October 2025

Environmental, Safety & Security Sequential Safety Meeting

MARATHON®

ANACORTES REFINERY

ESS Safety Metrics

DSA Eligible	OSHA rec	ORIR	AFPM 1a/1p	H2S >50 ppm	PSE 1/2	DEI 3/4	Permit deviations
✖	3	0.29	0/6	3	0/0	0/2	25
🎯	-	*0.30*	3	≤ 3	≤ 3	≤ 1	*34*

- **ORIR**: OSHA Recordable Injury
- **Anacortes**
- 1 – Debris in eye needing prescription eye drops
- 1- Sprained wrist requiring medical treatment.
- 1 – Fractured ankle.

- **PSE**: Process Safety Event, refer to R-12-007
- **DEI:** Designated Environmental Incident, refer to R-13-027

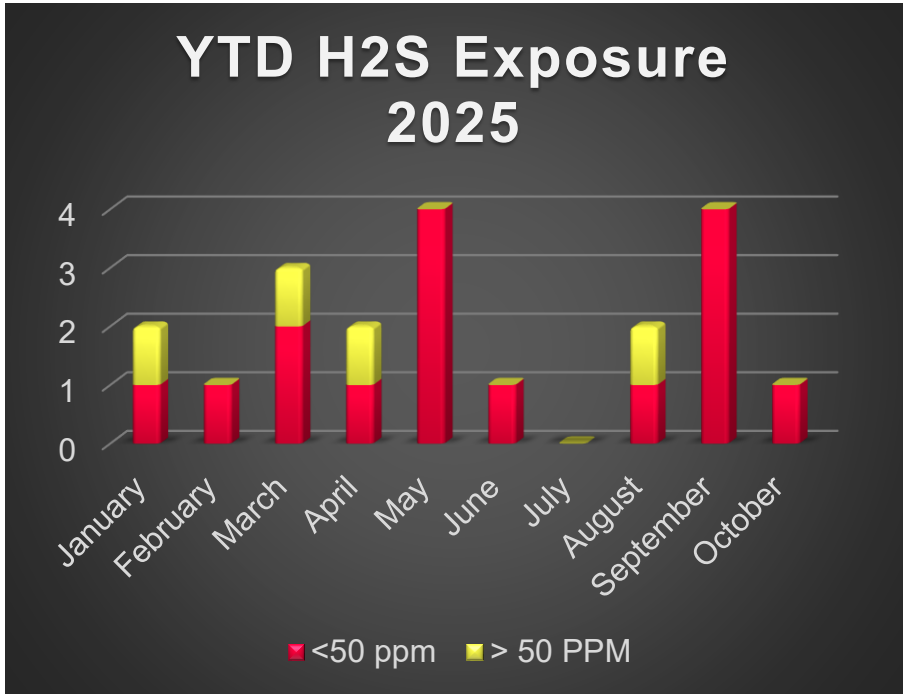
- **AFPM 1a: Actual Incident** - serious injury that caused a fatality, hospitalization, or other life-altering event.
- **AFPM 1p: Potential Incident -** an incident with the potential for fatality, hospitalization, or other life-altering event, including near misses.
- **Anacortes**
- 1p - Fall Protection Not Utilized
- 1p - HVAC Electrical Spark
- 1p – GFCI Electrical Shock
- 1p – Grating/Handrail Removal Fall Hazard
- 1p – Energy Isolation Verification
- 1p- H2S alarm greater than 100ppm.

Start Safe and Stay Safe: H2S Safety

- Hydrogen sulfide (H2S) is a highly toxic, colorless gas, an exposure to which may cause severe health complications or even death. Because H2S deadens the sense of smell, a detector or monitor must be used for accurate determination of the presence of gas.

- Additionally, when the potential for exposure to H2S exists, precautions must be taken, such as utilizing respiratory protection, to ensure individuals are not exposed.

- As of October 9, 2025, there have been 20 incidents of >20ppm H2S exposure at the Anacortes refinery.



- In situations where work is performed on systems with any quantity of H2S, an evaluation for respiratory protection should be made.

- Supplied air should be used to prevent accidental inhalation of H2S, however, a Full Face APR with H2S cartridge can be used by Marathon employees in place of Supplied Air when the system is isolated, cleaned/purged, the volume is small, and the concentration of H2S is <100 ppm.

- **H2S monitor alarm points**:
  - At 10 ppm -19.9 ppm = H_2S Low level audible alarm & flashing red and blue lights.
  - At 20 ppm and over = H_2S High level audible alarm = rapid more intense beeping & flashing red lights (no flashing blue light).

Full Face APR with adapter and acid gas cartridges

If a personal H_2S monitor goes into alarm,

- Assume that H_2S is present and immediately evacuate the area.
- Immediately report the event to Operations so that personnel can don fresh air and investigate situation with a MX6 or MX4 multi-gas meter.
- Notify your supervisor.

  NOTE: An individual must never return to the field without first docking a personal meter that has received an alarm. This is equivalent to working without a H_2S meter.

- Dock the meter on docking station as soon as possible, so that data from the meter can be downloaded
- Business partner personnel shall not return to the unit until advised by Operations personnel that it is safe to do so.

- If it is determined that an H_2S emergency exists, Operations personnel shall activate the localized unit or refinery evacuation siren and call x333 to initiate the Emergency Action Plan.

Start Safe and Stay Safe: Engagement questions

- Why is it inappropriate to move from one process unit to another process unit with an H2S meter alarming?
- Have you ever avoided wearing respiratory protection to finish a job faster? What risks does this pose?
- How can we prevent a complacent mindset with the use of H2S monitors and required respiratory equipment?
- Have you docked your H2S meter within the last 30 days?

  If you haven't, go dock your monitor!

Environmental Point of Interest

Permit deviations YTD: 25
DEI 1/2 YTD: 31
DEI 3/4 YTD: 2

It is rainy season!

This is a reminder that any trash or litter on the ground could get swept into the sewer system and cause major problems:

- Sewer blockages
- API overflow – oil to ground/compliance issue
- Turning regular trash into hazardous waste - $$
- Trash could end up in Fidalgo Bay

Please practice good housekeeping after rain/wind events and keep our refinery looking nice!

*Pictures are NOT from Anacortes Refinery

PSE1 MPC PROCESS SAFETY ADVISORY

GALVESTON BAY REFINERY SOUR WATER TANK FIRE INC# 409438

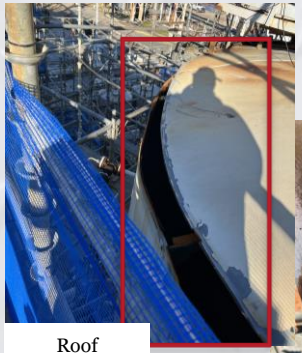
PSA 25-08 **Published 9/15/2025**

On December 13, 2023, while preparing GBR Sour Water Tank 222 for a maintenance outage, an explosion occurred when air was inadvertently introduced to the tank through a vacuum relief device. Damage occurred to the tank roof and separated a clamp-on 'PLIDCO' flange on a common vent pipe from the other sour system tanks. This resulted in a fire and vapor release to atmosphere.

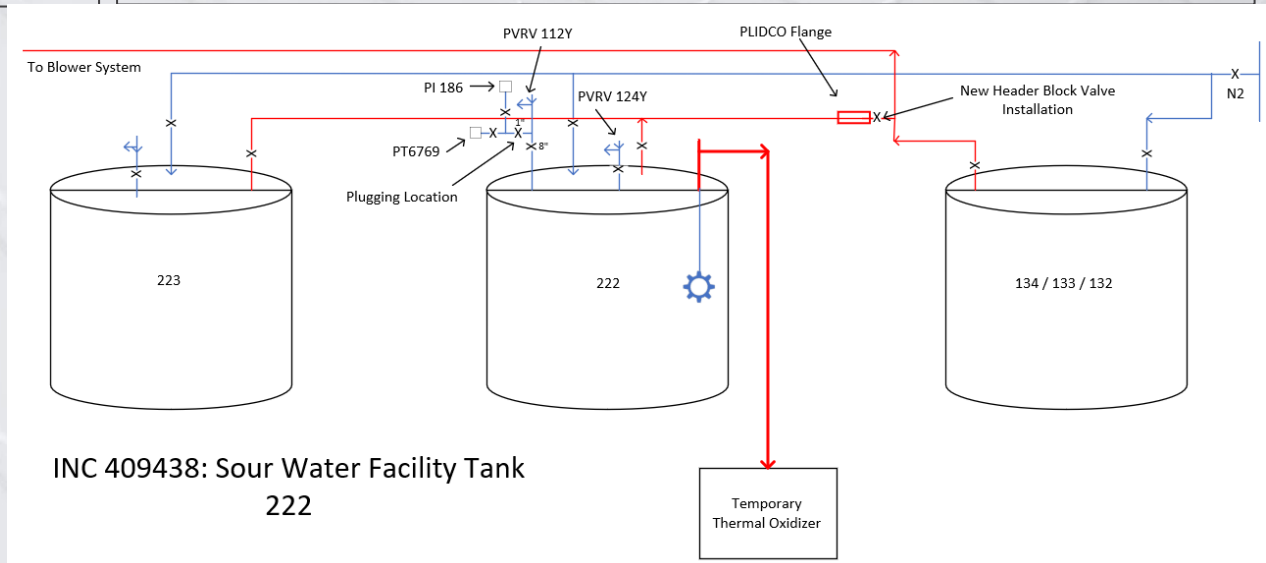
- **This incident was categorized as a PSE1 due to fire damage costs exceeding $100,000.**

Causal Factors:

- The nitrogen blanket supply to the tank was inadequate due to unknown plugging in the 1" common vent line connection to tank pressure transmitter, nitrogen control valve sensing line, and the manual pressure gauge.
- A work order was created to address the faulty pressure transmitter readings, but the work priority was not elevated as required (per RSP-1330-000 Operating Limits) for the Critical Process Variable (CPV) instrument.
- Operating procedures did not exist for removing sour water tanks from service.
- The cleanout guideline did not include a step to verify pyrophoric material was neutralized before switching from unit vapor recovery mode to atmospheric venting through a temporary thermal oxidizer.



Roof Damage



INC 409438: Sour Water Facility Tank 222

Marathon Petroleum Company LP

"THE REST OF THE STORY": In the months leading up to event, Operations identified faulty spurious readings from the Tank 222 pressure transmitter. Following troubleshooting, work orders were created and planned to calibrate and unplug the transmitter, but the work was not prioritized as Emergency, as required for CPV instrumentation. Unknown to Operations, the 1" vent line was plugged, which impacted the tank pressure transmitter readings, nitrogen blanket pressure regulator, and local pressure gauge. A common sour water tank vent system allowed the tank pressure to remain in normal operating ranges because the connected tanks' pressure control systems worked correctly. During the vapor removal process, tank pressure was monitored via the DCS by Operations to ensure Tank 222 did not pull a vacuum. Preparation of the tank for maintenance included chemical treatment for pyrophoric material, but neutralization testing was not performed prior to routing vapor away from the common vent system to a thermal oxidizer. After Tank 222 was switched from normal operation using the common vent header to vapor routing through a blower to a thermal oxidizer, an explosion occurred—likely caused by a drop in tank pressure and subsequent air ingress through a vacuum breaker, which allowed un-neutralized pyrophoric material to auto-ignite.

Tank 222 is the final tank that needs updating as part of the Sour Water N2 Blanketed Tanks Project. All other GBR Sour Water tanks have been updated with 3 new nozzles, pipe supports, independent pressure transmitters, and independent flow meters. This project was initiated after the April 2013 explosion and fire at the Detroit Refinery sour water tank (PSA is linked here). The objective is to reduce the risk of fire or explosion in inert gas blanketed sour water tanks by upgrading the existing piping and instrumentation.

DISCUSSION TOPICS:

- Review PSA 14-02 Detroit Sour Water Tank Explosion. It is linked **here**.
- Review SP-42-20 Tank Blanketing for designing, installing and operating Tank Blanketing systems on storage tanks to minimize the potential for drawing air into the tank during vacuum conditions.
- How are the hazards of insufficient tank blanketing and potential for pyrophoric material addressed within existing management systems?
- Maintenance Work Process- Work orders for a Critical Process Variable (CPV) are prioritized as Emergency, per RSP-1330-000 Operating Limits.
- Engineering- Design to eliminate single points of failure. There is potential for plugging at the sensing source for multiple instruments. In sour water systems, it is common for elemental sulfur plugging when air is introduced.
- Management of Change- Evaluate adequacy of safeguards against mixing air with pyrophoric material for any changes impacting blanketed tanks.
- Operating and/or Maintenance Procedures- When removing tanks from service, evaluate for presence of pyrophoric material. Use supplemental nitrogen when cleaning out tanks to ensure not to pull a vacuum.
- Safe Work Permits- Identify the potential for pyrophoric material and necessary mitigation.
- Inspection- Are you aware of clamp-on flanges, or 'PLIDCO' fittings, on hydrocarbon piping for long term/permanent installations? Are these seal welded?

Global Action

Recommendations	Assigned to:	Due Date:
Review this advisory with your leadership team and cascade to your entire organization to ensure site-wide review to improve process safety hazard recognition	Site VPs	12/31/2025
Update SP-42-20 Tank Blanketing to include steam/heat tracing the vapor lines (including pilot lines) with a system that will keep the walls of the entire piping circuit greater than 212°F to prevent condensation of water vapor on the inside of the pipe for tank blanketing systems to a closed vapor recovery system on tanks with high H2S concentrations in the vapor space (i.e., Sour Water Tanks).	Brad Martin	9/30/2026
Develop procedure for taking a Sour Water Tank out of service. Include steps for pyrophoric neutralization and transitioning tank to air. Review with Tank Technologist.	Operations/Products Directors	9/30/2026
Update SP-50-34 to add limitations for the use of 'PLIDCO' bolt on type fittings.	Mike Alford	9/30/2026

PSE1 MPC PROCESS SAFETY ADVISORY

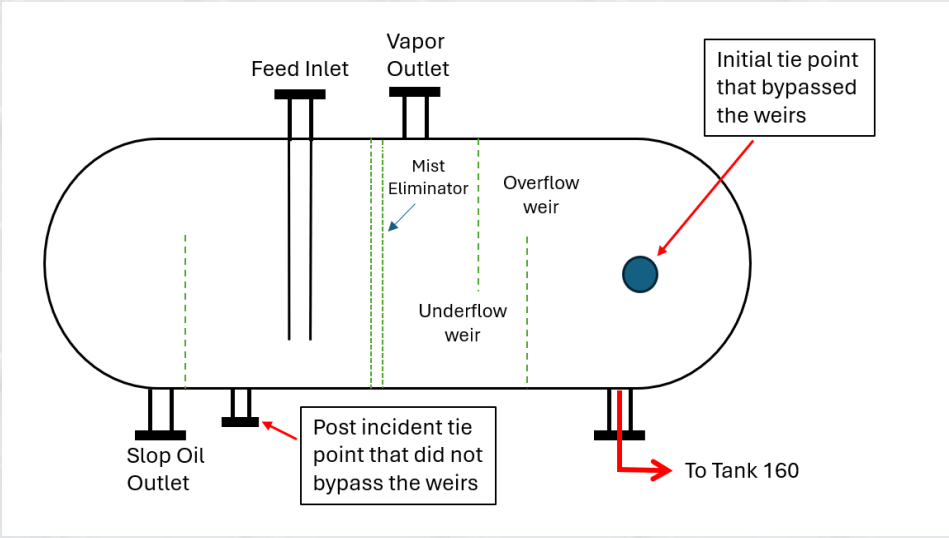
SPP SOUR WATER TANK 160 H2S RELEASE FROM RUPTURE DISC INC# 445621

On September 14, 2024, the rupture disc on Sour Water Tank 160 burst and released to the atmosphere. Personal and fixed gas H2S monitors began to activate. Tank 160 nitrogen blanket flow could not restore pressure, so draw from the tank was reduced to prevent air ingress. Just prior to the release, a temporary FCC gasoline treating system had been started up. Due to a design issue, FCC gasoline was routed to the tank causing the high pressure.

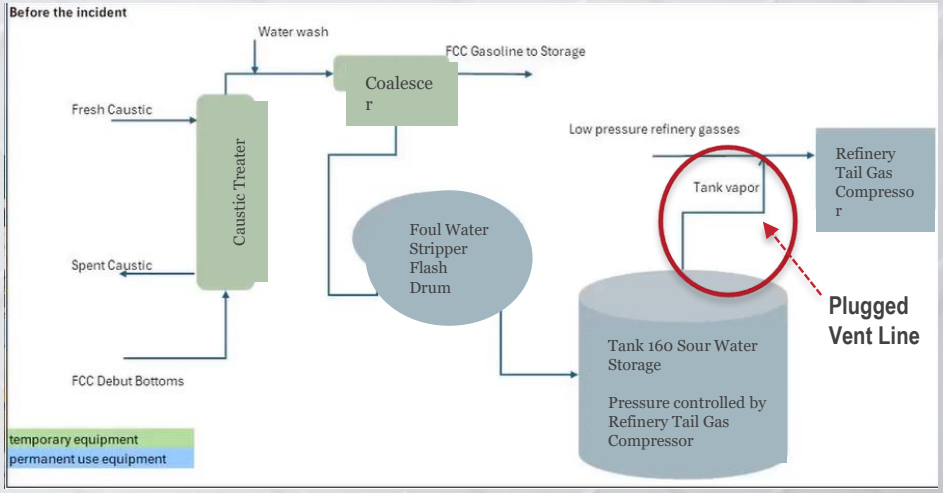
- **This incident was categorized as a PSE1 due to a release from a pressure relief device greater than the threshold quantity in a one-hour period and on-site shelter-in-place.**

Causal Factors:

- Design of the temporary coalescer water boot routed to water side of flash drum preventing oil and water separation prior to pumping to Tank 160.
- Tank 160 vent line to the tail gas compressor was determined to be plugged.



Foul Water Stripper Flash Drum



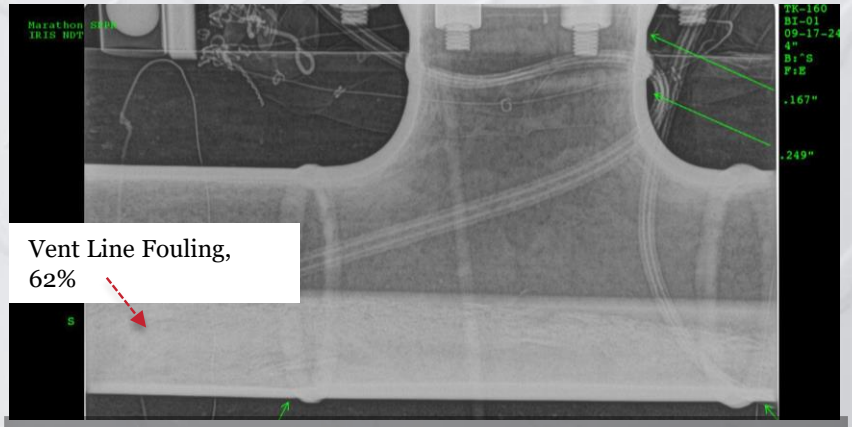
"THE REST OF THE STORY": In 2019, the FCC gasoline treater and precipitator were removed from service due to no longer being needed for sulfur removal of FCC gasoline and concerns with caustic carryover from the treater. A planned outage of the Gas Oil Hydrotreater (GOHT) unit, which supplies low sulfur gas oil to the FCC, was planned for September 2024 . The scope freeze for the scheduled GOHT catalyst change was September 2023, and the plan for sulfur treatment had not been set. In May 2024, Sequence of Event (SOE) for GOHT shutdown review highlighted product quality sulfur concerns. The Area Team began evaluating sulfur treatment options. On August 14, the team began designing a treatment system which included the FCC gasoline treater and wash water with redundant coalescers to remove entrained caustic. A flaw in the design routed the coalescer water boot to the water side of the sour water flash drum preventing any oil and water separation prior to pumping to the foul water storage Tank 160. On September 14, the treatment system was placed into service. Soon after, the level and pressure in Tank 160 began to rise and the tank vent control valve reached 100% output. Several hours later, the FCC Console received a high-pressure alarm that went unnoticed and remained active throughout the day. There was no conversation about the standing alarm during shift turnover and soon after tank pressure reached 4.5 PSI, the rupture disc burst, and released the vapor space of the tank to atmosphere. Post incident the vent line was identified as plugged with material that is suspected to be a sulfur oxide.

- ☑ Operations
- ☑ Maintenance
- ☑ Technical
- ☑ Engineering

Review the first 5 minutes of the SPP weekly video here.

DISCUSSION TOPICS:

- Does your site routinely utilize internal drawings and equipment files, in addition to P&IDs, during MOC evaluations?
- Are turnaround scope freeze dates strictly adhered to, ensuring that project evaluations are less susceptible to errors related to time pressure?
- Do vent systems have a purge or other mechanisms to confirm proper operation?
- Are DCS graphics missing key data, or is the data for troubleshooting spread across multiple screens?
- Are there areas or equipment that would benefit from the installation of a fixed gas monitor?
- Are you aware of any alarms that require rationalization because they do not currently meet all the characteristics outlined in RSP-1173-010 (Relevant, Unique, Diagnostic, Understandable, Prioritized, and Consequential)?
- Review SP-42-20 Tank Blanketing for designing, installing and operating Tank Blanketing systems on storage tanks to minimize the potential for drawing air into the tank during vacuum conditions.



Global Action

Recommendations

Recommendation included in GBR Global Recs in previous slide Update SP-42-20 Tank Blanketing to include steam/heat tracing the vapor lines (including pilot lines) with a system that will keep the walls of the entire piping circuit greater than 212°F to prevent condensation of water vapor on the inside of the pipe for tank blanketing systems to a closed vapor recovery system on tanks with high H2S concentrations in the vapor space (i.e., Sour Water Tanks).

Bring It Up!!!

If there are Safety questions or concerns you wish to discuss, please bring them up!