



Benicia Refinery • Valero Refining Company - California

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Via Email Notification

April 30, 2024

Reportable Flaring Event Causal Analysis
February 24, 2024
Plant No. B2626

Dr. Philip Fine
Bay Area Air Quality Management District
Bay Area Metro Center
375 Beale Street, Suite 600
San Francisco, CA 94105

Dear Dr. Fine:

A reportable flaring event occurred on February 24, 2024 at the Valero Refining Company – California, Benicia Refinery (Valero Refinery) (Id. No. B2626). The following Causal Analysis for this Reportable Flaring Event is provided to the Bay Area Air Quality Management District (District) pursuant to and in accordance with Section 12-12-406 and the District's Compliance Advisory dated June 25, 2007.

1. *Date on which the report was drafted (12-12-406).*

April 24, 2024

2. *The refinery name and site number (12-12-406).*

Valero Refinery, Id. No. B2626

3. *The assigned refinery contact name and phone number (12-12-406).*

Taryn Goodwin at (707) 745-7475

4. *Identification of the flare(s) at which the reportable event occurred by reviewing water seal monitoring data to determine which seals were breached during the event (12-12-406).*

South (S-18) and North (S-19) Flare

5. *The flaring event duration for each affected flare (12-12-406.1):*

- a) *The date(s) of the event;*
- b) *The start and end time of the event; and*
- c) *The net duration of event (in hours and minutes).*

Item	South Flare (S-18)	North Flare (S-19)	Flare Event Total
Start Date	2/23/2024	2/23/2024	2/23/2024
Start Time (hh:mm)	19:40	19:39	19:39
End Date	2/26/2024	2/26/2024	2/26/2024
End Time (hh:mm)	21:13	21:12	21:13
Duration (hh:mm)	73:33*	73:33*	73:34*

*Flaring was intermittent during this time period

6. *A brief description of the flaring event (12-12-406.1) (e.g., “flaring due to turnaround maintenance”).*

Flaring was due to an unplanned shutdown of the Fluidized Catalytic Cracking Unit (S-5) and Coker Unit (S-6).

7. *A process flow diagram showing the equipment and process units that were the primary cause of the event (12-12-406.1).*

The relevant piping and instrumentation diagrams (P&IDs) are attached and highlighted.

Please note that the attached P&ID contains information that the Valero Refinery considers to be trade secret and confidential business information (CBI) as defined by the California Public Records Act, Government Code § 6254.7 et seq., and the Freedom of Information Act, 40 CFR Part 2 (40 CFR § 2.105(a)(4)), 5 USC 552(b)(4), and 18 USC 1905. Because of the sensitive and competitive nature of this information, the Valero Refinery requests that the District afford the information CBI status and treatment indefinitely.

8. *The total volume of vent gas flared (MMSCF) throughout the event (12-12-406.5).*

Item	South Flare (S-18)	North Flare (S-19)	Flare Event Total
2/23/2024			
Volume (MMSCF)	0.043	0.183	0.226
2/24/2024			
Volume (MMSCF)	0.077	0.603	0.680
2/25/2024			
Volume (MMSCF)	0.058	0.247	0.305
2/26/2024			
Volume (MMSCF)	0.179	0.389	0.568
Flare Event Total			
Volume (MMSCF)	0.357	1.422	1.779

9. *The emissions associated with the flaring event per calendar day (12-12-406.5):*

- a) *# methane (CH₄) emitted;*
- b) *# non-methane hydrocarbon emitted; and*
- c) *# SO₂ emitted.*

Also provide the assumptions used to calculate emissions associated with the flaring event if they are different from those used for reporting under Regulation 12, Rule 11.

Item	South Flare (S-18)	North Flare (S-19)	Daily Total
<i>2/23/2024</i>			
CH4 (lbs)	24	66	90
NMHC's (lbs)	24	57	81
SO2 (lbs)	20	144	164
<i>2/24/2024</i>			
CH4 (lbs)	49	284	333
NMHC's (lbs)	26	249	275
SO2 (lbs)	11	824	835
<i>2/25/2024</i>			
CH4 (lbs)	31	108	139
NMHC's (lbs)	44	204	248
SO2 (lbs)	0	193	193
<i>2/26/2024</i>			
CH4 (lbs)	95	150	245
NMHC's (lbs)	135	327	462
SO2 (lbs)	7	475	482
Flare Event Total			
CH4 (lbs)	199	608	807
NMHC's (lbs)	229	837	1,066
SO2 (lbs)	38	1,636	1,674

The assumptions used to calculate emissions associated with the flaring event are consistent with those used for reporting under Regulation 12, Rule 11.

10. *A statement as to whether or not the gas was scrubbed to eliminate or reduce any entrained compounds and a list of the compounds for which the scrubbing was performed (12-12-406.1).*

The vent gases flared during this event were not scrubbed.

The refinery does not have the capability to scrub process unit vent gases that are sent to the flare. During typical operating conditions, the gases routed to the flare header are recovered. However, when the gases routed to the flare header exceed the capacity of the flare header, the gases must be combusted using the flare to maintain safe and environmentally compliant operations.

11. *The primary cause of the flaring event including a detailed description of the cause and all contributing factors. Also identify the upstream process units that contributed vent gas flow to the flare header and provide other flow instrumentation data, where available (12-12-406.1).*

The primary cause of flaring was the unplanned shutdown of the Fluid Catalytic Cracking Unit (FCCU) and Coker. The FCCU main air compressor (C-702) shut down on high vibration on 2/23/24 at approximately 19:00, which subsequently led to the

FCCU and Coker tripping offline due to low air flow. An emergency repair was initiated on C-702 after restart attempts were unsuccessful.

12. *Describe all immediate corrective actions to stabilize the flaring event, and to reduce or eliminate emissions (flare gas recovered or stored to minimize flaring during the event). If a decision was made not to store or recover flare gas, explain why (12-12-406.1).*

The shutdown operations followed established procedures. These procedures are intended to minimize flaring consistent with District regulations and Valero's Flare Minimization Plan (FMP), while ensuring the safety of the community, refinery personnel, and equipment.

13. *Was the flaring the result of an emergency (See definition in Reg. 12-12-201)? If so, was the flaring necessary to prevent an accident, hazard or release to the atmosphere (12-12-406.4)?*

This section is not applicable, as this flaring incident was not the result of an emergency.

14. *If not the result of an emergency and necessary to prevent an accident, hazard or release to the atmosphere, was the flaring consistent with an approved FMP? If yes, provide a citation to the facility's FMP and any explanation necessary to understand the basis for this determination (12-12-406.3).*

Pursuant to Regulation 12-12-301, flaring is prohibited unless it is consistent with an approved FMP. The current approved FMP is Revision 18.0 dated September 29, 2022. This series of events is consistent with Section 2.2.3 of the Valero Refinery FMP, Equipment Failure and Malfunction.

15. *If the flaring was due to a regulatory mandate to vent to a flare, why couldn't the gas be recovered, treated, and used as fuel gas (12-12-406.4)?*

The flaring was not due to a regulatory mandate to vent to a flare. The flaring was consistent with the Valero Refinery's approved FMP.

16. *Identify and describe in detail each prevention measure (PM) considered to minimize flaring from the type of reportable flaring event that occurred (12-12-406.2):*

- a) *State whether the PM is feasible (and will be implemented), or not feasible.*
- b) *Explain why the PM is not feasible, if applicable.*

During a post-incident review of the flaring event, the following additional prevention measures were identified in order to minimize the likelihood of similar flaring events occurring in the future:

- a) Limit operating speed range of C-702 until internals can be upgraded. Document in standing orders and discuss potential alarm setpoints when deviating from speed range
- b) Consider adding anti-surge/choke program to C-702

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- c) Consider overhaul for internal blade/stator redesign of C-702 and upgrade in the next turnaround

Please contact Taryn Goodwin at (707) 745-7475 if you have any questions on this reportable flare event.

Sincerely,



Taryn Goodwin
Manager – Environmental Engineering

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36-000-03E-73503 – Confidential Business Information (CBI)