

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: 04-NOV-2017 TIME: 1440 HOURS

2. OPERATOR: Energy XXI GOM, LLC

REPRESENTATIVE:
TELEPHONE:

CONTRACTOR:
REPRESENTATIVE:
TELEPHONE:

- STRUCTURAL DAMAGE
- CRANE
- OTHER LIFTING
- DAMAGED/DISABLED SAFETY SYS.
- INCIDENT >\$25K \$49,921
- H2S/15MIN./20PPM
- REQUIRED MUSTER
- SHUTDOWN FROM GAS RELEASE
- OTHER

3. OPERATOR/CONTRACTOR REPRESENTATIVE/SUPERVISOR ON SITE AT TIME OF INCIDENT: 8. OPERATION:

4. LEASE: G02947

AREA: MP LATITUDE: 29.26643
BLOCK: 73 LONGITUDE: -88.907959

5. PLATFORM: CF
RIG NAME:

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

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

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

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

9. CAUSE:

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

- 10. WATER DEPTH: 146 FT.
- 11. DISTANCE FROM SHORE: 8 MI.
- 12. WIND DIRECTION:
SPEED: M.P.H.
- 13. CURRENT DIRECTION:
SPEED: M.P.H.
- 14. SEA STATE: FT.
- 15. PICTURES TAKEN:
- 16. STATEMENT TAKEN:

On November 4, 2017 at approximately 14:40, a fire occurred in the vicinity of the glycol dehydration unit on the Main Pass (MP) Block 73 "CF" platform, owned and operated by Energy XXI. Energy XXI reported no pollution and no injuries associated with the incident. Energy XXI estimated the cost of damage to be \$49,921.

On the day of the incident, the work team, consisting of three operators, completed a Job Safety Environmental Analysis (JSEA) for "clean[ing] pin on glycol burner" at 12:00. After securing the glycol unit, the work team and the Person-in-Charge (PIC) pulled the fire arrestor. The crew cleaned the pin, and the PIC brought the glycol unit back on line, which included turning on the burner. The PIC monitored the glycol unit for fifteen minutes, noting the temperature on the reboiler was at 195 degrees F and the pumps were stroking normally. The PIC placed the glycol panel back in service, and went to the "Gauger Shack," where he told Operator 1 to monitor the temperature on the reboiler.

The PIC then walked across the catwalk to the "A" platform, and was speaking with the Compliance Foreman and Operator 2. After approximately 2 minutes, the Compliance Foreman noticed a fire in the vicinity of the glycol unit. The three personnel proceeded across the catwalk, where they were joined by Operator 1, who was still in the "Gauger Shack" when the fire alarm sounded. The four personnel then proceeded to the glycol unit, and they extinguished the fire using two 300-pound wheeled chemical firefighting units and one 30-pound handheld fire extinguisher. Energy XXI notified the BSEE New Orleans District at 20:56 that evening, and the BSEE investigation team conducted an on-site visit to the platform on November 7, 2017.

The BSEE investigation team discovered evidence of soot and fire extinguishing chemical concentrated in the vicinity of the glycol reboiler burner assembly, exhaust stack, and the still column. Additionally, three expended fusible plugs in the same vicinity had been replaced. Platform personnel removed the flame arrestor, and the investigation team found visible signs of soot on several areas of the flame arrestor.

From November 16 through November 19, a third-party vendor repaired the damaged portions of the glycol regeneration skid, and they provided photographic documentation of the repair. The external portion of the fire tube was significantly discolored, indicating evidence of glycol deterioration. The still column interior exhibited evidence of sour corrosion. Also, the still column was "plugged up with rust and broken pieces of grid which sat on screen above saddles." The ceramic packing saddles that were removed from the still column also contained black sediment. After inspecting the exhaust stack and stack arrestor, the vendor work crew discovered that the stack arrestor was "damage[d] beyond repair." The BSEE investigation team was unable to determine if the damage to the stack arrestor occurred prior to or during the incident.

Normally, rich glycol enters the glycol reboiler through the still column. Before entering the still column, the rich glycol goes through a charcoal filter designed to eliminate liquid hydrocarbons. After the rich glycol enters the still column, it flows downward through the packing saddles and into the reboiler. Since the still column was "plugged up" in this instance, the wet glycol flowed up the still column and out of the open air process vent. The vent is located in close proximity to other hot surfaces, including the exhaust stack and the burner assembly.

The Maintenance & Testing section of Energy XXI's Glycol Regeneration System Operating Procedure states the following: "Samples should be taken on a monthly basis and sent to appropriate vendor for testing. Upon results, follow the Vendor recommendations." The BSEE investigation team reviewed the glycol analysis reports from June to November 2017. Energy XXI did not provide any test results for the months of July or October.

The following highlights the relevant glycol analysis test results.

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In most instances, the pH was less than the recommended value of 7, but within the allowable parameters of 6.5 to 8. A pH value less than 7 indicates an acidic solution, increasing the potential for corrosion. Also, in every instance except one, the residue in both the lean and rich samples was not within recommended limits. The presence of residual solids is usually indicative of inadequate filtration, and can create sludge in the system. In most instances, the foam tests indicated height and stability parameters outside of recommended operating ranges for the rich samples. In every instance, the overall recommendation was to "change sock filters monthly and charcoal filters every two months.

The BSEE investigation team reviewed the provided information regarding sock and charcoal filter changes, with the following findings. The most recent charcoal filter change prior to the incident occurred on August 8, 2017, or 3 months prior to the incident. The sock filters were changed on August 8, 2017 and September 21, 2017, with an average of 44 days between the two most recent sock filter changes, and no sock filter changes during the month of October 2017.

One suggested mechanical maintenance practice (Stewart, M., & Arnold, K. (2011) Gas Dehydration Field Manual) is to take daily samples of glycol and visually check for fine black particles, which would indicate internal corrosion. Also, if the sample is viscous and black, it is likely contaminated with hydrocarbons or well-treating chemicals. Another test is to smell the sample; an aromatic smell, like rotten bananas, indicates that the glycol is thermally degraded. The BSEE investigation received no indication that daily glycol samples were inspected for these conditions.

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

- Equipment Failure - Plugging of the still column caused glycol (fuel) to be expelled into the atmosphere, where it contacted one or more hot surfaces (ignition), resulting in the fire.

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

- Failure to Follow Procedure - The platform personnel did not adhere to the established maintenance procedure, which required them to change sock filters monthly and change charcoal filters every two months.

20. LIST THE ADDITIONAL INFORMATION:

- A contributing factor in this incident is the lack of an adequate preventive maintenance program. The practice of having samples analyzed once a month is sometimes considered sufficient; however, there is no indication that any operators were inspecting the samples daily, as suggested by technical literature. Although it is not required by regulation, the practice of conducting daily visual sample observations may have enabled the operators to detect an abnormal condition prior to the incident occurring.

21. PROPERTY DAMAGED: **Glycol Reboiler**
NATURE OF DAMAGE: **Glycol Liquid carryover resulting in a fire.**

ESTIMATED AMOUNT (TOTAL): **\$49,921**

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:
The BSEE New Orleans District makes no recommendations to the Office of Incident Investigation.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: **YES**

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:
INC's issued February 20, 2018:

G110 (W) During the BSEE Investigation, Failure to Follow Procedure - The platform personnel did not adhere to the established maintenance procedure, which required them to change sock filters monthly and change charcoal filters every two months. NOTE: The INC has been corrected during the course of the BSEE investigation.

G111 (C) During the BSEE Investigation, Plugging of the glycol still column caused glycol (fuel) to be expelled into the atmosphere, where it contacted one or more hot surfaces (Ignition), resulting in the fire. NOTE: The INC has been corrected during the course of the BSEE investigation.

G112 (W) During the BSEE Investigation, a Glycol Tote Tank was found in the direct path of a fired vessel. NOTE: The INC has been corrected during the course of the BSEE investigation.

25. DATE OF ONSITE INVESTIGATION:
06-NOV-2017

28. ACCIDENT CLASSIFICATION:

29. ACCIDENT INVESTIGATION
PANEL FORMED: **NO**

26. INVESTIGATION TEAM MEMBERS:
Pierre Lanoix (Production Accident Investigator) / Harold Griffin /

OCS REPORT:

30. DISTRICT SUPERVISOR:
David Trocquet

27. OPERATOR REPORT ON FILE:

APPROVED
DATE: **07-MAR-2018**