

Environmental Reportable Events Summary



Event Date: March 22, 2023		
Event Title: Plant 1 Main Plant Flare Gas H ₂ S Exceedance		
Impacted Media (air, water, or soil): Air		
Operating Unit: Plant 1 Main Plant Flare		
Event Summary: On March 22, 2023, the Plant 1 Main Plant Flare gas hydrogen sulfide (H ₂ S) permit limit was exceeded while maintenance work was performed on the Plant 1 flare system. The Plant 1 flare gas recovery system (FGRS) had to be briefly shutdown to allow for necessary repairs, which resulted in an increase in H ₂ S levels in the flare gas combusted by the Plant 1 Main Plant Flare. All safety procedures were followed to perform the work. H ₂ S is combusted at the flare tip, which results in the generation of sulfur dioxide (SO ₂) and water vapor. The Plant 1 Main Plant Flare gas H ₂ S limit was exceeded from 10:00 a.m. to 12:00 p.m. on March 22, 2023. The event ended as soon as the maintenance work concluded. The specific permit terms or conditions exceeded for this event include:		
Permit Term or Condition	Maximum Reported Value	Event Duration
162 ppm H ₂ S in flare gas (3-hour average)	219 ppm H ₂ S in flare gas during a 3-hour average period	2 hours
The Commerce City North Denver Air Monitoring network of sensors within a three-mile radius of the refinery did not detect any levels above the acute health reference guidelines during this event.		
Event Date: March 24, 2023		
Event Title: Plant 1 Main Plant Flare and Gasoline Benzene Reduction (GBR) Flare Exceedance		
Impacted Media (air, water, or soil): Air		
Operating Unit: Plant 1 Main Plant Flare and GBR Flare		
Event Summary: During the startup of the Gasoline Benzene Reduction (GBR) unit on March 24, 2023, the GBR flare combustion zone net heating value (NHV _{cz}) dropped below the minimum limit and the Plant 1 Main Plant Flare gas hydrogen sulfide (H ₂ S) limit was exceeded. The event started after large amounts of steam were sent to the GBR flare during the unit's startup. To maintain the net heating value at the GBR flare, the system automatically introduced a large amount of supplemental city gas, which led to a drop in the city gas header pressure and resulted in a trip of the pressure swing adsorption (PSA) unit in the Hydrogen Plant. The PSA trip caused high flare gas flow and resulted in the opening of the flare suction valve on the Plant 1 main plant flare gas recovery system, as designed, which then resulted in gases with elevated concentration of H ₂ S going to Plant 1 Main Plant Flare. To resolve the issue, operations personnel immediately isolated the PSA valves and started resetting the Hydrogen Plant in order to bring the PSA back online. The event occurred between 1:30 a.m. and 9:00 a.m. on March 24, 2023. The specific permit terms or conditions exceeded for this event include:		
Permit Term or Condition	Reported Value	Event Duration
270 Btu/scf net heating value in the combustion zone of the GBR Flare (15-minute block average)	172 Btu/scf NHV _{cz} at the GBR Flare (minimum reported value during a 15-minute block average period)	30 minutes
162 ppm H ₂ S in flare gas at the Plant 1 Main Plant Flare (3-hour average)	289 ppm H ₂ S in flare gas at the Plant 1 Main Plant Flare (maximum reported value during a 3-hour average period)	6 hours
The Commerce City North Denver Air Monitoring network of sensors within a three-mile radius of the refinery did not detect any levels above the acute health reference guidelines during this event.		

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Environmental Reportable Events Summary



Event Date: March 24, 2023
Event Title: Sanitary Sewer Line Leak
Impacted Media (air, water, or soil): Soil
Operating Unit: Oil Movements Division 1 (OMD-1)
<p>Event Summary: On March 24, 2023, a leak occurred in the above-ground sanitary sewer line from the Environmental Laboratory, spilling approximately 5 gallons of sanitary sewer liquid into a storage tank containment area. Suncor operators barricaded the area and took the restrooms within the laboratory out of service to isolate the leak. The cause of the leak is believed to be due to damage caused by a frozen valve or normal degradation of polyvinyl chloride (PVC) over time.</p> <p>On March 27, 2023, a cleanup crew applied lime to the impacted soil for treatment and tilled it to a depth of 3-4 inches.</p> <p>The leak remained within the containment area and did not reach any surface water or groundwater. The cleanup was completed within two business days.</p>

Event Date: March 28, 2023 – April 2, 2023
Event Title: No. 1 Fluidized Catalytic Cracking Unit (FCCU) Startup Exceedances
Impacted Media (air, water, or soil): Air
Operating Unit: Plant 1 No. 1 FCCU
<p>Event Summary: During startup activities for the Plant 1 No. 1 Fluidized Catalytic Cracking Unit (No. 1 FCCU) that initiated on March 28, 2023, opacity and carbon monoxide (CO) limits were exceeded. Suncor operators followed protocols to minimize these emissions. The exceedances are typical during startup of the fluidized catalytic cracking units. However, on March 29, 2023, operators encountered issues with catalyst microfines in the regenerator and decided to shut down the unit. Startup activities resumed the same day.</p> <p>The event began at 9:00 a.m. on March 28, 2023 and continued intermittently until April 2, 2023. At around 5:00 a.m., on April 2, 2023, the startup activities were interrupted when an external voltage sag caused Plant 1 to be shut down.</p> <p>The specific permit terms or conditions exceeded for this event include:</p>

Permit Term or Condition	Maximum Reported Value
March 28, 2023	
CO limits were exceeded for 15 hours	
500 ppm CO (1-hour average)	1,030 ppm CO during a 1-hour average period
500 ppm CO at 0% O ₂ (1-hour average)	2,029 ppm CO at 0% O ₂ during a 1-hour average period
March 29, 2023	
CO limits were exceeded for 15 hours	
500 ppm CO (1-hour average)	1,030 ppm CO during a 1-hour average period
500 ppm CO at 0% O ₂ (1-hour average)	2,029 ppm CO at 0% O ₂ during a 1-hour average period
Opacity limits were exceeded for 11 hours	
Opacity not to exceed 20% (6-minute average)	88% opacity during a 6-minute average period
Opacity not to exceed 30% during sandblast (6-minute block)	43% opacity during a 6-minute block period
Opacity not to exceed 30% (6-minute average)	79% opacity during a 6-minute average period

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Opacity not to exceed 20% (3-hour average)	50% opacity during a 3-hour average period
March 30, 2023	
CO limits were exceeded for 3 hours	
500 ppm CO for a 1-hour average	1,030 ppm CO during a 1-hour average period
500 ppm CO at 0% O ₂ (1-hour average)	2,029 ppm CO at 0% O ₂ during a 1-hour average period
Opacity limits were exceeded for 3 hours	
Opacity not to exceed 20% (6-minute average)	85% opacity during a 6-minute average period
Opacity not to exceed 30% (6-minute average)	85% opacity during a 6-minute average period
Opacity not to exceed 20% (3-hour average)	41% opacity during a 3-hour average period
March 31, 2023	
CO limits were exceeded for 24 hours	
500 ppm CO (1-hour average)	1,030 ppm CO during a 1-hour average period
500 ppm CO at 0% O ₂ (1-hour average)	2,030 ppm CO at 0% O ₂ during a 1-hour average period
Opacity limits were exceeded for 16.4 hours	
Opacity not to exceed 20% (6-minute average)	35% opacity during a 6-minute average period
Opacity not to exceed 30% (6-minute average)	35% opacity during a 6-minute average period
Opacity not to exceed 20% (3-hour average)	29% opacity during a 3-hour average period
April 1, 2023	
CO limits were exceeded for 16 hours	
500 ppm CO (1-hour average)	1,030 ppm CO during a 1-hour average period
500 ppm CO at 0% O ₂ (1-hour average)	2,029 ppm CO at 0% O ₂ during a 1-hour average period
Opacity not to exceed 20% (6-minute average)	56% opacity during a 6-minute average period
Opacity not to exceed 30% during sandblast (6-minute block)	44% opacity during a 6-minute block period
Opacity not to exceed 30% (6-minute average)	56% opacity during a 6-minute average period
Opacity not to exceed 20% (3-hour average)	24% opacity during a 3-hour average period
<p>The Commerce City North Denver Air Monitoring network of sensors within a three-mile radius of the refinery did not detect any levels above the acute health reference guidelines during this event.</p>	

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Environmental Reportable Events Summary



Event Date: March 30, 2023 – April 2, 2023	
Event Title: Plant 1 No. 2 Sulfur Recovery Unit (No. 2 SRU) Startup Exceedances	
Impacted Media (air, water, or soil): Air	
Operating Unit: Plant 1 No. 2 SRU	
<p>Event Summary: During startup of the Plant 1 No. 2 Sulfur Recovery Unit (No. 2 SRU), sulfur dioxide (SO₂) levels exceeded the permit limits in the tail gas unit incinerator (H-25). These exceedances occurred during the No. 2 SRU warm-up phase when sulfur entrapped in the unit was burned off.</p> <p>The event began at 8:00 p.m. on March 30, 2023 and continued intermittently until April 2, 2023. At around 5:00 a.m., on April 2, 2023, the startup activities were interrupted when an external voltage sag caused Plant 1 to be shut down.</p> <p>The specific permit terms or conditions exceeded for this event include:</p>	
Permit Term or Condition	Maximum Reported Value
March 30, 2023 (Limit was exceeded for 4 hours)	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	255 ppm SO ₂ at 0% O ₂ during a 12-hour average period
March 31, 2023 (Limits were exceeded for 2 hours)	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	264 ppm SO ₂ at 0% O ₂ during a 12-hour average period
15.68 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator (H-25)	16.75 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator during a 1-hour period
April 1, 2023 (Limit was exceeded for 5 hours)	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	324 ppm SO ₂ at 0% O ₂ during a 12-hour average period
April 2, 2023 (Limit was exceeded for 5 hours)	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	610 ppm SO ₂ at 0% O ₂ during a 12-hour average period
<p>The Commerce City North Denver Air Monitoring network of sensors within a three-mile radius of the refinery did not detect any levels above the acute health reference guidelines during this event.</p>	

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Environmental Reportable Events Summary



Event Date: April 2, 2023 – April 3, 2023	
Event Title: Plant 1 Process Units Upset due to Power Interruption	
Impacted Media (air, water, or soil): Air	
Operating Unit: Plant 1 Process Units	
<p>Event Summary: At approximately 5:00 a.m. on April 2, 2023, an unexpected power outage caused by Xcel Energy triggered safety shutdowns at several process units in Plant 1 of the refinery. This resulted in environmental exceedances at the No. 1 Fluidized Catalytic Cracking Unit (No. 1 FCCU), tail gas unit incinerator (H-25), and the Plant 1 Main Plant Flare. The affected equipment was immediately restarted, and startup activities that were interrupted with the power outage resumed on April 3, 2023.</p> <p>The power interruption and shut down of several process units resulted in gases with high hydrogen sulfide (H₂S) concentrations to be sent to the Plant 1 Main Plant Flare, resulting in elevated sulfur dioxide (SO₂) emissions at the flare and periods of visible emissions. H₂S is combusted at the flare tip, which results in the generation of SO₂ and water vapor.</p> <p>The No. 1 FCCU and No. 2 Sulfur Recovery Unit (No. 2 SRU) were undergoing startup at the time of the power outage. The No. 1 FCCU startup activities resumed on April 3, 2023 and resulted in carbon monoxide (CO) and opacity exceedances. Startup procedures were followed during this time. The No. 2 SRU startup activities also resumed on April 3, 2023 and resulted in SO₂ exceedances at H-25. The environmental exceedances related to startup stopped once the units were stabilized on April 4, 2023.</p> <p>The event began on April 2, 2023, at 5:00 a.m. when the power outage occurred, and ended on April 4, 2023, at 7:00 p.m. after the units were restarted and stabilized.</p> <p>The specific permit terms or conditions exceeded for this event include:</p>	
Permit Term or Condition	Maximum Reported Value
April 2, 2023	
SO₂ limits were exceeded for 19 hours	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	2,121 ppm SO ₂ at 0% O ₂ during a 12-hour average period
15.68 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator (H-25)	120 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator during a 1-hour period
500 lb SO ₂ Refinery-wide on 24-hr rolling period (EPCRA RQ)	767 lbs SO ₂ (max during a 24-hr rolling period)
H₂S in Flare Gas limit was exceeded for 11 hours	
162 ppm H ₂ S in Plant 1 Main Plant flare gas (3-hour average)	323 ppm H ₂ S in Plant 1 Main Plant flare gas during a 3-hour average period
Opacity limits were exceeded for approximately 12 hours	
Opacity not to exceed 20% at the No. 1 FCCU (6-minute average)	52% opacity during a 6-minute average period
Opacity not to exceed 30% during sandblast at the No. 1 FCCU (6-minute block)	42% opacity during a 6-minute block period
Opacity not to exceed 30% at the No. 1 FCCU (6-minute average)	52% opacity during a 6-minute average period
Opacity not to exceed 20% at the No. 1 FCCU (3-hour average)	30% opacity during a 3-hour average period
Flares shall be operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.	32 minutes when the Plant 1 Main Flare operated with visible emissions
April 3, 2023	

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Environmental Reportable Events Summary



SO₂ limits were exceeded for 24 hours	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	646 ppm SO ₂ at 0% O ₂ during a 12-hour average period
15.68 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator (H-25)	29 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator during a 1-hour period
500 lb SO ₂ Refinery-wide on 24-hr rolling period (EPCRA RQ)	1,322 lbs SO ₂ (max during a 24-hr rolling period)
H₂S in Flare Gas limit was exceeded for 18 hours	
162 ppm H ₂ S in Plant 1 Main Plant flare gas (3-hour average)	320 ppm H ₂ S in Plant 1 Main Plant flare gas during a 3-hour average period
Opacity limits were exceeded for 5 hours	
Opacity not to exceed 20% at the No. 1 FCCU (6-minute average)	35% opacity during a 6-minute average period
Opacity not to exceed 30% during sandblast at the No. 1 FCCU (6-minute block)	47% opacity during a 6-minute block period
Opacity not to exceed 30% at the No. 1 FCCU (6-minute average)	43% opacity during a 6-minute average period
Opacity not to exceed 20% at the No. 1 FCCU (3-hour average)	31% opacity during a 3-hour average period
Flares shall be operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.	136 minutes when the Plant 1 Main Flare operated with visible emissions
April 4, 2023	
SO₂ limit was exceeded for 3 hours	
500 lb SO ₂ Refinery-wide on 24-hr rolling period (EPCRA RQ)	722 lbs SO ₂ (max during a 24-hr rolling period)
Opacity limit was exceeded for 0.4 hours	
Opacity not to exceed 20% at the No. 1 FCCU (6-minute average)	23% opacity during a 6-minute average period
<p>The Commerce City North Denver Air Monitoring network of sensors within a three-mile radius of the refinery did not detect any levels above the acute health reference guidelines during this event.</p>	
Event Date: April 3, 2023	
Event Title: Plant 1 Tank 774 Roof Drain Release	
Impacted Media (air, water, or soil): Soil	
Operating Unit: Oil Movements Division 1 (OMD-1)	
<p>Event Summary: On April 3, 2023, during a routine inspection, Suncor operators discovered stained soil and liquid material on the ground near Tank 774's roof drain. Further investigation revealed that during the refinery's startup activities, hydrocarbon liquid passed through the tank's secondary seal onto the floating roof and ultimately made it to soil via the roof drain. To prevent further leakage, Suncor operators immediately closed the roof drain valves. Roof drain valves are normally left open to prevent roof damage from stormwater accumulation. Vacuum trucks were deployed the same day to remove the liquid material. On April 4, 2023, soil removal process started. Upon completion of the soil removal, the affected area will be treated with microblaze non-formulated (MBNF). Suncor plans to conduct soil sampling at least two weeks after the application of MBNF.</p>	
<p>The leak remained within the containment area and did not reach any surface water or groundwater.</p>	

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Environmental Reportable Events Summary



Event Date: April 12, 2023 – April 13, 2023	
Event Title: Plant 1 Tail Gas Unit and No. 2 Sulfur Recovery Unit Upset	
Impacted Media (air, water, or soil): Air	
Operating Unit: Plant 1 Tail Gas Unit and No. 2 Sulfur Recovery Unit	
<p>Event Summary: On April 12, 2023, the level indicator on the tail gas unit (TGU) booster recovery knockout drum, D-7706, malfunctioned and the level indicator reading suddenly jumped from 0% to 100%, causing the TGU and the No. 2 Sulfur Recovery Unit (No. 2 SRU) to trip offline as designed. This led to the flaring of acid gas at the Plant 1 Main Plant Flare, sulfur dioxide (SO₂) exceedances at the tail gas unit incinerator (H-25), and elevated hydrogen sulfide (H₂S) in the Plant 1 fuel gas system. The affected units were stabilized, and no other units were impacted during the incident. H₂S is combusted at the flare tip, which results in the generation of sulfur dioxide (SO₂) and water vapor.</p> <p>Suncor is currently investigating the cause of the false indication on the level indicator.</p> <p>The event began on April 12, 2023, at 5:00 a.m. when the power outage occurred, and ended on April 13, 2023, at 3:00 p.m. after the units were stabilized.</p> <p>The specific permit terms or conditions exceeded for this event include:</p>	
Permit Term or Condition	Maximum Reported Value
April 12, 2023	
SO₂ limits were exceeded for 19 hours	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	4,527 ppm SO ₂ at 0% O ₂ during a 12-hour average period
15.68 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator (H-25)	545 lb/hr SO ₂ from the Plant 1 tail gas unit incinerator during a 1-hour period
500 lb SO ₂ Refinery-wide on 24-hr rolling period (EPCRA RQ)	5,365 lbs SO ₂ (total)
H₂S in Flare Gas limit was exceeded for 8 hours	
162 ppm H ₂ S in Plant 1 Main Plant flare gas (3-hour average)	329 ppm H ₂ S in Plant 1 Main Plant flare gas during a 3-hour average period
H₂S in Refinery Fuel gas was exceeded for 14 hours	
162 ppm H ₂ S in Plant 1 fuel gas (3-hour average)	300 ppm H ₂ S in Plant 1 fuel gas during a 3-hour average period
Opacity limit was exceeded for 6 minutes	
Opacity not to exceed 20% at the tail gas unit incinerator (6-minute average)	>20% opacity during a 6-minute average period
April 13, 2023 (SO₂ limits were exceeded for 15 hours)	
250 ppm SO ₂ at 0% O ₂ (12-hour rolling average) from the tail gas unit incinerator (H-25)	6,597 ppm SO ₂ at 0% O ₂ during a 12-hour average period
<p>The Commerce City North Denver Air Monitoring network of sensors within a three-mile radius of the refinery did not detect any levels above the acute health reference guidelines during this event.</p>	

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Event Date: April 12, 2023		
Event Title: Outfall Water Permit Exceedance		
Impacted Media (air, water, or soil): Water		
Operating Unit: Internal Outfall 002B and Outfall 020A		
Event Summary:		
<p>On April 12, 2023, compliance sampling revealed that benzene concentrations exceeded the 5 µg/L daily maximum permit limit at internal Outfall 002B and external Outfall 020A. Suncor subsequently conducted daily sampling at both outfalls, which showed no additional exceedances at external Outfall 020A, but one more exceedance at internal Outfall 002B on April 14, 2023. Additionally, compliance sampling on April 15, 2023, indicated that total suspended solids (TSS) at internal Outfall 002B exceeded the daily maximum permit limit.</p> <p>The result of a voluntary surface water sampling in Sand Creek downstream of Outfall 020A performed during this period showed benzene concentrations of less than 2 µg/L, which is below the EPA's drinking water maximum contaminant level of 5 µg/L and met the water quality standard for Sand Creek (5,300 µg/L).</p> <p>Suncor conducted an investigation and found that stripped sour water in Plant 1 was contaminated with benzene, probably during the refinery startup. Stripped sour water normally does not contain benzene and is routed to Lagoon 1. Water in Lagoon 1 became contaminated with benzene, which then flowed through Lagoons 2 and 3 and to Outfall 002B. Suncor isolated Lagoon 1 and nearly completely isolated Lagoon 2 from the outfall after discovering the source of the elevated benzene. Benzene concentrations subsequently dropped to below the detection limit at Outfall 002B by April 15, 2023. Water in the lagoons is being treated to remove the benzene prior to allowing it to discharge. Suncor plans to perform additional sampling of treated stripped sour water to help prevent a reoccurrence.</p> <p>The elevated TSS appears to be due to a damaged pump in the biological treatment system, which allowed the growth of excessive biological solids. The effluent from the biological treatment system was routed to Lagoon 3 because Lagoons 1 and 2 were isolated to protect the outfall from elevated benzene concentrations. This resulted in insufficient solids settling. The damaged pump associated with the biological treatment system was replaced, which has resulted in a steady reduction of solids in the biological treatment system effluent. In addition, flow through the biological treatment system was reduced to minimize solids carryover. The TSS at Outfall 002B was successfully reduced to below the daily maximum limit by April 18, 2023.</p> <p>The specific permit terms or conditions exceeded for this event include:</p>		
Permit Term or Condition	Internal Outfall 002B Benzene Concentration (µg/L)	Outfall 020A Benzene Concentration (µg/L)
April 12, 2023		
5 µg/L benzene	10 µg/L benzene	8 µg/L benzene
April 14, 2023		
5 µg/L benzene	10 µg/L benzene	4 µg/L benzene (below permit limit)
Permit Term or Condition	Internal Outfall 002B Total Suspended Solids (TSS)	
April 15, 2023		
1,098 lbs/day TSS	1,346 lbs/day TSS	

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