

CC 10/5/22

10/6/22

AG 10/06/22

Attachment I

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

July 1-3, 2022

Flaring Due to Loss of Hydrogen Production

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: September 28, 2022

2. The refinery name and site number:

Refinery: Chevron Richmond Refinery

Refinery Site Number: A0010

3. The assigned refinery contact name and phone number:

Contact Name: Brandon Sutter

Contact Phone Number: (510) 242-5212

Is this a rescission/modification of a previous report: No

Date of initial report: Not Applicable

Reason for rescission/modification: Not Applicable

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

Flare	Reportable Event (SO2 or Vent Gas Volume)
H2 (S-6021)	Vent Gas Volume

5. The flaring event duration for each affected flare

Flare (Source Number): H2 (S-6021)

The Date(s) of the event: July 1-3, 2022

The start time of the event: 7/1/2022 09:53 PM

The end time of the event: 7/3/2022 03:41 AM

6. A brief description of the flaring event –

On July 1, 2022, the refinery's hydrogen production plant had a momentary loss of hydrogen production. As a result, two process units that consume hydrogen shut down. Hydrogen production was quickly re-established, but the hydrogen-consuming units were still undergoing startup activities, which led to flaring at the hydrogen flare. Operations brought the hydrogen-consuming units back online which then ended the flaring event.

7. A process flow diagram showing the equipment and process units that were the primary cause of the event.

See Attachment Ia.

8. The total volume of vent gas flared (MMSCF) throughout the event

Flare	Volume (MMSCF)
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H2	1.9
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9. The emissions associated with the flaring event per calendar day

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
H2	July 1, 2022	187	79	0
H2	July 2, 2022	23	3	0
H2	July 3, 2022	63	7	0

Assumptions used to calculate emissions – consistent with the reporting under Reg. 12-11.

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.

The vent gas was not scrubbed to eliminate or reduce any entrained compounds.

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.

Primary causal factor: Compressor malfunction at the hydrogen production plant.

The primary contributor of the vent gas to the flare was the Hydrogen Plant.

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.

Operations brought the hydrogen-consuming units back online which ended the flaring event. The Hydrogen Plant does not have flare gas recovery.

13. Was the flaring the result of an emergency? If so, was the flaring necessary to prevent an accident, hazard or release to the atmosphere?

Flaring was not due to an Emergency (defined in Regulation 12-12-201) as interpreted by the BAAQMD.

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.

Flaring was consistent with Chevron’s FMP Section 2.1 Table 2-4. Table 2-4 identifies sources that can be flared in non-emergency situations (e.g. start-up, shut-down).

15. If the flaring was due to a regulatory mandate to vent to flare, why couldn’t the gas be recovered, treated, and used as fuel gas?

N/A. Flaring was not due to a regulatory mandate.

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

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

Flaring cannot be prevented when there is insufficient hydrogen consumption due to facility and relief system design. The Hydrogen Plant does not have flare gas recovery.

Flaring Due to Loss of Hydrogen Production

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H2 Flare

Momentary loss of hydrogen production led to two hydrogen-consuming units shutting down.