X-10

Outline of Key Questions for Transocean Interviewees

Transocean Personnel

A. The first 7 questions should be addressed to each of the following DWH rig personnel – M. Burgess, Driller; M. Ezell – Sr. Toolpusher and Asst. Driller A. Seralle:

1. How many times and how much fluid volume was bled back during the negative pressure test? (Questions should be asked for both the drill pipe and the kill line.)

2. Where was the fluid bled to each time (i.e. which pit or tank on the DWH, M/V Bankston or overboard) and was the fluid measured? Was the measurement data recorded?

3. Which annular (upper or lower) was closed during the performance of the negative test?

4. Did the BOP annular leak at any time after closing to perform the negative test?

    a. Was it necessary to increase closing pressure to get a good seal?
    b. If the annular leaked, how much fluid (mud) was needed to top up the riser?
    c. After closing the annular for the negative test, did the rig crew switch to the other annular at any time?

5. Were you part of or did you overhear any discussions regarding pressure on the drill pipe during the negative test? If so, who else was involved in any such discussions? What was said during these discussions? What conclusion(s) did you or others reach as to the cause of the pressure?

6. How was fluid volume from the well being monitored from early afternoon on April 20 through the explosion event? Can you recall/describe any discussions you had with the mudlogger about monitoring the well or fluid volumes during your shift?

7. During displacement , if you observe a sudden flow of mud at the surface, what do your (TO's) procedures dictate that you should do? [Alternatively, "what have you been trained to do?]

Additional Question for Senior Tool Pusher (Ezell)

8. Describe any phone calls from the rig floor, the mud pits or elsewhere indicating a problem with the well during the evening of the event. (Ask Ezell to estimate the time of the call in relation to the first explosion.)

EXHIBIT # 10

WIT:

Two Questions for OIM (Harrell)

1. Did you receive any phone calls from the rig floor or elsewhere indicating a problem with the well during the evening of the event? If so, as best you can recall, please describe who placed the call and the substance of any discussions during the call. Please also give us your best estimate of the timing of the call in relation to the first explosion.

2. Were involved in any conversations about pressures on the drillpipe during the negative test? If so, who else was involved and as best you can recall, what was said?

B. Questions for Transocean Subsea Engineer (C. Pleasant)

1. What are the test procedures used to verify the operation of all emergency back-up systems (i.e. Automated Mode Function (AMF) aka "Deadman," Emergency Disconnect System (EDS), Autoshear and ROV interventions) on the BOP?

    a. What were the results of these tests the last time they were performed? Where is that information reported/recorded?

    b. What is the test procedure for the AMF batteries to demonstrate they are fit for purpose?

2. How do you verify that the AMF and Autoshear systems are armed?

3. What function was associated with the BOP "yellow pod" leak reported on 23 February 2010?

    a. Was the leak investigated? If so, what were the findings and how were they reported/recorded?
    b. Was the leak detected before the BOP stack was run?
    c. Under Transocean's procedures, what amount of leakage is considered "acceptable" to run the stack? [Alternatively, "what amount of leakage would dictate that the stack be pulled?]

4. Does Transocean maintain copies of the DWH BOP control system application software at an on-shore location? Where are copies kept? Have you produced a copy of it into the MBI proceeding?

5. What are the key elements of the DWH BOP maintenance management system? What was the outstanding maintenance backlog (i.e. hours and jobs) at the time the DWH rig relocated to the Macondo well?

6. Who maintains and/or repairs BOP components and systems on Transocean's drilling rigs (alternatively on the DWH)?

    a. What is Transocean's process for quality verification?
    b. What have been the most frequent (common) maintenance or repair issues detected on the BOP stack and control systems?

7. With reference to the between wells BOP service period at the end of January 2010 (following DWH completion of drilling work on the Tiber prospect leading up to commencement of well drilling work on the Macondo well) what maintenance work was performed:
    a. on the BOP stack?
    b. on the yellow and blue pods generally?
    c. on the yellow and blue pod solenoid valves?
    d. was all maintenance and repair work performed under Original Equipment Manufacturer (OEM) procedures and conditions?
    e. Were OEM parts used in all cases?

8. When was the last time the blind shear rams were changed on the DWH BOP stack?
    a. What maintenance and/or inspection work has been performed since that time?
    b. Where is the maintenance and/or inspection work reported/recorded?

9. What modifications have been made to the ROV hot stab intervention system on the DWH BOPs?

10. If the well is flowing and the blind shear ram closes, what temperature, pressure and flow conditions can the blind shear ram tolerate and still close?

11. What effect(s) did the BOP hydraulic system leaks have, if any, on the BOP's functionality? How do you know? (What is the basis for your opinion?)

12. What effect(s) did the modifications to the BOP system and controls have on the primary functionality of the BOP stack, including its emergency systems? How do you know? (See history of modifications attached below.)

13. What effect(s) did the open maintenance or repair issues have on the primary functionality of the BOP stack and control systems? How do you know?

14. Can you describe (in detail) how the AMF/deadman system senses the loss of electrical power, rig communication and hydraulic pressure? Under what set of circumstances is the AMF/deadman actuated and how does that occur?

BOP Modification History

Introduction

The following section identifies the modifications that are known to have been carried out the subsea BOP hardware

General - 2001
The BOP stack supplied by Cameron is an 18 3/4 "15M TL type BOP. (See BOP description). The table below indicates the differences in BOP configuration between the description in the Deepwater Horizon Operating Manual and the as-built configuration.

Operating manual configuration	As-built configuration
18 3/4" Upper Annular (10K) on LMRP	18 3/4" Upper Annular (10K) on LMRP
18 3/4" Upper Annular (10K) on LMRP	18 3/4" Upper Annular (10K) on LMRP
Upper Blind Shear Ram on BOP	Blind Shear Ram on BOP
Lower Blind Shear Ram on BOP	Casing Shear Ram on BOP
3 1/2" to 6" Upper VBR on BOP	3 1/2" to 6 5/8" Upper VBR on BOP
3 1/2" to 6" Middle VBR on BOP	3 1/2" to 6 5/8" Middle VBR on BOP
3 1/2" to 6" Lower VBR on BOP	3 1/2" to 6 5/8" Lower VBR on BOP

No information is available to explain the changes between the operating manual and as-built configuration

LMRP Modifications

ST-lock modifications - December 2002
The ST locks on the BOP were modified in December 2002 according to TransOcean maintenance records. The maintenance record states "*St Locks Modification As Per Cameron Tsf Document No. Pa-006124.*"

No details of the MOC or the modification work are available.

Lower annular stripping element replacement - July 2006
The 10,000 PSI rated lower annular element was replaced with a 5,000 PSI 'stripping' element in July 2006 according to TransOcean maintenance records. The original 10,000 PSI rated annular body was not replaced.

No information is available on who requested this modification. It is likely that the request was made by BP.

The modification was carried out by TransOcean. A MOC for this modification is not available. A stripping annular allows the drill string to be moved within the BOP stack while the lower annular is closed and annular pressure is being isolated by the annular sealing mechanism. The 5,000 PSI rated working pressure is lower than the maximum anticipated pressure at the BOP. The annular would *(be expected to fail)* not be expected to operate in pressure conditions higher than rated.

Upper annular element replacement - October 2009

A BP RPD application to the MMS for a MC252 made reference to the following modification:

Revision I: 10-15-09
This RPD is to request approval to replace the upper annular element from the originally approved standard element rated to 10k on 5 1/2" pipe to a 6-5/8" element which is rated to 7.5k on 5 1/2" and 10k on 6 5/8".

No details of the MOC or the modification work are available.

Conduit valve package replacement
It has been reported the original Cameron manufactured Conduit Valve Package (CVP) was replaced with a valve package manufactured by Oceaneering. No information is available at this time to confirm this modification and the details of this modification are unknown.

The function of the CVP is to distribute hydraulic fluid supply from both the conduit and hot-line to the yellow and blue control pods. It is the valve configuration on the CVP that determines which pod is active.

Control pod
Both the yellow and blue control pods were originally designed and configured to be able to be retrieved while the stack was subsea. This feature is no longer available. The hydraulic supply and pilot lines pipe connection and electrical MUX cable connection have been modified and can only be disconnected while the pods and stack are on the surface.

It is likely that this modification was undertaken when he CVP package was modified.

No information is available at this time to confirm this modification and the details of this modification are unknown.

BOP Modifications

ST-lock modifications - December 2002
The ST locks on the BOP were modified in December 2002 according to TransOcean maintenance records. The maintenance record states "*St Locks Modification As Per Cameron Tsf Document No. Pa-006124.*"

No details of the MOC or the modification work are available.

New high interflow shuttle valves on casing shear rams - November 2003
The TransOcean maintenance records contains the following entry "*New high interflow 1 1/2" Gilmore shuttle valve installed on casing shear ram".*

No details of the MOC or the modification work are available.

Upgrade lower variable pipe ram to test ram - October 2004
The lower variable bore ram was converted to a 'test' ram in December 2004. The ram conversion consisted of inverting the lowermost variable ram, enabling pressure testing of the BOP components without the need for a test plug or cup tester. As part of the modification the position of the lower kill line connection was re-located from the lowermost ram to the middle ram. The BOP pressure and temperature transmitter was also relocated from the kill side of the middle ram to the kill side of the lowermost or the test ram.

The modification was requested by BP. A BP D&C DWOP dispensation was approved by the BUL. This dispensation was required due to the interpretation of the DWOP that a subsea stack required 4 sealing rams. The Horizon BOP is a 5 ram stack consisting of 1 test ram, 2 VBRs, 1

casing shear ram and 1 blind shear ram. The casing ram is not sealing. The MMS requires, 1 annular, 1 shear ram and 2 pipe rams (VBRs).

The modification was executed by TransOcean. The TransOcean work request states *"Upgrade Lower Pipe Rams To Inverted Rams That Will Test From Bottom Side. Bop Test Are Taking Too Much Rig Time"* The work request also indicates that "*CAMERON SERVICE REP WILL BE REQUIRED TO MODIFY BONNETS TO ACCEPT NEW TYPE RAMS."*

One modification that appears to have been overlooked at the time was to change the ROV hot-stab connection from the close side of the test ram actuator to the close side of the middle VBR. During the MC252 incident, the ROV intervention team installed the ROV hot stab and was under the impression that the hot stab was connected to the lower VBR or sealing ram.

No details of the MOC are available.

Dead Man Accumulator - December 2004
An audit of the rig in January 2005 made reference to the following modification

Subsea accumulator pre-charge
The pre-charge required on the subsea accumulators is 6800 psi while the maximum working gas pressure for subsea bottles is 6000 psi. This will mean different fluid volumes than are normal on the BOP Control system. The dead man accumulators have now become part of the subsea accumulators since the dead man system has been modified. Transocean should be able to supply the corrected figures, calculations and analysis for the system as it will be configured. There will be little appreciable differences in the system operability but it is important to know how the reduced pre-charge and extra accumulators work on the system.

No information is available at this time to confirm this modification and the details of this modification are unknown.

Blind close and ST-lock ROV hydraulic circuit - 2010

The incident responder logbook for Harry Theirens for the 25th of April at 15:50 hrs states '*Talk with Steve Hand - "the STS (ST-lock system) was modified a couple of months ago. This changed a discreet hot stab capability to a combined (blind shear ram) close/STS (ST-lock system) function.*
This may be a leak path because it is common to the VBR/Shear ram function"

The logbook entry continues: *"I asked when this change happened, asked if T.O. could provide drawings of the change, was told no. Asked if T.O. had contacted the people who made the change, the sub sea engineers - told that some had been contacted but confirmation was sketchy".*

A red-lined mark-up of the stack flow diagram T.O. drawing number: SK-122124-21-05 sheet 2 of 3 identified the modification to the ROV circuit. The modifications include:

- Combining the ROV hot-stab pipe work for the following functions:
  - Blind shear ram close
  - ST-lock close
  - Choke and Kill fail-safe valves close

  The original BOP flow schematic indicated a separate ROV hot-stab for the blind shear close and ST-lock close. There was no ROV hot-stab for closing the choke and kill fail-safe valves.
- Removal of a fast-dump feature on all choke and kill failsafe valves. This involve the removal of the following components:
  - One pilot actuated fast-dump valve for each choke and kill valve (total 8)

- Four pressure regulators
- Two sets of 3x15 gallon accumulators
- on the open side of

No further details of the modification are available.

Control System modifications

There have been a significant number of modifications made to the BOP control pods since 2001. See table 2 below for details

Sub-component	Date	Modification
Pod SPM valves	Nov 2001	All 1" valves have been changed out to upgrade 3/4" valve
Pod flow meters	Mar 2002	Spare pod sent in Cameron for upgrade to install high-shock flow meters
Power supply	Oct 2002	Upgrade of 5Volt power supply to SEMs - to a higher amp rating
Pod regulators	May 2004	Install orifices in pod regulators to stop regulators oscillating
Pod SEM	Jun 2004	Cameron installed software for upgrade
Pod Select	Nov 2004	Add a second pod select solenoid functioned by an existing pod select switch - to add double redundancy to each control pod
Pod	Feb 2005	Replace all unused functions on pod with blind flanges. Possible failure points resulting in stack pull.
Pilot regulator	Sep 2005	Replace pilot regulator with a better designed, more reliable regulator, regulator leaks (Gilmore is a larger unit and will require a bracket to be fabricated for mounting)
Control panel	Feb 2006	Modification to Cameron control software to sound an alarm should a button stay pushed for more than 15 secs. If a button is stuck and not detected it will lock up panel
Dead Man system	Jan 2007	Cameron will remove the SEM from the MUX section to replace the pie-connectors (customer provided) and to install the AMF/deadman modification kit.