FLARE CAUSAL ANALYSIS REPORT - PUBLIC COPY

1. **Date on which the report was drafted:** January 29, 2024

2. **The refinery name and site number.**
   Martinez Refinery, Plant # B2758

3. **The assigned refinery contact name and phone number.**
   Sharon Lim, (925) 335-3467

4. **Identification of the flare(s) at which the reportable event occurred by reviewing the water seal monitoring data to determine which seals were breached during the event.**
   The reportable event was for the exceedance of vent gas volume of greater than 500,000 SCF. The flares that processed the vent gas were West Air Flare **S1012**; East Air Flare **S854;** Coker Flare **S1517;**

5. **The flaring event duration for each affected flare**

   West Air Flare – Intermittent Use
   a. **The date(s) of the event:** November 26 – December 2, 2023
   b. **The start time of the event:** 11/26/2023 1:41 AM
   c. **The end time of the event:** 12/2/2023 4:15 AM

   Coker Flare – Used during initial shutdown
   a. **The date(s) of the event:** November 26, 2023
   b. **The start time of the event:** 11/26/2023 1:41 AM
   c. **The end time of the event:** 11/26/2023 1:47 AM

   East Air Flare – Use during initial shutdown
   a. **The date(s) of the event:** November 26, 2023
   b. **The start time of the event:** 11/26/2023 1:41 AM
   c. **The end time of the event:** 11/26/2023 1:49 AM

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

   No. 3 HDO recycle gas compressor tripped on November 26, 2023. This caused an emergency shutdown and the unit automatically depressured to the flare blowdown system as designed. Hydrogen Imbalance caused additional flaring.

7. **A process flow diagram showing the equipment and process units that were the primary cause of the event.**
   Process Flow Diagrams are redacted.

8. **The total volume of vent gas flared (SCF) throughout the event.**
   25,268,071 SCF

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

Date	Flow (SCF)	Methane (lbs)	Non-methane (lbs)	SO2 (lbs)
11/26	5,297,986	447	296	23
11/27	5,096,105	356	284	26
11/28	3,722,080	261	280	30
11/29	3,708,906	331	281	19
11/30	3,467,036	373	373	13
12/1	2,993,175	392	296	8
12/2	982,783	119	134	3
Total	56,664,850	10624.9	6837.2	216.0

Assumptions used to calculate emissions associated with the flaring event were based on the methodology used for reporting under Regulation 12 Rule 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 scrubbing was performed.

The gas that was flared 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: At about 1:40 AM on November 26, 2023, the 3HDO recycle compressor tripped offline. The 3 HDO unit automatically depressured to the flare system as designed. With this shutdown, the hydrogen system became imbalanced and the facility began flaring hydrogen.

When the Maintenance team arrived for troubleshooting, the local panel for the compressor did not show any alarms/shutdowns. After extensive troubleshooting the system and dismantling parts of the compressor, Maintenance identified the likely initiating cause was a “closed” indication on the suction Emergency Isolation Valve. The valve’s air motor and air solenoid were seized. The root cause of this seizure was insufficient lubrication of the air-driven components. Maintenance disassembled all parts, replaced gaskets, and rebuilt the assembly. The air motor and air solenoid were reinstalled and confirmed valve operation in the field. The unit was restarted up and flaring stopped.

Secondary factors were the following:

1. H2 Plants were the sources of vent gas flow to the flare header. Approximately 80% of the flared vent gases during this time was hydrogen.

2. The shutdown was extended due to leaks on the fresh feed PSV and Heater F-55 outlet check valves during pressure testing of the startup procedure. Repairs had to be made prior to continuing with startup.

12. Describe all immediate corrective actions to stabilize the flaring event, and to reduce or eliminate emissions (flared 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 recovered maximum amount of gases possible and the adjustments were made to hydrogen production. H2 Plant rates were kept at minimum rates to decrease the vent gases to flare.

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?

No, this was not classified as an emergency.

"Emergency: 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 is caused by sudden, infrequent and not reasonably preventable equipment failure, natural disaster, act of war or terrorism or external power curtailment, excluding power curtailment due to an interruptible power service agreement from a utility."

14. If not the result of an emergency and necessary to prevent an accident, hazard or release to 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.

Yes, the flaring was consistent with the FMP. Please see Section 3.4.1 Startup and Shutdown of Process Units and page 23 for hydrogen imbalance.

15. If the flaring was due to a regulatory mandate, to vent to the flare, why couldn't the gas be recovered, treated, and used as fuel gas?

Not applicable. Flaring was not due to a regulatory mandate.

16. Identify and describe in detail each preventative measure (PM) considered to minimize the flaring from the type of reportable flaring event that occurred:

a. **State whether the PM is feasible (and will be implemented), or not feasible**

To prevent reoccurrence, a PM for lubricating the EIV at every Catalyst Change was implemented. (Note this can only occur when the unit is shutdown)

Consider upgrading the air driven EIV to an electronically actuated EIV due 4Q2025.

b. Explain why the PM is not feasible, if applicable

Not applicable.