

**FLARE CAUSAL ANALYSIS REPORT**

*Flaring Associated with #3 HDO Startup and H2 Imbalance - Public  
February 10, 2023*

- 1) Date on which the report was drafted.**  
April 28, 2023
- 2) The refinery name and site number.**  
Tesoro Martinez Refinery, Plant # B2758
- 3) The assigned refinery contact name and phone number.**  
Sharon Lim, Advance HES Engineer, (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.**  
West Air Flare, **S1012** and Coker Flare, **S1517**
- 5) The flaring event duration for each affected flare:**
  - a. The date(s) of the event**  
February 10-20, 2023
  - b. The start and end time of the event**  
Starting time 00:00  
Ending time 19:00
  - c. The net duration of the event (in hours and minutes)**  
10 days and 19 hours
- 6) A brief description of the flaring event**  
  
Facility continues with startup activities. #3 HDO (S-850) startup and H2 Imbalance were the sources of 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 from public copy.
- 8) The total volume of vent gas flared (MMSCF) throughout the event.**  
Based on the Regulation 12 Rule 11 Flare Monitoring report, the net gas flow to the flare was 57.43 MMSCF.
- 9) The emissions associated with the flaring event per calendar day:**
  - a. # methane emitted
  - b. # non-methane hydrocarbon emitted
  - c. # SO<sub>2</sub> emitted

See Table 1 for summary

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Table 1

Date	Methane (lbs/D)	Nonmethane (lb/D)	SO2 (lbs/D)
2/10	931	351	15
2/11	1098	625	18
2/12	717	563	9
2/13	518	783	242
2/14	1485	1039	206
2/15	848	298	125
2/16	515	79	27
2/17	1048	168	22
2/18	627	104	18
2/19	594	115	26
2/20	384	81	3

**Also provide the assumptions used to calculate emissions associated with the flaring event if they are different from those used for reporting under Regulation 12 Rule 11.**

The emissions associated with this 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 vented gas which was flared was not scrubbed.

**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.**

On February 10 through February 20, 2023, Operations had numerous operational challenges to restart the #3 HDO. We had the hydrogen makeup compressor trip during a routine lube oil filter swap, plugged product coolers, unit trip due to instrumentation work, leaking pump seals on feed pump, and heat exchanger leaks. This caused shutdowns of the #3 HDO and depressurization, which resulted in flaring. Maintenance made repairs as quickly as possible and Operations attempted to restart and return to normal operations.

H2 continued to be flared during this period. H2 Plant is up and running prior to other units as hydrogen is essential for the reactions.

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- 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.**

H2 Plant rate was kept at low rates to decrease the vent gases to flare. We used the flare gas recovery compressors to recycle vent gas to 5 Gas Plant when 5 Gas compressor temperatures and BTU content of the fuel gas allowed.

- 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?**

Flaring was not the result of an "emergency" as defined by the BAAQMD.

*"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, this is consistent with our 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.

- 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**

The following prevention measures were feasible and executed:

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5 Gas Plant was started up first so that the flare gas compressors had a place to send the recovered flare gas. 5 Gas Plant compresses the gas for use in the fuel gas system and removes H<sub>2</sub>S in its adsorbers.

Minimum hydrogen was produced until #3 HDO started up to minimize hydrogen to the flare and fuel gas systems. Some hydrogen was sent to the fuel gas and combusted in heaters.

The refinery idled over two years ago. Equipment was refurbished but as Operations started up various pieces of equipment, new problems were uncovered and were quickly addressed. With these additional repairs, future startups will be smoother and shorter.

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

Not applicable.

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