

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: 25-APR-2016 TIME: 1720 HOURS

2. OPERATOR: Shell Offshore Inc.

REPRESENTATIVE:

TELEPHONE:

CONTRACTOR: Helmerich & Payne

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: G08241

AREA: GB LATITUDE:

BLOCK: 426 LONGITUDE:

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

5. PLATFORM: A-Augur TLP

RIG NAME: H&P 406

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 1
- LTA (1-3 days)
- LTA (>3 days)
- RW/JT (1-3 days)
- RW/JT (>3 days)
- Other Injury 1 Medical Treatment

- FATALITY
- POLLUTION
- FIRE
- EXPLOSION

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

9. WATER DEPTH: 2860 FT.

10. DISTANCE FROM SHORE: 136 MI.

11. WIND DIRECTION: ESE
SPEED: 15 M.P.H.

12. CURRENT DIRECTION: SE
SPEED: 1 M.P.H.

13. SEA STATE: 2 FT.

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

17. INVESTIGATION FINDINGS:

At approximately 15:20 hour on 25 April 2016, a Helmerich and Payne, Inc. (H&P) employee was injured while removing a seat from a mud pump cylinder on the H&P 406 rig that is permanently fixed on Shell Offshore Inc.'s (Shell's) Auger tension leg platform (TLP) located at Garden Banks Block 426. The injured party (IP) required evacuation from the TLP rig for medical treatment.

In anticipation of possible drilling activity, the mud pumps on the H&P 406 rig went through maintenance in September of 2015. In October of 2015, the drilling project was cancelled and the mud pumps were scheduled to be torn down for placing in a "cold stack" mode. In January 2016, an attempt was made to remove the mud pump seats; however, the seats were unable to be pulled out with a standard duty seat puller. In early April 2016, another attempt was made to pull the seats with heavy duty (HD) seat puller, but the seats would not release from the cylinders. The H&P crew discovered that the threads on the 2.375-inch pulling stem were damaged; therefore, operations were suspended until a replacement threaded stem was purchased.

In the meantime, around mid to late April, the H&P crew began using a burr grinder to cut relief grooves in the seats in order to remove enough surface area that would allow the seats to be released with less pressure. H&P developed a plan to address the reduced tensile strength and calculated that the maximum pressure limit of 4500 pounds per square inch (psi) would adequately compensate for the reduced tensile strength. The plan was communicated to the H&P crew; however, it was not documented using a job safety analysis or hazard analysis assessment. After the crew completed grinding off the relief grooves, the HD seat puller with a replacement 2-inch threaded stem was rigged up on Pump #1, Modules #2 and #3, and the seats were pulled without incident. When the crew rigged up the HD seat puller on Pump #1 Module #1, they noted that the relief grooves were not ground down to the depth of the other two modules. Thus, the H&P crew ground down the grooves on Module #1 and rigged up the HD seat puller for pulling the seat. The HD seat puller was pressured up to 4500 psi and the H&P mechanic prepared to release the pressure to pull the stem. At the same time, the IP stepped onto the platform near the HD seat puller when a loud noise was heard. The 2-inch threaded stem had ejected from the HP seat puller into the air and struck the IP's right hand. The IP was evaluated by the rig medic and then evacuated from the rig to a medical facility onshore for treatment. The physician determined that the IP had suffered a fracture to his right hand. The IP was treated by inserting two pins to repair the fractured right hand finger and was released for sedentary work status on 30 April 2016. On 10 May 2016, the IP was re-evaluated and released on a light duty work status at H&P's Jackson, Mississippi yard. The IP was finally released to work with no restrictions on 13 June 2016.

The fractured HD seat puller threaded stem was submitted to Howard & Associates International, Inc. (HAI) in Lafayette, Louisiana for metallurgical evaluation. The HD seat puller stem was manufactured from Grade B7 material per American Society for Testing and Materials (ASTM) A193 standard specifications (2014 edition) and subjected to chemical composition analysis and mechanical property testing. HAI concluded that the stem had failed due to overload beyond the stem's design capacity. The metallurgical evaluation results confirmed that the threaded stem experienced loading beyond its rated capacity which was evident by the resulting necking, stretching and dimples and cleavage fractures on the stem's surface.

According to the H&P Root Cause Investigation Report, the probable cause of the incident was attributed to a replacement threaded pulling stem that was not an original equipment manufacturer (OEM) certified part required for the HD seat puller. Therefore, since the 2-inch threaded stem was not OEM part, it failed during a single rapid overload event.

Possible contributing causes for the incident stated in the H&P Root Cause Investigation Report include the following: 1) the positioning of the IP's body related to the HD seat puller; 2) the H&P crew did not recognize the potential hazard of stored energy when using a HD seat puller; and 3) deficiencies noted during preventative maintenance of the mud pumps.

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

According to the H&P Root Cause Investigation Report, the probable cause of the incident was attributed to a replacement threaded pulling stem that was not an original equipment manufacturer (OEM) certified part required for the HD seat puller. Therefore, since the 2-inch threaded stem was not OEM part, it failed during a single rapid overload event.

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

Possible contributing causes for the incident stated in the H&P Root Cause Investigation Report include the following: 1) the positioning of the IP's body related to the HD seat puller; 2) the H&P crew did not recognize the potential hazard of stored energy when using a HD seat puller; and 3) deficiencies of preventative maintenance of the mud pumps.

20. LIST THE ADDITIONAL INFORMATION:

21. PROPERTY DAMAGED:

NATURE OF DAMAGE: **For Public Release**

The HD seat puller threaded stem was damaged during this incident.

The HD seat puller threaded stem fractured and parted into two pieces during this incident.

ESTIMATED AMOUNT (TOTAL): \$207

22. RECOMMENDATIONS TO PREVENT RECURRENCE NARRATIVE:

The BSEE Lafayette District recommends to the Office of Incident Investigations that a Safety and Environmental Management Systems (SEMS) audit be conducted at the Shell Auger TLP rig.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: YES

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

A G-110 (W) Incident of Noncompliance (INC) was issued "After the Fact" to document Shell Offshore Inc.'s failure to oversee that operations were performed in a safe and workmanlike manner on the H&P 406 platform rig located on Shell's Auger TLP. On 25 April 2016, an H&P employee sustained an injury while pulling a mud pump seat with a HD seat puller. When attempting to pull the seat from Mud Pump #1 Module #1, the HD seat puller stem parted and a piece of the stem was ejected into the air striking the H&P employee on his right hand. The severity of the injury required evacuation from the Auger TLP to an onshore medical facility where he was diagnosed with a fractured right hand.

25. DATE OF ONSITE INVESTIGATION:

26. ONSITE TEAM MEMBERS:

Troy Naquin /

29. ACCIDENT INVESTIGATION

PANEL FORMED: NO

OCS REPORT:

30. DISTRICT SUPERVISOR:

Elliott S. Smith

APPROVED

DATE: 18-JUL-2016