

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT  
GULF OF MEXICO REGION

ACCIDENT INVESTIGATION REPORT

For Public Release

1. OCCURRED

DATE: 29-FEB-2016 TIME: 1930 HOURS

2. OPERATOR: Talos Energy Offshore LLC

REPRESENTATIVE:

TELEPHONE:

CONTRACTOR:

REPRESENTATIVE:

TELEPHONE:

- STRUCTURAL DAMAGE
- CRANE
- OTHER LIFTING DEVICE
- DAMAGED/DISABLED SAFETY SYS.
- INCIDENT >\$25K
- H2S/15MIN./20PPM
- REQUIRED MUSTER
- SHUTDOWN FROM GAS RELEASE
- OTHER

3. OPERATOR/CONTRACTOR REPRESENTATIVE/SUPERVISOR  
ON SITE AT TIME OF INCIDENT:

6. OPERATION:

4. LEASE: G01238

AREA: PL LATITUDE:

BLOCK: 23 LONGITUDE:

- PRODUCTION
- DRILLING
- WORKOVER
- COMPLETION
- HELICOPTER
- MOTOR VESSEL
- PIPELINE SEGMENT NO.
- OTHER

5. PLATFORM: D

RIG NAME:

6. ACTIVITY:  EXPLORATION(POE)  
 DEVELOPMENT/PRODUCTION  
(DOCD/POD)

8. CAUSE:

- EQUIPMENT FAILURE
- HUMAN ERROR
- EXTERNAL DAMAGE
- SLIP/TRIP/FALL
- WEATHER RELATED
- LEAK
- UPSET H2O TREATING
- OVERBOARD DRILLING FLUID
- OTHER \_\_\_\_\_

7. TYPE:

- HISTORIC INJURY
  - REQUIRED EVACUATION
  - LTA (1-3 days)
  - LTA (>3 days)
  - RW/JT (1-3 days)
  - RW/JT (>3 days)
  - Other Injury

- FATALITY
- POLLUTION
- FIRE
- EXPLOSION

- LWC  HISTORIC BLOWOUT
- UNDERGROUND
  - SURFACE
  - DEVERTER
  - SURFACE EQUIPMENT FAILURE OR PROCEDURES

9. WATER DEPTH: 61 FT.

10. DISTANCE FROM SHORE: 20 MI.

11. WIND DIRECTION:  
SPEED: M.P.H.

12. CURRENT DIRECTION:  
SPEED: M.P.H.

13. SEA STATE: FT.

COLLISION  HISTORIC  >\$25K  <=\$25K

## 17. INVESTIGATION FINDINGS:

On February 29, 2016, an incident occurred on the South Pelto (PL) 23-D platform (OCS-G 1238). The platform is operated by Talos Energy Offshore LLC (Talos). According to the operator, a production alarm sounded at 1930 hours. Personnel went to the panel to investigate and found the burner safety low (BSL) indicator for the Heater Treater (NBK-2900) activated. Upon arrival at the treater, the operator noticed a small fire in the BSL box of the left-side fire tube. (Note: There are two fire tubes in this treater.) The operator activated a nearby Emergency Shutdown Station (ESD), notified other personnel of the fire, and put out the fire with a 30# BC fire extinguisher. There were no injuries, nor was the platform evacuated. The platform remained shut in from the time of the incident until repairs were completed on March 18, 2016. Production was resumed on March 19, 2016.

Background information from the Talos incident investigation report states as follows: "The fire was inside the 24-inch fire tube inside of the heater treater. The tube was identified as A-106 Grade B schedule 20 material. There were two fire tubes in this heater treater and both tubes experienced the same type of corrosion. The treater was processing approximately 380 bopd and 200 bwpd. The gas phase contained 1.33% of CO<sub>2</sub> and no H<sub>2</sub>S. The produced water had a laboratory pH of 2.95 and a chloride content of 25,028 mg/l. The operating conditions in the treater were 30 psig and 120°F. The chemical program consisted of a paraffin inhibitor with an emulsion breaker and water clarifier used as needed. The emulsion breaker being used contained phosphoric acid. It was being injected upstream of the primary vessels at the header."

## 18. LIST THE PROBABLE CAUSE(S) OF ACCIDENT:

Findings performed by an engineering firm investigating the incident states in part:

1. The mechanism of this failure was thermo-galvanic corrosion where the top of the fire tube, which was the hottest area, became anodic to the cooler metal in the water.
2. This galvanic cell required several parameters to be present to produce the extremely high corrosion rates that were observed on the fire tube. These parameters included the temperature gradient on the metal surface that was water wet, the scale deposition on the top of the tube, the chloride concentration in the produced water, and the low pH of the produced water. These parameters when combined together produced the highly corrosive galvanic cells that resulted in the failures.
3. The water in the treater had a measured laboratory pH of only 2.95. This very low pH accelerated the corrosion process. It was possible that the phosphoric acid in the emulsion breaker had contributed to the low pH. [...]
4. The low pH condition converted the CO<sub>2</sub> in the water to carbonic acid, which made the water very corrosive. This would explain why the pits exhibited a mesa corrosion morphology that is usually associated with CO<sub>2</sub> corrosion.
5. [...] Based on the time to failure, the calculated pitting corrosion rate at the failure sites was 450 mils/year (mpy). This was an extremely high corrosion rate which could not have been achieved by CO<sub>2</sub> corrosion alone. This corrosion rate would have required an outside driving force such as thermo-galvanic corrosion.

6. [...] All of the pits were isolated to the top and sides of the tube where the scales were present. There was no evidence of any significant pitting in the areas where no scales were present. It appeared that the surface scales had helped to insulate the metal, which increased the localized surface temperature of the metal.

7. The x-ray diffraction (XRD) analysis of the surface scales identified calcium phosphate siderite (iron carbonate), and calcite (calcium carbonate). These carbonate scales should not have formed at a pH of 2.95. The presence of calcium phosphate suggested that the emulsion breaker was not compatible with the produced water. The iron carbonate was the product of CO2 corrosion and the calcium carbonate was an inorganic mineral scale."

19. LIST THE CONTRIBUTING CAUSE(S) OF ACCIDENT:

N/A

20. LIST THE ADDITIONAL INFORMATION:

Talos plans to implement the following preventive control measures:

"1. Anodes will be added for cathodic protection of the shell and fire tube based on the calculated surface area.

2. A new fire tube was constructed with a heat resistant coating.

3. A change in the chemical program:

a. An emulsion breaker that will not produce calcium phosphate scale will be added.

b. A scale inhibitor program will be to address calcium carbonate scale deposition.

4. Reduce the fluid temperature in the treater from 120 °F to 105 °F, therefore reducing the fire tube skin temperature.

5. The fire tube will be pulled and visually inspected:

a. Before the vessel has been in service for 60 days (May 18th). [\* completed]

b. Before the vessel has been in service for 180 days (September 15th).

c. Based on the rates of corrosion, an inspection interval will be initiated.

6. The lessons learned from the incident will be generated and sent to all platforms in order to prevent future occurrences." [\* completed]

21. PROPERTY DAMAGED:

NATURE OF DAMAGE:

Fire Tube  
Burner Box  
Pilot  
Burner Safety Low

Fire Damage

For Public Release

ESTIMATED AMOUNT (TOTAL): **\$90,000**

22. RECOMMENDATIONS TO PREVENT RECURRENCE NARRATIVE:

**The Houma District has no recommendations for the Office of Incident Investigations.**

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: **NO**

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

**N/A**

25. DATE OF ONSITE INVESTIGATION:

**02-MAR-2016**

26. ONSITE TEAM MEMBERS:

**Terry Hollier /**

29. ACCIDENT INVESTIGATION

PANEL FORMED: **NO**

OCS REPORT:

30. DISTRICT SUPERVISOR:

**Bryan Domangue**

APPROVED

DATE: **02-NOV-2016**