

Attachment IV

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

November 25, 2020
Flaring Due to Compressor Trip

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: February 9, 2021

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: (925) 394-8773

Is this a rescission/modification of a previous report: Yes.

Date of initial report: 1/29/2021

Reason for rescission/modification: Investigation is now complete for Attachment IV

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)	SO ₂ , Vent Gas Volume

5. The flaring event duration for each affected flare

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

The Date(s) of the event: November 25, 2020

The start time of the event: 12:53 PM

The end time of the event: 2:26 PM

The net duration of event (in hours and minutes): 1 hour, 3 minutes

**note flaring was intermittent during the times described above in Section 5*

6. A brief description of the flaring event –

On November 25th, 2020, a compressor in the Hydroprocessing ABU (Area Business Unit) tripped offline during performance of planned online maintenance testing. Attempts were made to restart the compressor but were unsuccessful. Feed was subsequently pulled from the process unit, leading to flows to the Flare Gas Recovery (FGR) system exceeding FGR capacity, and process gases were sent to the flare relief system. Flaring began at approximately 12:52 PM on November 25th, 2020 at the NISO Flare. The primary source of vent gas flared during this event was process material from a hydrocracking unit. Operations immediately responded, de-pressuring the unit to stabilize operating conditions. Intermittent flaring stopped at NISO Flare on November 25th, 2020 at approximately 2:26 PM. The sulfur dioxide (SO₂) emissions from the NISO flare exceeded 500 pounds (lbs) and 500,000 SCF within a 24-hr period.

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

See Attachment IVa.

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

Flare	Volume (MMSCF)
NISO	0.69

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

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
NISO	November 25, 2020	95.8	848.6	4,217.5

Assumptions used to calculate some of the 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.

Contributing cause #1: System design does not meet API Standard 612 for upstream release valves.

Contributing cause #2: Fast-acting solenoids caused pressure dip and subsequent trip.

Contributing cause #3: Reduced high pressure header pressure.

The main contributor of vent gas flow during this event originated from an IsoMax unit in the Hydroprocessing ABU.

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 immediately to de-pressure the unit and stabilize operating conditions.

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

The flaring was the result of an emergency, as defined in Regulation 12-12 (a condition at a petroleum refinery beyond the reasonable control of the owner or operator requiring immediate corrective action to restore normal and safe operation that was caused by a sudden, infrequent and not reasonably preventable equipment failure). The flaring was necessary to prevent an unabated release to the atmosphere.

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 the result of an emergency. The flaring is also consistent with Chevron's FMP Section 5.4 Figure 5-1. This event was unplanned. Causes for the flaring were analyzed through a TapRoot investigation. 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 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

1. Design review against API standards and scope for TA as appropriate. Consider adding a bleeder valve as mitigation or moving block valve to be upstream of dump valve.

Completion date: 8/5/2021

2. Design review of dump solenoid orifice sizing to ensure proper operation for both speed and function.

Completion date: 8/5/2021

Signature: *Linda Duca*

Email: lduca@baaqmd.gov

Signature: *Alme Rosquites*
Alme Rosquites (Feb 23, 2021 12:58 PST)

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Flaring Due to Compressor Trip

On November 25th, 2020, a compressor in the Hydroprocessing ABU (Area Business Unit) tripped offline during performance of planned online maintenance testing. Attempts were made to restart the compressor but were unsuccessful. Feed was subsequently pulled from the process unit, leading to flows to the Flare Gas Recovery (FGR) system exceeding FGR capacity, and process gases were sent to the flare relief system. Flaring began at approximately 12:52 PM on November 25th, 2020 at the NISO Flare. The primary source of vent gas flared during this event was process material from a hydrocracking unit. Operations immediately responded, de-pressuring the unit to stabilize operating conditions. Intermittent flaring stopped at NISO Flare on November 25th, 2020 at approximately 2:26 PM. The sulfur dioxide (SO₂) emissions from the NISO flare exceeded 500 pounds (lbs) and 500,000 SCF within a 24-hr period.

NISO Flare



Relief flows



Hydroprocessing ABU



Compressor