

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

1. OCCURRED

DATE: **11-MAR-2005** TIME: **1510** HOURS

2. OPERATOR: **LLOG EXPLORATION COMPANY**

REPRESENTATIVE: **Bob McMann**

TELEPHONE: **(504) 833-7700**

3. LEASE: **G24154**

AREA: **GC** LATITUDE:

BLOCK: **157** LONGITUDE:

4. PLATFORM:

RIG NAME **DIAMOND OCEAN SARATOGA**

5. ACTIVITY: EXPLORATION (POE)

DEVELOPMENT/PRODUCTION
(DOCD/POD)

6. TYPE: FIRE

EXPLOSION

BLOWOUT

COLLISION

INJURY NO. 0

FATALITY NO. 0

POLLUTION

OTHER **Accidental Riser Disconnect**

7. OPERATION: PRODUCTION

DRILLING

WORKOVER

COMPLETION

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: **2618** FT.

10. DISTANCE FROM SHORE: **100** MI.

11. WIND DIRECTION: **NNW**

SPEED: **12** M.P.H.

12. CURRENT DIRECTION: **NNW**

SPEED: **1** M.P.H.

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

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

Eugene Rouse, Eagle Consult.

CITY: **Gretna** STATE: **LA**

TELEPHONE: **(504) 392-9902**

CONTRACTOR: **Diamond Offshore**

CONTRACTOR REPRESENTATIVE/
SUPERVISOR ON SITE AT TIME OF INCIDENT:

Ron Davis

CITY: **Houston** STATE: **LA**

TELEPHONE: **(281) 647-2266**

17. DESCRIBE IN SEQUENCE HOW ACCIDENT HAPPENED:

On March 11, 2005, at 1300 hours the wellhead connector on the BOP Stack on the Diamond Offshore Ocean Saratoga (working for LLOG Exploration) inadvertently unlatched. The well had production casing set, a subsea tree installed and the last in-hole operation prior to the incident occurring was to perforate the production interval. This is an oil producing reservoir and the rig was in 2,614 feet of water.

Upon the Wellhead Connector unlatching, the differential pressure between the weighted completion fluid in the riser and the normal seawater pressure caused the stack to separate from the wellhead profile on the top of the subsea tree. The fluid level in the riser equalized to the seawater hydrostatic.

The following is the Saratoga Rig timeline summary of events leading up to the riser disconnect.

In transit to shipyard at Sabine Pass from 1/24/2005 to 1/26/2005.

Performed the following work in the Shipyard from 1/26/2005 to 2/7/2005. Replaced column and patched hole in hull due to collision damage with supply boat. Inspected and repaired fairleaders and changed out ram bonnets on Blow Out Preventers (BOPs). Spliced blue and yellow pod hoses. Changed out cross head bearings on the number one mud pump. Replaced metal under anchor winch. Cleaned, ventilated lower hull fuel tank and repair piping. Cleaned, ventilated lower hull brine tank. Replaced all column emergency escape ladders. Replaced some piping throughout upper deck rig

In transit to temporary stack site from 2/7/2005 to 2/8/2005.

Anchored in Sabine Pass from 2/8/2005 to 2/15/2005. Completed splicing pod hoses and install them on the hose reel. Re-attached the pilot lines to pod and function fire pods on Lower Marine Riser Package (LMRP). Pilot lines did not vent properly causing slow functions. Troubleshoot lines and stacked up BOPs in moon pool and attempted to function test. Stack would not test properly so removed stack to stump and removed splices from pod hoses.

Underway to drilling location from 2/15/2005 to 2/18/2005. Completed removal of pod hose splices and verify the vent times on the pilot line. Re-connected to the pod junction plates and test fire pilot functions on pods. Could not complete stack function test due to vessel motion and safety considerations for crew in the moon pool area.

Arrived on drilling location and run anchors, offloaded start-up equipment and ran subsea tree from 2/18/2005 to 2/22/2005.

Moved stack to moonpool, run stack and landed out BOPs and perform over pull test on the blue pod. Pressure test on the blue pod and function test BOPs on the yellow pod from 2/22/2005 to 2/26/2005. Prior to running the BOPs the stack was pressure tested on the stump and function tested on the skid beams. The Function Test Checklist was used and completed by the Subsea Engineer. The Subsea Engineer was operating the functions and had rig personnel and a Subsea Trainee verifying the functions. The BOP stack was run and landed onto a previously run subsea tree. Upon landing, the Subsea Engineer powered up the system, selected the Blue Pod, and latched the wellhead connector. The ROV was operable and the latching up operation was witnessed by the Rig Management. There was a question as to whether the connector indicator rod had traveled its full extent and the connector was unlocked and then locked again on the Blue Pod. The observations showed that the connector was locked. An over pull was successfully carried out. Although not called for in his procedures, the Subsea Engineer switched to the Yellow Pod to check on the operation of the connector. He did not detect that the connector had gone to unlock upon switching from the Blue Pod

to the Yellow Pod. The stack had down weight on the wellhead and seawater in the riser this precluded the stack from lifting off the mandrel. Believing things were okay, the Subsea Engineer switched back to the Blue Pod, the ROV was retrieved to surface, and the BOP was tested using the Blue Pod. Rig operations proceeded for two weeks with the BOP stack operating on the Blue Pod and the problem went undetected.

Performed normal well operations for completion from 2/26/2005 to 3/11/2005.

On March 11, 2005 after the well had been perforated but prior to the start of gravel pack completion operations, the Subsea Engineer prepared for the required bi-weekly pressure test of the BOP system. The test was to be conducted with the Yellow Pod which the Subsea Engineer switched to while the rig crew was preparing to run the test plug. It was just prior to running the test plug into the riser that it became apparent that the fluid level had fallen significantly in the riser. The shear rams were closed and the riser filled with weighted completion fluid. The ROV was run to bottom and it was verified that the wellhead connector had unlocked and the BOP had lifted approximately about 3". The Subsea Engineer noted that all indicators on the Yellow Pod circuit showed the connector to be locked. The Subsea Engineer switched back to Blue Pod and it was observed that the connector immediately attempted to go to lock position. The BOPs were relatched with the Blue Pod and the rig clean up the fluid in the riser and well. A 300 feet cement plug and storm packer was installed in the wellbore while the event was investigated.

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

In summary due to poor procedures and human errors the hoses were crossed on the wellhead connector for the Yellow Pod circuit. To verify this the pilot lines at the hose reels were switched and the proper operation of the connector confirmed by functioning of the Yellow Pod circuits.

Several opportunities to correct the above errors were missed, the hoses to the Yellow Pod were not installed properly and were not detected during the shipyard shake out inspection. The Subsea Function Test Checklist Procedures failed to detect the improper operation when testing the BOPs in the moon pool. A further opportunity to detect improper operation of the connector was missed during the landing and latch up operations on the seafloor.

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

Miscommunication between the Subsea Engineer and the assistant Subsea Engineer during the function verification process as to the position of the latch indicator on the H-4 type connector when switching from the Blue to the Yellow Pod.

20. LIST THE ADDITIONAL INFORMATION:

The following are directives issued by the contractor to avoid future events:

1. Where the control circuits on the wellhead or LMRP connector are disturbed for whatever reason, the Senior Subsea Engineer or a Subsea Supervisor (if present) will personally verify and document that the circuits are reinstated correctly.

2. The Senior Subsea Engineer onboard or a Subsea Supervisor (if onboard) will

personally observe, verify, and document the function tests performed prior to running the BOPs. The Function Test Check List will be used during the tests. Competent personnel will assist the Subsea Engineer by operating the control system from a control station selected by the Subsea Engineer. A pre-job meeting will be held where all Safety, Operations, and Communications details are agreed upon prior to commencing the operation. A JSA must be completed prior to commencement. It is the responsibility of the OIM to insure that competent personnel are made available to assist the Subsea Engineer during this process.

- a) The Function Test Check List procedure will be modified to state the minimum DODI competence level that must have been achieved by the verifying person with signature blocks for the person doing the function and the verifying person.
- b) The use of hand held radio or direct handset via rig communications system is required between the person acting as the verifying authority and the person function testing the BOP. This requirement will be included on the Function Test Check Sheet.
- c) The verification block for the connectors on the Function Test Check Sheet will be modified to require dual visual verification of the LMRP and BOP connectors.

3. The stack landing procedure will be modified to provide positive confirmation of BOP connector integrity prior to commencing operations on any well. Specific provisions for this are:

- a) Upon initial landing of the BOP upon the wellhead, visual confirmation via ROV or Rig TV of the wellhead being latched with the initial Pod selected will be verified by the OIM.
- b) An over pull of at least 50,000 lbs. above landing weight will be conducted and verified by the OIM with the initial Pod selected.
- c) Upon satisfactory completion of the first over pull the opposite Pod will be selected, with visual confirmation that the connector remains latched after selection is complete. A second over pull of at least 50,000 lbs. above landing weight will be conducted and verified by the OIM.
- d) Pressure testing of the wellhead connector seal of at least 500 psi will also be conducted initially using both Pods. One test on the standby Pod is sufficient. These pressure tests must be done before any well operations are conducted that could expose any formation to the BOPs. Test charts must be obtained for this verification with both OIM and Operators Representative signatures.

Action Item - All Semisubmersibles - Changes to the individual rig's BOP stack function test checklist and running procedures must be made to include the above directives immediately. Once completed, forward the procedures to the assigned Subsea Supervisor for review and approval.

21. PROPERTY DAMAGED:

NATURE OF DAMAGE:

Lost 500 bbls calcium bromide completion fluid from the riser.

Lost 500 bbls calcium bromide completion fluid from the riser.

ESTIMATED AMOUNT (TOTAL): \$77,500

22. RECOMMENDATIONS TO PREVENT RECURRANCE NARRATIVE:

Issue a safety alert to highlight that both the Blue and Yellow Pods should be tested on the subsea well head to verify proper function prior to the start of well operations. Also review current regulation to determine if testing of both Pods should be required in the regulations.

23. POSSIBLE OCS VIOLATIONS RELATED TO ACCIDENT: NO

24. SPECIFY VIOLATIONS DIRECTLY OR INDIRECTLY CONTRIBUTING. NARRATIVE:

25. DATE OF ONSITE INVESTIGATION:

22-MAR-2005

26. ONSITE TEAM MEMBERS:

Jerry Freeman / John McCarroll /

29. ACCIDENT INVESTIGATION

PANEL FORMED: NO

OCS REPORT:

30. DISTRICT SUPERVISOR:

Michael J. Saucier

APPROVED

DATE: 09-MAY-2005

POLLUTION ATTACHMENT

1. VOLUME: GAL 500 BBL
YARDS LONG X YARDS WIDE

APPEARANCE: **RAINBOW SHEEN**

2. TYPE OF HYDROCARBON RELEASED: OIL
 DIESEL
 CONDENSATE
 HYDRAULIC
 NATURAL GAS
 OTHER Calcium Bromide

3. SOURCE OF HYDROCARBON RELEASED: **calcium bromide completion fluid from riser**

4. WERE SAMPLES TAKEN? **NO**

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

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

6. ESTIMATED RECOVERY: 0 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**