refineries that include, among other HAPs, the reduced sulfur compounds carbonyl sulfide (COS) and carbon disulfide (CS_2). *See* 40 C.F.R. § 63.1562(a) and 63.1568(a)(1).

22. Refinery MACT 2 at 40 C.F.R. § 63.1562(b)(3) provides that "affected sources" subject to Refinery MACT 2 include the process vent or group of process vents on Claus or other types of sulfur recovery plant units or the tail gas treatment units serving sulfur recovery plants that are associated with sulfur recovery.

23. Refinery MACT 2 at 40 C.F.R. § 63.1568(a) provides that owners and operators of affected sulfur recovery units (SRUs) are required to, among other things, meet each applicable emission limitation in Table 29 to Refinery MACT 2, prepare an operation, maintenance, and monitoring (OMM) plan according to the requirements in 40 C.F.R. § 63.1574(f), and operate at all times according to the procedures in the OMM plan.

24. Table 29 to Refinery MACT 2 provides, in part, that each new or existing Claus SRU that uses an oxidation control system, is part of a sulfur recovery plant with design capacity greater than 20 LTD, and is subject to Refinery NSPS Subpart J shall meet the emission limit for each process vent of 250 ppmvd SO_2 at zero percent excess air.

25. Refinery MACT 2 at 40 C.F.R. § 63.1568(c)(1) provides, in part, that continuous compliance with each applicable emission limitation in Table 29 must be demonstrated according to the methods specified in Table 34 to Refinery MACT 2.

26. Table 34 to Refinery MACT 2 provides, in part, that each new or existing Claus SRU that uses an oxidation control system, is part of a sulfur recovery plant with design capacity greater than 20 LTD, and is subject to Refinery NSPS Subpart J shall demonstrate continuous compliance by, among other things, maintaining each 12-hour rolling average concentration of SO_2 at or below the applicable emission limitation.

27. Refinery MACT 2 at 40 C.F.R. § 63.1574(f) provides that the owner or operator must prepare and implement an OMM plan for each control system and continuous monitoring system for each affected source as required by Subpart UUU of Part 63. The purpose of this plan is to detail the operation, maintenance, and monitoring procedures the owner or operator will follow.

28. Refinery MACT 2 at 40 C.F.R. § 63.1574(f)(2) provides that each OMM plan must include, among other requirements: (i) process and control device parameters to be monitored for each affected source, along with established operating limits, and (ii) procedures for monitoring emissions and process and control device operating parameters for each affected source.

29. Refinery MACT 2 at 40 C.F.R. § 63.1579 defines “control device” as any equipment used for recovering, removing, or oxidizing HAP in either gaseous or solid form. Such equipment includes, but is not limited to, condensers, scrubbers, electrostatic precipitators, incinerators, flares, boilers, and process heaters.

30. Refinery MACT 2 at 40 C.F.R. § 1570(c) provides, in part, that the owner or operator must at all times operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

31. Section 112(i)(3) of the CAA, 42 U.S.C. § 7412(i)(3), and 40 C.F.R. § 63.4, prohibit the owner or operator of any source from operating such source in violation of any NESHAP applicable to the source.

Ohio SIP

32. Section 110 of the CAA, 42 U.S.C. § 7410, requires each state to adopt and submit to EPA a plan that provides for implementation, maintenance, and enforcement of primary and secondary National Ambient Air Quality Standards in the state. Upon approval by EPA, the plan becomes a part of the applicable federally enforceable SIP for the state. *See* 42 U.S.C. § 7410(a)(1).

33. On January 22, 2003, EPA approved Ohio's construction permit program for Prevention of Significant Deterioration in attainment areas, OAC Chapter 3745-31, as part of the federally enforceable SIP. 68 Fed. Reg. 2909 (Jan. 22, 2003).

34. OAC Rule 3745-31-05(A)(3) states that the director of the Ohio Environmental Protection Agency (OEPA) shall issue a permit-to-install (PTI) or a permit-to-install and operate on the basis of the information appearing in the application, or information gathered by or furnished to OEPA, or both, if the director determines that the installation, modification, or operation of the air contaminant source will, among other things, employ best available technology (BAT).

35. OAC Rule 3745-31-01 defines BAT as any combination of work practices, raw material specifications, throughput limitations, source design characteristics, an evaluation of the annualized cost per ton of air pollutant removed, and air pollution control devices that have been previously demonstrated to the director of environmental protection to operate satisfactorily in this state or other states with similar air quality on substantially similar air pollution sources.

36. Section 113(a)(1) of the CAA, 42 U.S.C. § 7413(a)(1), provides, in part, that whenever the Administrator of EPA finds that any person has violated or is in violation of any requirement or prohibition of an applicable SIP or permit, the Administrator shall notify the person and the State in which the plan applies of such finding.

Title V Permit Program

37. Title V of the CAA, 42 U.S.C. §§ 7661–7661f, and its implementing regulations at 40 C.F.R. Part 70 establish an operating permit program for certain sources, including certain sources subject to standards under Section 112 of the CAA. The purpose of Title V is to ensure that all "applicable requirements" for compliance with the CAA are included in the Title V operating permit for the source.

38. Pursuant to Section 502(a) of the CAA, 42 U.S.C. § 7661a(a), it is unlawful for any person to, among other things, operate a major source subject to Title V except in compliance with a Title V permit after the effective date of any permit program approved or promulgated under Title V of the CAA.

39. On July 21, 1992, EPA promulgated the State Operating Permit Programs at 40 C.F.R. Part 70. 57 Fed. Reg. 32295 (July 21, 1992).

40. 40 C.F.R. § 70.7(b) provides that the owner or operator of a Title V source shall not operate such source after the date that a timely and complete Title V permit application is required to be submitted, except in compliance with a permit issued under Part 70.

Statement of Facts

Canton Refinery

41. MPC owns and operates a petroleum refinery at 2408 Gambrinus Avenue SW, Canton, Ohio (Canton Refinery).

42. The Canton Refinery has fuel gas combustion devices that include process heaters, the #14 Boiler, and the Ultra-Low Sulfur Diesel (ULSD) Distillate Hydrotreater Reactor (DHR) Charge Heater.

43. The North Fuel Drum at the Canton Refinery feeds fuel gas to process heaters for the Continuous Catalytic Reformer. All other permitted fuel gas combustion devices (except flares) are fed by the South Fuel Drum.

44. The process heaters (except the Kerosene Hydrotreater Heater 4-2-B-1, Iso-Stripper Heat Exchanger 4-24-B-1, and Naphtha Pre-Treater Heater 4-30-B-1) and the #14 Boiler are affected facilities under Refinery NSPS Subpart J because they are equipment at a refinery used to combust fuel gas that commenced construction, reconstruction, or modification after June 11, 1973, and on or before May 14, 2007.

45. The ULSD DHR Charge Heater is an affected facility under Refinery NSPS Subpart Ja because it is equipment at a refinery used to combust fuel gas that commenced construction, modification, or reconstruction after May 14, 2007.

46. The Canton Refinery has a Claus sulfur recovery plant with two Claus units, SRU #34 and SRU #38, that process refinery acid gases.

47. The SRUs vent to either of two Shell Claus Off-gas Treatment (SCOT) units, SCOT 1 and SCOT 2, that reduce and hydrolyze sulfur compounds in the SRU tail gas (*e.g.*, SO_2, COS, and CS_2) to H_2S on a hydrotreating catalyst within the SCOT reactor. SCOT 1 and SCOT 2 share a single amine treating unit (SCOT TGTU), where H_2S is recovered and recycled to the SRUs.

48. The SCOT TGTU vents to a thermal oxidizer (TO) for conversion of the residual reduced sulfur compounds to SO_2 prior to discharge into the ambient air via the TO stack.

49. The Claus sulfur recovery plant is an affected facility under Refinery NSPS Subpart J because it is a process unit at a petroleum refinery that recovers sulfur from H_2S by a vapor-phase catalytic reaction of SO_2 and H_2S with a design capacity for sulfur feed of greater than 20 LTD for which construction or modification commenced after October 4, 1976 and on or before May 14, 2007.

50. The TO stack is an affected source under Refinery MACT 2 because it is a process vent on a tail gas treating unit serving a sulfur recovery plant that is associated with sulfur recovery.

51. The TO and SCOT units are “control devices” as set forth by Refinery MACT 2 at 40 C.F.R. § 63.1579 because they are equipment used for recovering, removing, or oxidizing HAP in gaseous form.

Claus Sulfur Recovery Plant PTI

52. On February 25, 2014, OEPA issued PTI Permit Number P0112479 (2014 PTI) for the Claus sulfur recovery plant at the Canton Refinery.

53. The 2014 PTI identifies Claus Trains #34 and #38 (*i.e.*, SRU #34 and SRU #38 with associated control equipment) as Emission Units (EUs) P011 and P016, respectively. P011 and P016 share the SCOT TGTU and TO and are permitted as a single EU Group.

54. Condition C.1(b)(1)(a) of the 2014 PTI specifies BAT emission limits for EUs P011 and P016 as follows:

a. Combined SO_2 emissions from P011 and P016 shall not exceed 21.1 pounds per hour (lbs/hr) as a rolling, 12-hour average;

b. SO_2 emissions from P016 shall not exceed 8.66 lbs/hr; and

c. SO_2 emissions from P016 shall not exceed 37.9 tons per year.

Canton Refinery Title V Permit

55. On June 21, 2021, OEPA issued Title V Permit Number P0127829 for the Canton Refinery (2021 Title V Permit), which includes requirements for the fuel gas combustion devices and the Claus sulfur recovery plant.

56. Condition C.1(b)(1)(i) of the 2021 Title V Permit provides that MPC shall not burn any fuel gas in process heaters that contains H_2S in excess of 230 mg/dscm or 162 ppmv, as set forth by Refinery NSPS Subpart J at 40 C.F.R. § 60.104(a)(1).

57. Condition C.2(b)(1)(h) of the 2021 Title V Permit provides that MPC shall not burn any fuel gas in the #14 Boiler that contains H_2S in excess of 230 mg/dscm or 162 ppmv, as set forth by Refinery NSPS Subpart J at 40 C.F.R. § 60.104(a)(1).

58. Condition C.3(b)(1)(i) of the 2021 Title V Permit provides, in part, that MPC shall comply with the emission limits set forth by Refinery NSPS Subpart Ja at 40 C.F.R. § 60.102a(g)(1) for the ULSD DHR Charge Heater. MPC elects to comply with the option to not burn any fuel gas that contains H_2S in excess of 162 ppmv determined hourly on a 3-hour rolling average basis in accordance with 40 C.F.R. § 60.102a(g)(1)(ii).

59. Condition C.8(b)(1)(a) of the 2021 Title V Permit incorporates the BAT SO_2 emission limitations for EUs P011 and P016 set forth in Condition C.1(b)(1)(a) of the 2014 PTI.

60. Condition C.8(b)(1)(e) of the 2021 Title V Permit provides that SO_2 emissions from EUs P011 and P016 shall not exceed 250 ppmvd as a rolling, 12-hour average at zero percent excess air, as set forth by Refinery NSPS Subpart J at 40 C.F.R. § 60.104(a)(2)(i).

61. Condition C.8(b)(1)(g) of the 2021 Title V Permit provides that the SO_2 emission limitation for EUs P011 and P016 specified by Refinery MACT 2 is equivalent to the SO_2 emission limitation specified by Refinery NSPS Subpart J.

62. Condition B.30(a) of the 2021 Title V Permit provides, in part, that MPC shall submit reports within 30 days following the end of each calendar quarter to the Canton City Health Department, Air Pollution Control Division, documenting all instances of SO_2 emissions from EUs P011 and P016 in excess of any applicable limit specified by the Title V permit, 40 C.F.R. Part 60, OAC Chapter 3745-18, and any other applicable rules or regulations. The report shall document, among other things, the reason (if known) and the corrective actions taken (if any) for each exceedance, as set forth at 40 C.F.R. § 60.7(c).

63. Condition C.8(b)(2)(i) of the 2021 Title V Permit provides that MPC must at all times operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions in accordance with Refinery MACT 2 at 40 C.F.R. § 1570(c).

64. Condition C.8(c)(2) of the 2021 Title V Permit provides that MPC shall prepare an OMM plan according to the requirements in Refinery MACT 2 at 40 C.F.R. § 63.1574(f) and operate at all times according to the procedures in the plan.

Information Request and Document Review

65. Pursuant to Section 114(a) of the CAA, 42 U.S.C. § 7414(a), EPA issued an Information Request to MPC on August 23, 2023.

66. On September 21, 2023, MPC provided a response to the Information Request (September 2023 Documents).

67. The information gathered from reviewing the September 2023 Documents includes, but is not limited to, the facts set forth below.

OMM Plan

68. Pursuant to Refinery MACT 2, MPC developed an OMM plan for affected sources at the Canton Refinery. The effective date of the OMM plan provided in the September 2023 Documents is December 14, 2018 (2018 OMM Plan).

69. Section 5.0 of the 2018 OMM Plan covers the Claus sulfur recovery plant at the Canton Refinery.

70. Section 5.0 of the 2018 OMM Plan does not provide control device parameters or established operating limits for the SCOT units.

71. Section 5.0 of the 2018 OMM Plan does not provide procedures for monitoring control device operating parameters for the SCOT units.

December 2022 Freeze Events

72. The Claus sulfur recovery plant at the Canton Refinery began experiencing multiple unit upsets on or around December 23, 2022, including upsets of SRU #34, SCOT 1, and SCOT 2.

73. MPC identified the cause of the December 2022 Claus sulfur recovery plant upsets as freeze events that resulted from cold weather. The temperature in the Akron-Canton area dropped to a low of approximately -5°F on December 23, 2022.

74. The continuous emissions monitoring system (CEMS) for EUs P011 and P016 recorded the following SO_2 emission deviations between December 23, 2022 and December 28, 2022:

a. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 250 ppmvd at zero percent excess air for 44 hours;

b. The rolling, 12-hour average SO_2 emissions from P016 exceeded 8.66 lbs/hr for 44 hours; and

c. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 21.1 lbs/hr for 53 hours.

75. MPC also reported that the unplanned shutdown of the Claus sulfur recovery plant on December 23, 2023 resulted in acid gas with high H_2S concentrations going to the fuel gas system.

76. The H_2S CMSs for both the North and South Fuel Drums fuel gas recorded the rolling 3-hour average concentration of H_2S in excess of 162 ppmv for 3 hours on December 23, 2022.

January 2023 SO_2 Exceedance Events

77. Claus sulfur recovery plant equipment at the Canton Refinery underwent multiple shutdown and startup events in January 2023, as summarized below.

a. Process data show that MPC shut down the SCOT 2 reactor system on January 11, 2023. SCOT 1 continued to operate.

b. MPC reported experiencing an unplanned shutdown of SRU #34 on January 14, 2023. SRU #34 remained shut down until January 31, 2023.

c. MPC reported experiencing an unplanned shutdown of SRU #38 on January 19, 2023.

d. Process data show that MPC shut down the SCOT 1 reactor system on January 20, 2023.

e. Process data show that MPC ignited the SCOT 2 heater on January 24, 2023; however, the SCOT 2 reactor outlet temperature remained below the lower limit specified by MPC's operating procedures and the hydrogen analyzer downstream of the SCOT 2 reactor did not show a response. Hydrotreating catalyst temperature and hydrogen concentration at the catalyst are critical parameters for proper operation of the SCOT reactor.

f. MPC reported starting up SRU #38 at approximately 2:00 a.m. on January 25, 2023.

g. Process data show that MPC increased the SCOT 2 heater and reactor temperatures to normal operating conditions and introduced hydrogen for the hydrotreating reaction at approximately 11:00 a.m. on January 31, 2023.

78. The sequence of events described above show that MPC operated SRU #38 without properly operating either of the SCOT 1 or SCOT 2 control devices from approximately 2:00 a.m. on January 25, 2023 to 11:00 a.m. on January 31, 2023.

79. At approximately 4:00 p.m. on January 30, 2023, the SO_2 concentration measured by the CEMS for EUs P011 and P016 began to sharply increase. An additional SO_2 concentration spike occurred on the morning of January 31, 2023.

80. On or around January 31, 2023, MPC initiated a startup of SRU #34 and SCOT 1.

81. MPC reported activating an emergency stop on SCOT 1 on January 31, 2023 at 8:44 p.m. during the startup in response to a high temperature excursion in the SCOT 1 reactor caused by operator error. MPC added nitrogen to cool the SCOT 1 reactor following the emergency stop.

82. MPC reported that the emergency stop and nitrogen purge of SCOT 1 on January 31, 2023, caused an SO_2 emission exceedance.

83. The CEMS for EUs P011 and P016 recorded the following SO_2 emission deviations between January 30, 2023 and February 1, 2023:

a. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 250 ppmvd at zero percent excess air for 10 hours;

b. The rolling, 12-hour average SO_2 emissions from P016 exceeded 8.66 lbs/hr for 40 hours; and

c. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 21.1 lbs/hr for 15 hours.

84. In its quarterly report submitted to the Canton City Health Department, Air Pollution Control Division, MPC incorrectly attributed the cause of all SO_2 exceedances listed in Paragraph 83 to the startups of SRU #34 and SCOT 1 that occurred on January 31, 2023. MPC did not document a reason for the exceedances that began on January 30, 2023 (prior to the startup of SRU #34 and SCOT 1), and it did not document any corrective actions taken in response to those exceedances.

February 2023 Blower and SCOT 2 Trip Event

85. MPC reported that the SCOT Booster Blower experienced a trip event on February 2, 2023 that was caused by high liquid levels in the blower knock-out drum.

86. SCOT 2 was subsequently shut down due to high system pressure that developed with the blower offline. MPC reported that stable operation of SCOT 2 was reestablished approximately four hours after the shutdown.

87. The SO_2 concentration measured by the CEMS for EUs P011 and P016 began to sharply increase upon the SCOT 2 shutdown on February 2, 2023.

88. The CEMS for EUs P011 and P016 recorded the following SO_2 emission deviations between February 2, 2023 and February 3, 2023:

a. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 250 ppmvd at zero percent excess air for 10 hours; and

b. The rolling, 12-hour average SO_2 emissions from P016 exceeded 8.66 lbs/hr for 14 hours.

February 2023 SCOT TGTU Deviation Event

89. An SO_2 exceedance incident occurred at the Canton Refinery beginning on February 4, 2023 during a startup of SRU #34.

90. MPC determined that the cause of the incident was extremely high heat stable amine salt (HSAS) concentration combined with elevated amine temperature in the SCOT TGTU.

91. HSAS formation in amine treating systems consumes free amine solvent and decreases carbon dioxide slip, potentially leading to the degredation of H_2S absorption performance in the SCOT TGTU.

92. SO_2 breakthrough events, such as the January 2023 SO_2 exceedance events and February 2023 blower and SCOT 2 trip event described above, are known to cause the formation of HSASs.

93. MPC sampled the SCOT TGTU amine on January 27, 2023, prior to the SO_2 breakthrough events that occurred from January 30 to February 2, 2023. Laboratory analysis performed by MPC showed that free amine concentration was slightly below the recommended operating range and HSAS concentration was more than double the recommended limit specified by MPC's Guidelines for Amine Quality.[1]

94. MPC again sampled the SCOT TGTU amine on February 3, 2023, after the SO_2 breakthrough events that occurred from January 30 to February 2, 2023.

95. Prior to receiving the laboratory results from the February 3, 2023 amine sample, MPC proceeded to start up SRU #34 on February 4, 2023.

96. The SO_2 concentration measured by the CEMS for EUs P011 and P016 began increasing upon startup of SRU #34. MPC attempted to troubleshoot the high SO_2 measurements by increasing the amine solvent circulation rate, increasing heat duty for amine solvent regeneration, and adding fresh amine, but was unsuccessful.

[1] MPC specified low and high limits for free amine concentration at its control board that are inconsistent with MPC's Guidelines for Amine Quality. The free amine concentration of the January 27, 2023 sample was within the control board limits but outside the limits of the guidelines.

97. On February 5, 2023, MPC's laboratory analysis found the free amine concentration in the February 3, 2023 sample to be significantly below normal operating conditions specified by MPC's Guidelines for Amine Quality.

98. On February 6, 2023, MPC's laboratory analysis found the HSAS concentration in the February 3, 2023 sample to be nearly six and a half times the recommended limit specified by MPC's Guidelines for Amine Quality. A third party laboratory analysis of the February 3, 2023 amine sample subsequently showed high levels of thiosulfate, which is consistent with HSAS formation from SO_2 breakthrough.

99. MPC developed a procedure for adding caustic to the SCOT TGTU for HSAS neutralization but did not report implementing this procedure in response to the extremely high HSAS concentration found in the February 3, 2023 sample.

100. MPC reported placing SRU #34 on hot standby at 3:19 p.m. on February 6, 2023, at which point the SO_2 concentration measured by the CEMS for EUs P011 and P016 began to fall.

101. The CEMS for EUs P011 and P016 recorded the following SO_2 emission deviations between February 4, 2023 and February 7, 2023:

a. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 250 ppmvd at zero percent excess air for 47 hours;

b. The rolling, 12-hour average SO_2 emissions from P016 exceeded 8.66 lbs/hr for 61 hours; and

c. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 21.1 lbs/hr for 49 hours.

March 2023 SRU #34 Trip Event

102. MPC reported that contractors accidently shut off instrument air to the acid gas control valves for SRU #34 on March 23, 2023, causing the valves to close and SRU #34 to shut down. MPC brought SRU #34 back online within half an hour of the shutdown.

103. Loss of acid gas to SRU #34 during the March 23, 2023 shutdown resulted in excess air and high temperature in the SCOT 2 reactor, causing the SCOT 2 reactor system to shut down and the SO_2 concentration measured by the CEMS for EUs P011 and P016 to increase.

104. MPC restarted the SCOT 2 reactor system within an hour of the shutdown and the SO_2 concentration measured by the CEMS correspondingly decreased.

105. MPC sampled the SCOT TGTU amine at 5:00 a.m. on March 24, 2023. Laboratory analysis of this sample found that the free amine concentration had decreased but was still at the low end of the normal operating range. The HSAS concentration was slightly higher than the recommended limit specified by MPC's Guidelines for Amine Quality.

106. Also around 5:00 a.m. on March 24, 2023, the amine solvent regeneration temperature began increasing, ultimately reaching a temperature approximately 25°F higher than the average operating temperature from the previous day. This was the highest regeneration temperature recorded in the process data that MPC provided in the September 2023 Documents. MPC has not established a high limit for the regeneration temperature.

107. At approximately 10:00 a.m. on March 24, 2023, the SO_2 concentration measured by the CEMS for EUs P011 and P016 began to increase.

108. MPC again sampled the SCOT TGTU amine at 12:00 p.m. on March 24, 2023. Laboratory analysis of this sample found that the free amine concentration had dropped significantly below normal operating conditions specified by MPC's Guidelines for Amine Quality but the change in HSAS concentration was insignificant compared to the 5:00 a.m. sample.

109. MPC reduced the amine solvent regeneration temperature for the SCOT TGTU at approximately 8:00 p.m. on March 24, 2023 and added fresh amine to the system at approximately 1:00 a.m. on March 25, 2023. The SO_2 concentration measured by the CEMS for EUs P011 and P016 began to decrease around this time.

110. MPC concluded that the SRU #34 trip event on March 23, 2023 caused the SCOT TGTU amine solvent to become contaminated and resulted in excess SO_2 emissions.

111. EPA finds that improper temperature control of amine solvent regeneration in the SCOT TGTU was also a causal factor for amine solvent degredation and excess SO_2 emissions.

112. The CEMS for EUs P011 and P016 recorded the following SO_2 emission deviations between March 24, 2023 and March 25, 2023:

a. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 250 ppmvd at zero percent excess air for 20 hours; and

b. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 21.1 lbs/hr for 19 hours.

May 2023 Power Outage

113. On May 24, 2023, the Canton Refinery experienced a complete loss of steam production due to a power outage at the #14 Boiler.

114. MPC subsequently performed a refinery shutdown over several hours in response to the loss of steam.

115. MPC determined that the power outage was caused by a trip of the North Main Breaker as a result of improper positioning of the breaker in a substation following preventative maintenance. The South Main Breaker was removed for maintenance at the time of the trip, so the North Main Breaker was a single point of failure.

116. Because steam was not available to regenerate the amine solvent in the SCOT TGTU, the SCOT TGTU was unable to remove H_2S from the tail gas being vented to the TO.

117. The CEMS for EUs P011 and P016 recorded the following SO_2 emission deviations between May 24, 2023 and May 27, 2023:

a. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 250 ppmvd at zero percent excess air for 68 hours;

b. The rolling, 12-hour average SO_2 emissions from P016 exceeded 8.66 lbs/hr for 72 hours; and

c. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 21.1 lbs/hr for 68 hours.

118. MPC also reported that the power outage and loss of steam event resulted in high H_2S concentration at the fuel gas system.

119. The H_2S CMSs for both the North and South Fuel Drums fuel gas recorded the rolling 3-hour average concentration of H_2S in excess of 162 ppmv for 55 hours between May 25 and 27, 2023.

July 2023 Power Outage

120. MPC reported that a power outage in the South Area of the Canton Refinery and subsequent loss of steam occurred on July 9, 2023.

121. Similar to the May 2023 power outage event, MPC reported that the loss of power and steam prevented the regeneration of amine solvent in the SCOT TGTU and resulted in an SO_2 exceedance from EUs P011 and P016.

122. MPC shut down both SRU #34 and SRU #38 in response to the power outage.

123. On July 12, 2023, MPC performed a startup of SRU #38 and the SO_2 concentration measured by the CEMS for EUs P011 and P016 sharply increased.

124. The free amine concentration in the SCOT TGTU was below normal operating conditions specified by MPC's Guidelines for Amine Quality at the time of the July 12, 2023 startup.

125. The amine solvent regeneration temperature in the SCOT TGTU was unstable following the July 12, 2023 startup, dropping to nearly 50°F below the low limit established by MPC before recovering to normal operating temperatures.

126. MPC determined that the SCOT TGTU was unable to adequately remove H_2S from the tail gas because of the startup operations occurring at the Claus sulfur recovery plant, resulting in an SO_2 exceedance from EUs P011 and P016.

127. EPA finds that low free amine concentration and improper temperature control of amine solvent regeneration in the SCOT TGTU were also causal factors for the SO_2 exceedance that occurred on July 12 and 13, 2023.

128. MPC reported that another SO_2 exceedance occurred from EUs P011 and P016 on July 13 and 14, 2023 as a result of starting up multiple refinery units following the power outage.

129. The CEMS for EUs P011 and P016 recorded the following SO_2 emission deviations between July 9, 2023 and July 14, 2023:

a. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 250 ppmvd at zero percent excess air for 48 hours;

b. The rolling, 12-hour average SO_2 emissions from P016 exceeded 8.66 lbs/hr for 112 hours; and

c. The rolling, 12-hour average SO_2 emissions from P011 and P016 exceeded 21.1 lbs/hr for 19 hours.

Other Fuel Gas Combustion Device H_2S Exceedances

130. MPC reported that a relief valve opened on a refinery unit and relieved to the fuel gas system on August 6, 2022, but the flow of amine solvent used to remove H_2S from the fuel gas did not increase in response to the open relief valve. The H_2S CMSs for both the North and South Fuel Drums fuel gas recorded the rolling 3-hour average concentration of H_2S in excess of 162 ppmv for 5 hours.

131. MPC reported that vapor from a refinery unit containing high H_2S was sent to the refinery fuel drum on February 2, 2023. The H_2S CMSs for the North and South Fuel Drums fuel gas recorded the rolling 3-hour average concentration of H_2S in excess of 162 ppmv for 7 and 8 hours, respectively.

132. MPC reported that a power outage on April 1, 2023 resulted in high H_2S concentration in the fuel gas. The H_2S CMSs for both the North and South Fuel Drums fuel gas recorded the rolling 3-hour average concentration of H_2S in excess of 162 ppmv for 2 hours.

Violations

CAA Sections 111 and 112 Violations

133. MPC failed to provide control device parameters for the SCOT units, along with established operating limits, in the 2018 OMM Plan, in violation of 40 C.F.R. § 63.1574(f)(2)(i) and 2021 Title V Permit Condition C.8(c)(2).

134. MPC failed to provide procedures for monitoring control device operating parameters for the SCOT units in the 2018 OMM Plan, in violation of 40 C.F.R. § 63.1574(f)(2)(ii) and 2021 Title V Permit Condition C.8(c)(2).

135. Between August 6, 2022 and May 27, 2023, MPC exceeded the 162 ppmv rolling, 3-hour average H_2S concentration limit in the North Fuel Drum fuel gas for 72 hours, in violation of 40 C.F.R. § 60.104(a)(1) and 2021 Title V Permit Condition C.1(b)(1)(i).

136. Between August 6, 2022 and May 27, 2023, MPC exceeded the 162 ppmv rolling, 3-hour average H_2S concentration limit in the South Fuel Drum fuel gas for 73 hours, in violation of 40 C.F.R.

§§ 60.104(a)(1) and 60.102a(g)(1)(ii) and 2021 Title V Permit Conditions C.1(b)(1)(i), C.2(b)(1)(h), and C.3(b)(1)(i).

137. Between December 23, 2022 and July 14, 2023, MPC exceeded the 250 ppmvd rolling, 12-hour average SO_2 emissions limit at zero percent excess air from EUs P011 and P016 for 247 hours, in violation of 40 C.F.R. §§ 60.104(a)(2)(i) and 63.1568(a)(1) and 2021 Title V Permit Conditions C.8(b)(1)(e) and C.8(b)(1)(g).

138. MPC violated 40 C.F.R. § 63.1570(c) and 2021 Title V Permit Condition C.8(b)(2)(i) by failing to operate and maintain the affected source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions, as follows:

a. MPC failed to properly winterize Claus sulfur recovery plant equipment prior to the December 2022 Freeze Events, when the Akron-Canton area experienced a low temperature of approximately -5°F. According to the National Weather Service, the record low temperature in the Akron-Canton area for the month of December is -16°F.

b. MPC failed to properly operate either of the SCOT 1 or SCOT 2 control devices from January 25, 2023 to January 31, 2023, while SRU #38 was in operation. MPC did not heat the SCOT reactor to a sufficiently high temperature or supply hydrogen to the SCOT reactor, both of which are required for the reaction of SO_2 and reduced sulfur HAPs.

c. MPC failed to monitor and manage amine purity and HSAS concentration in the SCOT TGTU from February 4, 2023 to February 6, 2023. While MPC sampled the TGTU amine on February 3, 2023, the complete laboratory analysis was not reported for three days. MPC proceeded to start up SRU #34 on February 4, 2023, prior to receiving any laboratory results for the TGTU amine sample.

139. MPC failed to prepare and submit a written report that includes the nature and cause of any malfunction (if known) and the corrective action taken or preventative measures adopted for the SO_2 excess emissions event at the Claus sulfur recovery plant that began on January 30, 2023, in violation of 40 C.F.R. § 60.7(c) and 2021 Title V Permit Condition B.30(a).

140. Pursuant to 42 U.S.C. §§ 7411(e) and 7412(i)(3), the violations described above are violations of the CAA.

Ohio SIP Violations

141. Between December 23, 2022 and July 14, 2023, MPC exceeded the 8.66 lbs/hr rolling, 12-hour average SO_2 emissions limit from EU P016 for 343 hours, in violation of the Ohio SIP and 2021 Title V Permit Condition C.8(b)(1)(a).

142. Between December 23, 2022 and July 14, 2023, MPC exceeded the 21.1 lbs/hr rolling, 12-hour average SO_2 emissions limit from EUs P011 and P016 for 223 hours, in violation of the Ohio SIP and 2021 Title V Permit Condition C.8(b)(1)(a).

143. Pursuant to 42 U.S.C. § 7413(a)(1), the violations described above are violations of the Ohio SIP.

MICHAEL HARRIS Digitally signed by MICHAEL HARRIS
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Michael D. Harris
Division Director
Enforcement and Compliance Assurance Division