

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: 10-FEB-2017 TIME: 0900 HOURS

2. OPERATOR: BHP Billiton Petroleum (GOM) Inc.
REPRESENTATIVE:
TELEPHONE:
CONTRACTOR: Transocean Offshore
REPRESENTATIVE:
TELEPHONE:

- STRUCTURAL DAMAGE
- CRANE
- OTHER LIFTING DEVICE
- DAMAGED/DISABLED SAFETY SYS.
- INCIDENT >\$25K Estimated cost \$80,000
- H2S/15MIN./20PPM
- REQUIRED MUSTER
- SHUTDOWN FROM GAS RELEASE
- OTHER Moon Pool Flap

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

6. OPERATION:

4. LEASE: G34986
AREA: GC LATITUDE:
BLOCK: 521 LONGITUDE:

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

5. PLATFORM:
RIG NAME: T.O. DEEPWATER INVICTUS

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

8. CAUSE:

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

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

FATALITY
 POLLUTION
 FIRE
 EXPLOSION

LWC HISTORIC BLOWOUT
 UNDERGROUND
 SURFACE
 DEVERTER
 SURFACE EQUIPMENT FAILURE OR PROCEDURES

9. WATER DEPTH: 4036 FT.

10. DISTANCE FROM SHORE: 110 MI.

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

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

13. SEA STATE: FT.

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

On February 10, 2017, on board Transocean's Deepwater Invictus drillship operating for BHP Billiton Petroleum in Green Canyon Block 520, it was discovered that the forward moon pool travel flap had separated from the hull of the vessel and had descended to the seafloor. There was no structural damage to the vessel and no damage to the integrity of the riser or blowout preventers (BOPs). The drillship was operating in approximately 4,036 feet of water.

On the morning of February 10, 2017, a decision was made for the Deepwater Invictus marine crew to deploy the forward moon pool travel flap and engage the locking pins. Upon arriving at the moon pool area, the crew discovered that the forward travel flap was no longer attached by its five hinge pin brackets on the bottom of the vessel. It was determined that sometime between February 8 and February 9, 2017, the hinge pin brackets sheared from the hull of the vessel. The weight of the travel flap triggered a shock load to the "Hold Back Chain," which parted, and the travel flap descended to the seabed. The Master/Offshore Installation Manager (OIM) launched a Remotely Operated Vehicle (ROV) to survey for any damage to the hull of the vessel, the marine riser, and the BOP system. ROV inspection videos confirmed that there were gashes in the flotation on the marine riser at approximately 1,100 feet below the vessel. No other visual damage was noted to the riser or the BOP system. The BOP system was successfully pressure tested to 10,000 psi to verify its integrity.

The ROV also located the 28-foot-long by 40-foot-wide by 2-foot-high (38.4 tons seawater weight) travel flap, which came to rest on the seafloor approximately 397 feet southwest of the well center. There were no other subsea infrastructures that could have been potentially damaged or severed in the vicinity of the seafloor where the travel flap came to rest.

Bureau of Safety and Environmental Enforcement (BSEE) Inspectors conducted an inspection/investigation on February 14, 2017, and collected documentation for the incident. The investigation noted that the forward travel flap is located at the bottom of the moon pool area of the vessel in order to reduce wave slap and resistance when the drillship is in transit. It should be utilized during transit speeds greater than eight knots or when seas and the speed of the vessel create excessive wave motion that might allow waves to splash over the aft or forward bulkhead of the moon pool.

In early May 2016, Transocean contracted a dive team to inspect and make repairs to both forward and aft travel flaps. Both "Hold Back Chains" were replaced on the forward and aft travel flaps. The locking pins were repaired on the aft travel flap, but due to time constraints, the forward travel flap locking pins were not addressed; yet it was reported that they were fully functional, with both locking pins engaged when in the stowed position.

Before transit from the Gulf of Mexico (GOM) to Trinidad, the forward flap was deployed, and the locking pins were engaged. Upon arrival in Trinidad in mid-May 2016, it was observed that during the attempt to raise the travel flap, the lifting wench would stall out, and a jerking motion of the "Hold Back Chain" was noted when deploying the travel flap back into position. At this point, the pad was damaged in the process, and locking pins were impaired. This was confirmed by visual inspection with the ROV.

In the nine-day transit back to the GOM in late December 2016, it is believed that the five hinge pin brackets had weakened from the motion and vibrations of the vessel due to the locking pins not being fully engaged in the deployed position. Once on location, the forward travel flap was held in the stowed position with the "Hold Back Chain" only, due to the misalignment of the locking pins. Over time, through a

series of weather events, this created additional stress on the hinge pin brackets which eventually failed due to fatigue.

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

- **Failure of the hinge pin brackets**

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

- **Lack of an inspection program on the moon pool flaps prior to the incident**

20. LIST THE ADDITIONAL INFORMATION:

- **BHP is planning to recover the moon pool flap before the rig departs the field.**

21. PROPERTY DAMAGED:

Moon pool flap

NATURE OF DAMAGE:

Dropped to the sea floor

ESTIMATED AMOUNT (TOTAL): **\$80,000**

22. RECOMMENDATIONS TO PREVENT RECURRENCE NARRATIVE:

The Houma District has no recommendations for the Office of Incident Investigations at this time.

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

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

25. DATE OF ONSITE INVESTIGATION:

26. ONSITE TEAM MEMBERS:

Robert Reeves / Adriano Garcia /

29. ACCIDENT INVESTIGATION

PANEL FORMED: **NO**

OCS REPORT:

30. DISTRICT SUPERVISOR:

Bryan Domangue

For Public Release

APPROVED

DATE:

28-APR-2017