

**Attachment V**

Causal Analysis Report

Chevron Richmond Refinery  
Reportable Flaring Events

November 27, 2023  
Flaring Due to Shutdown of Hydrogen Plant Trains

Refinery Flare Event – Cause Investigation Report

**1. Date on which the report was drafted:** January 12, 2024

**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: Duy Nguyen  
Contact Phone Number: (510) 242-3132

---

---

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: November 27, 2023

The start time of the event: 11/27/2023 3:26 PM

The end time of the event: 11/27/2023 05:00 PM

**6. A brief description of the flaring event**

On November 27, 2023, Hydrogen Plant Trains shut down due to power failure. Hydrogen Plant shutdown procedures include routing flows to relief and subsequent flaring. Operations timely proceeded with the shutdown activities per the procedure to reduce the emissions.

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

See Attachment IIa.

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

Flare	Volume (MMSCF)
H2	2.4

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

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
H2	November 27, 2023	1125	216	0.4

*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: Procedures are designed to adhere to unit and flare system design.

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

**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 timely proceeded with the shutdown activities per the procedure to reduce the emissions. 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 during Hydrogen Plant shutdown due to facility and relief system design. Operational activities were consistent with shutdown procedures.

# Attachment IIa: Flaring During Shutdown of Hydrogen Plant Train

