



Benicia Refinery • Valero Refining Company - California

3400 East Second Street • Benicia, California 94510-1097 • Telephone (707) 745-7011 • Facsimile (707) 745-7339

NEKO

April 29, 2019

Reportable Flaring Event Causal Analysis
February 20, 2019
Plant No. B2626

Mr. Jack Broadbent
Bay Area Air Quality Management District
Bay Area Metro Center
375 Beale Street, Suite 600
San Francisco, CA 94105

Dear Mr. Broadbent:

A reportable flaring event occurred on February 20, 2019 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 29, 2019

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).*

Mikayla Briggs at (707) 745-7609

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).*

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	0	02/20/2019	02/20/2019
Start Time (hh:mm)	0:00	12:38	12:38
End Date	0	02/20/2019	02/20/2019
End Time (hh:mm)	0:00	18:07	18:07
Duration (hh:mm)	0:00	05:29	05:29

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

The primary cause of the flaring event on February 20, 2019 was due to a sulfur leak in the steam jacketed piping at the sulfur gas unit.

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
02/20/2019			
Volume (MMSCF)	0.000	0.584	0.584
Flare Event Total			
02/20/2019			
Volume (MMSCF)	0.000	0.584	0.584

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
02/20/2019			
CH4 (lbs.)	0	170	170
NMHC's (lbs.)	0	357	357
SO2 (lbs.)	0	1438	1438
Flare Event Total			
CH4 (lbs.)	0	170	170
NMHC's (lbs.)	0	357	357
SO2 (lbs.)	0	1438	1438

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 BAAQMD has stated that it defines "scrubbed" gasses as completely scrubbed. However, as described in Section 1.1.3 of the FMP, scrubbed fuel gas that is in excess of what can be handled by fuel gas consumers during the event flows to the refinery flare header, mixes with other vent gases enroute to the flare where it is safely disposed of by combustion. For this reason, it is important to note that a portion of the gases were scrubbed in contrast to a situation where a scrubber is unable to treat fuel gas, in which case, none of the gases are scrubbed and results in greater SO2 emissions.

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 the flaring event on February 20, 2019 was sulfur contamination in the steam condensate system due to a leak in the steam jacketed piping at the sulfur gas unit. On February 20, 2019 a significant drop in the hydrogen A (H2U-A) train purity was observed. Following the low H2U-A purity identification, initial troubleshooting efforts and increased sampling began. As a safety mechanism to protect unit equipment, HPTG was sent to the low pressure fuel gas (LPFG) system which was then routed to the flare header. After HPTG was routed to the flare header, operations observed that the hydrogen purity did not improve and continued troubleshooting to identify the sulfur source. Based on sampling data and isolation of a section of the sulfur rundown line it was determined that the sulfur leak had occurred due to sulfur contamination of the steam condensate system. The failure point was identified as a spool piece failure upstream of a plug valve to the E-1304 dipleg.

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).*

Immediate corrective actions that were taken to stabilize the flaring event and to reduce or eliminate emissions include:

- A. Control House Monitoring
- B. Increased sampling in the H2U-A and BFW circuit to identify the location of the sulfur contamination.

The Valero Refinery does not have the ability to store flare gas. Per Section 4.2 of the FMP, the ability to store flare gas is not a cost effective prevention measure.

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 14.0 dated January 28, 2019. This series of events is consistent with Section 2.2 of the Valero Refinery FMP, Reasons for Flaring:

2.2.3 – 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 (Revision 14.0 dated January 28, 2019).

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):*

During a post-incident review of the flaring event, the following additional prevention measures were identified in order to prevent a similar flaring event from reoccurring in the future.

- A. Develop a written procedure to diagnose cause and identify steps to correct for a low hydrogen purity event.

- B. Develop a written procedure to diagnose cause and identify steps to correct for low pH or high conductivity in the steam condensate system.
- C. Improved communication procedures from third party on routine sampling of the boiler feed water to include immediate notification to Valero personnel for data outside the normal pH range.
- D. A spool piece failure was identified upstream of the plug valve to E-1304 dipleg and was isolated as an immediate prevention measure. The spool piece failure mechanism and redesign will be evaluated prior to the next planned downtime.

Please contact Ms. Mikayla Briggs at (707) 745-7609 if you have any questions on this reportable flare event.

Sincerely,



Kimberly A. Ronan
Manager – Environmental Engineering

KAR/MNB

cc (w/out attachments):
PGrazzini@baaqmd.gov

Enclosures: (1 P&IDs)
36-000-03E-73503