

Attachment VII

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

May 29, 2019

Flaring Due to Vessel Depressurization

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: July 30, 2019

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: Laura Kurt

Contact Phone Number: (510) 242-5219

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

Date of initial report: N/A

Reason for rescission/modification: N/A

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
SISO (S-6012)	None
FCC (S-6016)	None

5. The flaring event duration for each affected flare

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

The Date(s) of the event: May 29, 2019

The start time of the event: 9:12AM

The end time of the event: 9:27AM

The net duration of event (in hours and minutes): 15 Minutes

Flare (Source Number): SISO (S-6012)

The Date(s) of the event: May 29, 2019

The start time of the event: 9:12AM

The end time of the event: 9:13AM

The net duration of event (in hours and minutes): 1Minute

Flare (Source Number): FCC (S-6016)

The Date(s) of the event: May 29, 2019

The start time of the event: 9:13AM

The end time of the event: 9:14AM

The net duration of event (in hours and minutes): 1 Minute

6. A brief description of the flaring event –

During the evening of May 28, 2019, a furnace in the Taylor Katalytic Denitrifier (TKN) unit of the Hydroprocessing Area Business Unit began to experience flow control issues. The furnace was shutdown, hydrocarbon feed was removed from the associated reactor vessel, and maintenance began work to troubleshoot and repair the flow controllers. On May 29, 2019, an engineering review of the process conditions identified an increased risk of hydrogen embrittlement in the reactor vessel. To mitigate this risk, the pressure in the vessel was quickly depressured to relief and flaring began at approximately 9:12AM at the FCC, North Isomax (NISO), and South Isomax (SISO) flares. Flaring ended at approximately 9:27AM. The sulfur dioxide (SO₂) emissions from only the NISO flare exceeded 500 pounds (lbs) on the May 29th, 2019 calendar day.

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

See Attachment VIIa

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

Flare	Volume (MMSCF)
NISO	0.13
SISO	0.003
FCC	0.001

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

Flare	Calendar Day	CH ₄ (lbs.)	NMHC (lbs.)	SO ₂ (lbs.)
NISO	May 29, 2019	23	54	2,240
SISO	May 29, 2019	1	3	17
FCC	May 29, 2019	0.5	1.5	1.8

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.

Root Cause:

1. The stem of the minimum flow regulator of fuel gas to the furnace did not function properly, causing the furnace to automatically shutdown.
2. Reactor vessel depressurization was not initiated quickly enough after feed was removed from the unit, resulting in the need for a rapid depressurization of the vessel which overwhelmed the flare gas recovery system

The main contributor of vent gas flow during this event originated from TKN reactor vessels.

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.

The flare gas recovery system remained online during the flaring event and recycled a portion of the relief gas to the fuel gas system.

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 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 analyzed through a TapRoot® investigation 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

All prevention measures have been considered and have or will be implemented.

1. Repair the stem of the minimum flow regulator of fuel gas to the furnace
Commencement Date: 5/28/2019
Completion Date: 5/29/2019
2. Revise applicable procedures to provide prescriptive actions to address hydrogen embrittlement risk during loss of feed scenarios, including guidelines for time frame
Commencement Date: 6/20/2019
Projected Completion Date: 9/27/2019

TKN Flaring Due to Vessel Depressurization

During the evening of May 28, 2019, a furnace in the Taylor Katalytic Denitrifier (TKN) unit of the Hydroprocessing Area Business Unit began to experience flow control issues. The furnace was shutdown, hydrocarbon feed was removed from the associated reactor vessel, and maintenance began work to troubleshoot and repair the flow controllers. On May 29, 2019, an engineering review of the process conditions identified an increased risk of hydrogen embrittlement in the reactor vessel. To mitigate this risk, the pressure in the vessel was quickly depressurized to relief and flaring began at approximately 9:12AM at the FCC, North Isomax (NISO), and South Isomax (SISO) flares. Flaring ended at approximately 9:27AM.

