

CC 6/6/22

LD 6/7/22

AG 06/07/22

Attachment I

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

March 4, 2022

Flaring Due to Process Upset in Amine Scrubber

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: May 27, 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 (SO ₂ or Vent Gas Volume)
NISO (S-6013)	Vent Gas Volume and SO ₂

5. The flaring event duration for each affected flare

Flare (Source Number): NISO (S-6013)

The Date(s) of the event: March 4, 2022

The start time of the event: 3/4/2022 6:52 PM

The end time of the event: 3/4/2022 8:52 PM

6. A brief description of the flaring event –

On March 4, 2022, liquid accumulated in a compressor knockout drum due to a process upset in an amine scrubber. As a result of increased liquid accumulation and potential for liquid carryover, a downstream compressor automatically shut down causing an increase in system pressure. Flows were then routed to the Flare Gas Recovery System to reduce the system pressure. Flows to the FGR System exceeded FGR capacity, and flaring occurred. Operations responded by stabilizing the liquid accumulation at the compressor knockout drum, which allowed the compressor to successfully start up. This stopped the flow to the relief system, and the flaring ceased.

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)
NISO	0.7

9. The emissions associated with the flaring event per calendar day

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
NISO	March 4, 2022	99.7	202.9	2,148.5

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: Solid accumulation in the amine scrubber.
 Contributing causal factor: Temperature of amine scrubber inflows.

A hydrocracker in the Hydroprocessing Area Business Unit contributed to vent gas flow.

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 responded by stabilizing the liquid accumulation at the compressor knockout drum, which allowed the compressor to successfully start up. This stopped the flow to the relief system, and the flaring ceased.

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.

The flaring was consistent with Chevron's FMP Section 5.4 Figure 5-1. This event was unplanned. Causes for the flaring were investigated and the corrective actions have already been or will be implemented to reduce the likelihood of a recurrence of flaring resulting from the same causes.

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 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

Prevention measures have been considered and have or will be implemented.

1. Evaluate amine scrubber internals for improved performance.
2. Perform training with crews regarding amine scrubber inflow temperatures.

Flaring Due to Process Upset in Amine Scrubber

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