

UNITED STATES DEPARTMENT OF THE INTERIOR  
 MINERALS MANAGEMENT SERVICE  
 GULF OF MEXICO REGION  
**ACCIDENT INVESTIGATION REPORT**

1. OCCURRED

DATE: **20-SEP-2008** TIME: **0100** HOURS

2. OPERATOR: **Union Oil Company of California**

REPRESENTATIVE: **Campise, Debra**

TELEPHONE: **(832) 854-2617**

CONTRACTOR: **Transocean Offshore**

REPRESENTATIVE: **Galati, Mike**

TELEPHONE: **(713) 232-8447**

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

4. LEASE: **G21245**

AREA: **WR** LATITUDE:

BLOCK: **678** LONGITUDE:

5. PLATFORM:

RIG NAME: **T.O. DISCOVERER DEEP SEAS**

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: **7005** FT.

10. DISTANCE FROM SHORE: **181** MI.

11. WIND DIRECTION: **E**  
 SPEED: **1** M.P.H.

12. CURRENT DIRECTION: **E**  
 SPEED: **1** M.P.H.

13. SEA STATE: **3** FT.

17. DESCRIBE IN SEQUENCE HOW ACCIDENT HAPPENED:

While displacing the Blow Out Preventer (BOP) stack with Synthetic Base Mud (SBM) after returning to location from evacuating for Hurricane Ike, a seal on the Lower Blind Shear Rams (LBSR) failed. The failure was due to an induced differential caused by functioning open the Upper Variable Bore Rams (UVBR) without opening a valve to allow for pressure equalization across the UVBR.

After latching up the Lower Marine Riser Package (LMRP) to the BOP stack, the kill line, boost line, drill pipe and riser were displaced to SBM. In preparation to displace the choke line from seawater to SBM, the UVBR was opened and the line displaced through the stack across the UVBR. After displacing the BOP and riser, the Emergency Drill Pipe Hang-Off Tool (EDPHOT) was retrieved. The BOP test tool was tripped in the hole and landed in the wellhead. Testing commenced on the BOP stack. While attempting to test the Annular, the pressure kept bleeding off. The Annular was tested good on the low pressure test of 250 psi but would not hold pressure on the high pressure test of 3500 psi. The ROV was sent down to visually observe the BOP stack and found a SBM leaking from the LBSR bonnet doors.

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

During the displacement procedure, the choke line and UVBR are opened to displace the BOP stack by taking returns up the choke line. The stack was shut-in around the EDPHOT with the Upper Blind Shear Rams (UBSR), LBSR, UVBR, Middle Variable Bore Rams (MVBR) and all the failsafe valves closed. After displacing the kill line through the annular bleed valve and the riser through the drill pipe, the choke line had to be displaced. The UVBR was opened with the Upper Inner Kill Valve (UIKV) and the Upper Inner Choke Valve (UICV) still closed. To displace the choke line, SBM was pumped down the kill line and across the stack to take returns up the choke line. When the UVBR were opened with the UIKV and UICV closed, a pressure drop was induced in the BOP. The pressure drop was induced by decreasing the volume in a closed system as a result of the ram being taken out of the system when the UVBR were opened.

The seals on the bonnet doors for the LBSR were rated for a -660 psi negative differential. To collapse these seals, the pressure inside of the BOP would have to go 660 psi below the seawater hydrostatic pressure. With a water depth of 7,005 feet, the seawater hydrostatic pressure is equal to 3,133 psi. The pressure drop in the BOP from opening the UVBR was equal to approximately 6,900 psi. This results in a final pressure of approximately -3,767 psi. The pressure would only drop until the seal collapsed at 2,473 psi (660 psi below seawater hydrostatic) and then water would invade the BOP and equalize the pressure. Once the seals failed, the bonnet door and BOP body washed out creating a leak path to the inside of the BOP.

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

The Upper Outer Kill Valve (UOKV) and UIKV were opened and then the UIKV was closed immediately after opening but before the UVBR was opened. This created a closed system and allowed for the unequalization to occur. The standard operating practice to balance the pressure on both sides of a valve before opening was not conducted.

20. LIST THE ADDITIONAL INFORMATION:

The active mud pit volume was investigated and a total volume of 12.5 bbls was calculated missing from the pits. The SEM contained 51% synthetic fluid for 6.4 bbls of pollutant material that was discharged into GOM waters. The SEM was 14.1 ppg.

The BOP stack has been going through an upgrade process for approximately the past 3 years. The bonnet doors for all ram cavities were being upgraded with new seals that are rated to a -4,500 psi differential. The Test Rams, Lower Variable Rams (LVBR), MVBR, and UVBR had already been upgraded with the new seals, but the LBSR and UBSR had not yet been upgraded. After recovering the BOP, new bonnet doors with the upgraded seals were procured and installed in the LBSR and UBSR.

The rig returned to location on 14-Sep-2008. The LMRP was latched to the BOP stack on 17-Sep-2008. The ROV was launched on 19-Sep-2008 and observed the leak on 20-Sep-2008. The well was secured and the riser and BOP stack were unlatched and pulled for repairs on 23-Sep-2008.

21. PROPERTY DAMAGED:

NATURE OF DAMAGE:

LBSR bonnet door body and seals.

The bodies and seals sustained washout.

Upper Dual Compact Ram body.

ESTIMATED AMOUNT (TOTAL): \$250,000

22. RECOMMENDATIONS TO PREVENT RECURRENCE NARRATIVE:

Due to the nature of this event, the Houma District has no recommendations to the Regional Office.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: YES

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

The cause of this event was found to be human error and an Incident of Non-Compliance (E-100) for pollution will be issued.

25. DATE OF ONSITE INVESTIGATION:

26. ONSITE TEAM MEMBERS:

Ben Coco /

29. ACCIDENT INVESTIGATION

PANEL FORMED: NO

OCS REPORT:

30. DISTRICT SUPERVISOR:

Bryan A. Domangue

APPROVED

DATE: 24-DEC-2008

# POLLUTION ATTACHMENT

1. VOLUME: GAL 6.4 BBL  
YARDS LONG X YARDS WIDE

APPEARANCE:

2. TYPE OF HYDROCARBON RELEASED:  OIL  
 DIESEL  
 CONDENSATE  
 HYDRAULIC  
 NATURAL GAS  
 OTHER Synthetic Base Mud

3. SOURCE OF HYDROCARBON RELEASED: **Synthetic Base Mud discharged from subsea BOP leak.**

4. WERE SAMPLES TAKEN? **NO**

5. WAS CLEANUP EQUIPMENT ACTIVATED? **NO**

IF SO, TYPE:  SKIMMER  
 CONTAINMENT BOOM  
 ABSORPTION EQUIPMENT  
 DISPERSANTS  
 OTHER \_\_\_\_\_

6. ESTIMATED RECOVERY: GAL BBL

7. RESPONSE TIME: HOURS

8. IS THE POLLUTION IN THE PROXIMITY OF AN ENVIRONMENTALLY SENSITIVE AREA (CLASS I)? **NO**

9. HAS REGION OIL SPILL TASK FORCE BEEN NOTIFIED? **NO**

10. CONTACTED SHORE: **NO** IF YES, WHERE:

11. WERE ANY LIVE ANIMALS OBSERVED NEAR: **NO**

12. WERE ANY OILED OR DEAD ANIMALS OBSERVED NEAR SPILL: **NO**