

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: 11-APR-2017 TIME: 0710 HOURS

2. OPERATOR: Anadarko Petroleum Corporation
REPRESENTATIVE:
TELEPHONE:
CONTRACTOR: Diamond Offshore Drilling, Inc.
REPRESENTATIVE:
TELEPHONE:

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

4. LEASE: G25174
AREA: GC LATITUDE:
BLOCK: 627 LONGITUDE:

5. PLATFORM:
RIG NAME: DIAMOND OCEAN BLACKHORNET

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

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

6. OPERATION:

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

8. CAUSE:

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

9. WATER DEPTH: 4409 FT.

10. DISTANCE FROM SHORE: 137 MI.

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

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

13. SEA STATE: FT.

On April 11, 2017, while picking up riser to begin Anadarko's well 003 in Green Canyon Block 627, an incident occurred on board the Diamond Ocean Blackhornet in which the riser gantry crane (RGC) dropped a joint of riser approximately 19 feet in the riser bay. The riser bay had been barricaded to prevent personnel from entering the work area, and no personnel were injured as a result of this incident.

On the morning of the incident, the deck crew was in the process of securing the 4th joint of riser in the riser bay with the RGC. The RGC operator lowered the RGC to the riser joint and commanded the crane hooks to capture it on both ends. The operator received a "Green Light" on his remote console, which indicated that it had properly secured the riser. When the operator began to lift the riser joint, the crane stopped moving and began to give a general alarm on the remote console. The RGC operator attempted to level the crane without success, so the operator stopped the operation and called for an Electronic Technician (ET) to troubleshoot the issue.

The ET arrived to find the RGC remote console was not responding and proceeded to place the crane in override mode to level the riser joint. The RGC operator functioned the remote console, and then leveled the riser joint before switching out of override mode. Once the remote console was taken out of override mode, the operator attempted to lift the riser joint again but without success. The ET advised the operator that the remote console had to be powered down, and then powered back up to reboot the system. Once powered down, the aft crane hook lost hydraulics and released the riser joint which allowed it to fall, while the forward end of the riser joint slid off its hook. The riser joint fell approximately 15 feet, striking additional riser joints, and then fell an additional 4 feet to the bottom of the riser bay.

Bureau of Safety and Environmental Enforcement (BSEE) Inspectors conducted an inspection / investigation on April 18, 2017 and collected documentation for the incident. It was determined that the riser capture mechanism should not have failed when the system was powered down. The system was designed so that the hydraulics of the system are too weak to open when there is a load on the RGC. The over-center mechanism locks the capture hooks when closed by a link arm which when under a load, exerts force against a mechanical stop/lock. This mechanical stop/lock prevents the hooks from opening while under a load, even if hydraulics are lost. The "Green Light" on the control panel indicated that the RGC had properly secured the riser joint, but in fact it had not. The investigation discovered that the proximity switch activated the "Green Light" without being properly centered and fully secured to the riser. If the riser had been properly secured by the RGC, the riser joint could not have been dropped when the RGC console was powered down.

National Oilwell Varco (NOV) has issued a product information bulletin to give effected rigs guidance on how to inspect and correct the RGC riser capture device. The rig has since inspected the load holding valves on the forward and aft riser crane hooks. An adjustment has been made to the position of the hydraulic proximity switches to indicate when the crane hook locks are fully engaged as well as adding "Yoke Landed" criteria to the software to ensure that there is full capture of riser joint with the hooks. The Job Safety Analysis (JSA) and work procedure has been updated to require visual conformation that the forward and aft hooks are fully engaged prior to lifting the riser joint.

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

- Malfunction of the riser capture mechanism.
- The proximity switch falsely sent the signal to the control console that the RGC had properly secured the riser by giving the "Green Light" signal.

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

- Lack of Awareness: The deck crew failed to notice that the Riser Gantry Crane hooks were not fully engaged in the locked position.

20. LIST THE ADDITIONAL INFORMATION:

The RGC is manufactured by NOV, and it is an overhead crane which operates on parallel beams using the Riser Yoke (RY), which lifts the riser and keeps it clamped while delivering it to the Riser Elevation System. The RY uses two sets of lifting hooks, one on each end of the spacer, to pick up a riser joint from the riser bay and is operated by push buttons from the RGC remote console.

The entire system is based upon synchronous movements of the gantry crane travel and hoisting. If the system sees unintended movement within certain values, it will shut down the RGC. If the control valve gets stuck or is manually operated (human error) at the wrong time, the system will deactivate and shut down all movements of the crane.

There are three safety barriers built into the design of the riser capture device and controls to prevent loads from being dropped. 1) When a load is detected by the load cells, the software inhibits the opening of the riser capture devices. 2) An over-center lock mechanism mechanically locks the capture fingers during lifts. 3) The hydraulics are set up to be too weak to open the capture finger during lifts.

21. PROPERTY DAMAGED:

N/A

NATURE OF DAMAGE:

N/A

ESTIMATED AMOUNT (TOTAL):

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:

BSEE Houma District has no recommendations to make to 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:

18-APR-2017

For Public Release

26. ONSITE TEAM MEMBERS:

Adriano Garcia / Robert Reeves /

29. ACCIDENT INVESTIGATION

PANEL FORMED: **NO**

OCS REPORT:

30. DISTRICT SUPERVISOR:

Bryan Domangue

APPROVED

DATE: **19-JUN-2017**