CC 7/29/21
LD 7/30/21
AR 8/2/21

Attachment III

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

May 27, 2021
Flaring Due to Shutdown of Boilers

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: July 29, 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: 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)**
FCC (S-6016)	SO2
FCC (S-6016) and Alky (S-6019)	Vent Gas Volume

5. The flaring event duration for each affected flare

Flare (Source Number): FCC (S-6016)
The Date(s) of the event: May 27, 2021
The start time of the event: 5/27/2021 5:48 PM
The end time of the event: 5/27/2021 7:06 PM

Flare (Source Number): Alky (S-6019)
The Date(s) of the event: May 27, 2021
The start time of the event: 5/27/2021 5:49 PM
The end time of the event: 5/27/2021 7:04 PM

6. A brief description of the flaring event –

On May 27, 2021, the Refinery experienced the loss of all boilers in operation which caused a significant loss of refinery steam production. The boilers tripped offline because of an activation of a safety system due to a significant change in fuel gas composition being delivered to the boilers. The fuel gas composition change occurred when a different process plant was brought online that supplies fuel gas to the refinery. The loss of refinery steam production caused the slowing of a steam driven compressor in another unit, causing that unit to vent process gases to the Flare Gas Recovery (FGR) system as designed. Flows sent to the FGR system exceeded FGR

capacity, and gas was routed to the flare relief system. Operations restarted boilers, alleviating the loss of steam production. This stopped flows to the flare 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 IIIa.

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

Flare	Volume (MMSCF)
FCC	1.0
Alky	0.5

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

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
FCC	May 27, 2021	164.3	1,895.9	704.0
Alky	May 27, 2021	49.3	799.9	92.8

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.

Primary Causal Factor: Power Plant boilers logic and control do not automatically adjust for large fuel gas composition variations.
Contributing Causal Factor: Power Plant Operations personnel were not notified when the process unit was starting up.

The main contributor of vent gas flow during this event was the Refinery fuel gas system.

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 immediately responded, initiating steam load shed moves to help mitigate the loss of steam production. Operations restarted boilers, alleviating the loss of steam production. This stopped flows to the flare 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?

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 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?

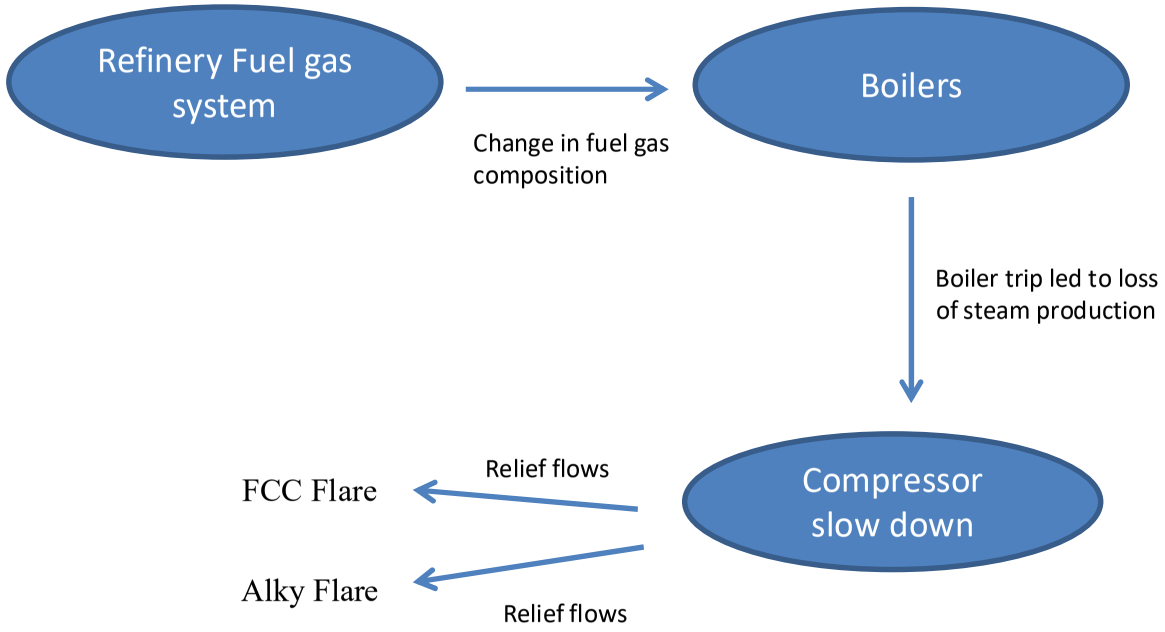
N/A. Flaring was not due to regulatory mandate.

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

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

1. Update process plant startup procedure to include notifications to Power Plant Operations prior to initial pressurizing and startup.
2. Consider implementing automatic logic and controls to better manage fuel gas composition variations at the Power Plant boilers.

Flaring Due to Shutdown of Boilers



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