FLARE CAUSAL ANALYSIS REPORT

1. **Date on which the report was drafted:** October 23, 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 related to vent gas volume exceeding 500,000 SCF/day. The flares that processed the vent gas were West Air Flare **S1012**; East Air Flare **S854;**.

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

   West Air Flare – 35 hours and 36 minutes
   a. **The date(s) of the event:** August 17-18, 2024
   b. **The start time of the event:** 8/17/2024 4:47
   c. **The end time of the event:** 8/18/2024 16:23

   East Air Flare – Used during initial shutdown
   a. **The date(s) of the event:** 8/17/2024
   b. **The start time of the event:** 8/17/2024 5:27
   c. **The end time of the event:** 8/17/2024 5:48

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

   Flaring occurred due to the emergency shutdown of #1 HDO. Unit depressurization caused flaring. A hydrogen imbalance from No. 1 H2 and No. 2 Plants resulted in additional flaring.

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

8. **The total volume of vent gas flared (SCF) throughout the event.**
   1,418,250 SCF

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

Date	Flow (SCF)	Methane (lbs)	Non-methane (lbs)	SO2 (lbs)
8/17/2024	1,221,365	221	155	4
8/18/2024	196,885	50	26	1
Total	1,418,250	271	182	5

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 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: On Saturday, August 17, 2024, the fresh feed filter for No. 1 HDO plugged and the spare filter was activated. The fresh feed to the surge drum was interrupted due to the rapid pluggage of the spare filter. Fresh feed rate was quickly reduced by Operations, but at approximately 5:30 am, low level of stripper bottoms triggered a shutdown of the unit's recycle and fresh feed pumps as designed. This caused the furnaces to trip and the depressurization sequence was then initiated. The unit was depressured safely to flare and Operations secured the unit.

    The cause of the pluggage and low levels was due to an upset at the upstream unit, the feed Pretreatment Unit (PTU). An emulsion layer had developed at the Pretreatment Unit B Train as indicated by high amp readings in the grid. Demulsifier injection to break the emulsion had been increased in prior days leading up to the event. Subsequently the emulsion and water were sent to 1 HDO.

    Secondary causal factors:
    1) Hydrogen imbalance as hydrogen is not consumed when #1 HDO is cutting feed rates and is shutdown. Operations reduced H2 production until just before 1 HDO startup.
    2) The Stripper tower level controller is tuned slowly to avoid sudden feed disruptions to the Isomerization Unit, this allowed the stripper to be starved of feed oil, the level continued to fall past the low-level alarm and through the recycle hdo pump low level trip setpoint.

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.**
    Refinery Operations took immediate steps to increase the amount of gas that the fuel gas recovery compressors could recover and directed the gas to the No. 5 Gas Plant. Additionally, the Refinery reduced the hydrogen

production rate in order to decrease the amount of gases vented to the 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 Facility's FMP. Please refer to Section 3.4.1 Startup and Shutdown of Process Units of the FMP and pages 22 in the FMP pertaining to Hydrogen System Imbalance. As described in the FMP, an imbalance in the hydrogen system can occur when the production of hydrogen is out of balance with hydrogen consumption at various units.

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**

	Prevention Measure	Due Date
1	Replace feed filters	Completed
2	Evaluate and implement automated valve closure of 1HDO Stripper tower LCV-157 and LCV-737 Product flow to On/Off Spec Lines based on tower level	03/12/2025
3	Update PTU OPS Limits Alarm Management database for alarms related to grid activity. OPS instructions need to be clarified and improved for mitigation of	11/27/2024

	water rise and possible carryover into product header. (Causal factors)	

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

Not applicable.