

EXHIBIT #	106
WIT:	

## Critical Questions

### General

1. Tell me about your oilfield experience.
2. How long on DW Horizon? How long in current role? When did you arrive on the rig?
3. Where were you located? What was your room assignment
4. When did you come on tour and go off tour on the 20th April?
5. Could you tell me what happened during that shift?
6. Where and when were fluids released?
  - a. Please identify any locations where you saw fluids (gas, water, mud) escaping.
7. Can you describe what you saw and heard leading up to the explosion? And when?
8. When did you realize something was wrong?
9. Where and when were flames observed?
10. Did you smell any fumes or vapors? What were they?
11. Did you hear any explosions? From which direction did any blast pressure wave come?
12. Did you observe any collateral damage to the rig? What and where?
13. Do you know where anyone else was located on the rig near the time of the event?
14. Did you hear or see any gas or fire alarms?
15. When was your last training on well event response?
16. What training and competency processes do you have and could we have a copy of any associated records
17. What's your general knowledge of risks associated with your activities? Why is it important to monitor what you do?
18. What was your frame of mind? Understanding of well status? What was your next programme of work?

# Critical Questions

## MI Swaco – Mud Engineers

1. Do you know who put the displacement program together?
2. What was your understanding of the riser displacement procedure? (In asking this question I'd be looking to know how well they understood the need to get the spacer above the stack, if they understood the densities and volumes of the different fluids, and what the objective was)
3. What was the procedure for mixing the spacer to its final volume of ~430 bbl?  
(Confirmation of composition, fluid transfers and densities.
  - a. Was the last volume increase prior to displacement "dusting up" the vis and density prior to pumping))
4. Was the FAS XL used? (again, confirmation of what we've been told)
5. Was using the FAS AK/FA SQUEEZE as a spacer a standard practice?
  - a. Did it align with the approved Mud Program? Well Program?
  - b. **If the answer is no.** Was any MoC and or risk assessment done? What was your understanding of the desire to overboard the LCM materials?
6. Who, on the rig, made the decision on what fluids and volumes to pump?
7. Do you know if mud was being back loaded to the boat during the displacement?
  - a. Is this standard practice?
8. Were you aware of the risk of moving mud around during the displacement when unable to record volumes?
9. Do you know how volumes were being monitored during the displacement?
10. Clarify our understanding that the pills were mixed together and why that was done?
11. Where were you during the displacement?
12. Were you involved in the Negative test?
13. Were you at any meetings prior to the Negative test or displacement?
  - a. Who else attended these meetings?
  - b. Did you talk to the Mudloggers?
14. Who was in charge of the operation?
15. Did you hear a discussion about pressure on the Drill Pipe?
  - a. What were the pressures?
16. Are you aware of any fluids being bled off - do you know to which pits the fluids went?
17. Did you notice anything unusual during the events leading up to the incident? (Fluid volumes, rates, etc.)
  - a. Were you comfortable with the fluid transfers, inventory of mud on the rig etc.?
  - b. Where volumes measured?
18. Were you there for the sheen test that was done?
19. How is a sheen test conducted?
20. After the sheen test do you know who was watching the flow line?
21. How was the diverter system aligned?
22. How was the mud system aligned?
  - a. What is the system layout
23. How was the overboard disposal system aligned?
24. Was the diverter closed? If so, when was it closed?

# Critical Questions

## TransOcean – Toolpushers & Driller

1. How long on DW Horizon? How long in current role? When did you arrive on the rig?
2. If you were there can you tell me about the wiper trip / recovering the wear bushing / running the casing / cementing the casing?
3. Can you recall the weight and volume of the spacer that was pumped?
4. Can you recall the displacement volume pumped?
5. What did the line up on the rig floor look like for the negative test?
6. How were the different pressures being monitored?
7. Can you recall what the DP pressures were?
8. Were any pressures / fluids bled off from the well?
9. How was the pressure on the well bled off - which pits did the returns go to - what was the line up, how were the volumes measured?
10. Do you know how fast the bleed offs were flowing?
11. Which annular was used for the negative test?
12. Did the annular leak when it was closed for the negative test?
13. Was the annulus topped up - if so with how much fluid and how often?
14. Tell me in as much detail as you can about the negative test.
15. Who decided to do the bleed offs?
16. Do you know how many bleed offs there were?
17. Who was on the rig floor at that time?
18. Who was operating the BOP / kill valve etc?
19. Who was communicating with the cementer?
20. Who was directing the rig floor operations?
21. Did you pump down the kill line to check it was full?
22. What is the line volume between the cement unit and rig floor?
23. How much pressure did that put on the kill line?
24. What conversations took place on the rig floor?
25. Who was in attendance during these conversations?
26. Did you hear a discussion about pressure on the DP?
27. Can you describe these phenomena to me (Bladder effect)?
28. Do you know if anyone calculated what the differential pressures should be during the negative test?
29. Did you attend a meeting to discuss the displacement to sea water?
30. Did you talk to the mud logger during your shift?
31. Did you know mud was being back loaded?
32. Was mud being back loaded to the boat - when did this start and when did it finish?
33. Were you aware of the risk of moving mud around during the displacement when unable to record volumes?
34. Was the trip tank being cleaned out - when did that start and finish?
35. Was fluid being dumped overboard during the displacement?
36. Do you know when the dump line was opened?
37. Who was monitoring the mud volumes during the displacement - how was that being done?
38. Look at Discovery Wells data - annotate the chart
  - a. Do you know why there was a pressure increase on the cement line at 1752?
  - b. Do you know when the IBOP was closed?

- c. Do you know why the DP pressure was just bled to 273 psi at 1700?
  - d. What do you think was happening between 2100 and 2200?
  - e. Do you know what the pressure blip at 1842 could be?
39. If you got a sudden flow of mud at surface what would you and your crew's response be?
- a. Is there a procedure for such an event?
  - b. Which annular would you normally close?
40. How was the pipe spaced out across the BOP? (*Tolerance of the Dynamic Position diversions wave-action and heave compensator*)
41. Is there a standard space out across the BOP and when is it used?
42. Could you describe to me how the Diverter was lined up on that day?
- a. How are the valves operated?
43. If the Diverter is lined up to the small gas buster - how is it changed to the overboard line?
44. Where is the vent line from the small gas buster?
45. Where is the gas buster situated?
46. How is the BOP and Diverter panels configured - is it all green for open and red for closed?
47. How many BOP panels are there on the rig?
48. Can you describe the flow line / diverter / overboard lines and valves configuration?
49. Did you get daily written instructions - what did they include?
50. Do you know of any hydraulic leaks or other issues with the BOP Stack?
51. Do you know the last time the ROV Hot Stab was used on the BOP?
52. What telephone calls did you receive after you left the rig floor?
53. When did you realise that something was wrong?
54. What did you see and hear leading up to and during the explosions?
55. When was your last training on well event response?
56. Where are the flow meter sensors situated and how accurate are they?
57. Do you have any hand written logs of events on the day of the event? Do you have any in your possession?
58. Did they have any concerns about the 1400 psi on the drill pipe gauge and equalising the pressure across the IBOP?
- a. What was going on when there was 1400psi on the drill pipe?
59. Can you describe what the "bladder effect" is?
60. From time you stopped pumping, please take us through your actions to the time of incident?
- b. Tell us what you can remember? What did you see and hear?
61. What is the Emergency Response design philosophy
62. What is the design philosophy of the Fire & Gas system
63. What processes are used to manage alarms, interlocks, and by passes?



## Critical Questions

### TransOcean – Master & OIM

1. Are you aware of any hot work or other work activities on deck or below deck?
2. Which engines were running at the time of the incident?
3. What is the Emergency Response design philosophy
4. What is the design philosophy of the Fire & Gas system
5. Where any fire and gas detection systems overridden?
6. What processes are used to manage alarms, interlocks, and by passes?
7. Was any critical safety equipment (ESD, EDS, F&G) out of service at the time of the incident?
8. What processes are used to manage changes to operating practices and procedures?
9. Thrusters – What does that mean? How do they work with EDS?
  - a. Do you have to MOC emergency disconnect?
  - b. What's the disconnect time?
  - c. Does that change protocol for EDS at all?
  - d. What's the linkage between thrusters and EDS?
10. What was the EDS setting on the Rig that day:
  - a. How was it managed?
11. When did you first initiate the EDS?
12. Were there any external audit actions outstanding?
13. Emergency Response Plan
  - a. T-P will inform the OIM if an imminent well-control situation. OIM tells the Master to prep for evacuation?
  - b. When did this notification take place?
  - c. When did you implement the Emergency Response Plan? What was involved?
14. Where are you back-up drawings held? Are As built drawings available?
15. What sort of back-ups do you have for your Data Systems?
  - a. How regularly do you back up
  - b. Who does your reports go to?
  - c. Are these reports accessible?

## Critical Questions

### TransOcean Subsea Engineers, OIM & Drillers

1. What are the test procedures used to verify the operation of all the emergency back-up systems (AMF, EDS, Autoshear and ROV intervention) on the BOP, and what were the results of these tests the last time they were done? What is the test procedure for the condition of the AMF batteries to demonstrate they are fit for purpose?
2. How do you verify that the AMF and Autoshear systems were armed?
3. On what function was the hydraulic leak on the yellow pod reported on 23 February 2010, was it investigated and what were the findings?
4. Do you have offsite storage of the BOP control system application software, and if so, can you provide a copy?
5. Did you have a robust BOP maintenance management system implemented on the Deepwater Horizon, and what is the outstanding maintenance back log (hours and jobs)?
6. Who maintains or repairs BOP components and systems, and what is your process for quality verification? What have been the most frequent problems on the hydraulic system and the control pods?
7. During the between wells BOP service period at the end of January 2010, what repair and maintenance work was performed on the pod solenoid valves and was it done under OEM procedures and conditions?
8. When was the last time the blind shear rams were changed, and what maintenance / inspection routine has been performed since?
9. What modifications have been made to the ROV intervention system on the Deepwater Horizon BOPs?

## Critical Questions

### Halliburton Cementing & Mud Logging

1. Explain all the inputs into OptiCem?
2. What was the main focus of the OptiCem modeling runs?
3. What was the issue around the mud compressibility when you were running the OptiCem model? How did you get the OptiCem model to match the hydrostatic pressure measured by the MDT logging tool?
4. What were the mechanical specifications of the centralizers used in the OptiCem model?
5. Did you read version 18, gas flow potential when you sent the report to BP?
6. Did you notify anyone of the serious risk of gas flow potential?
7. How do you calibrate the OptiCem hydraulic model to actual conditions? (Cementing Engineer)
8. What input parameters in OptiCem model create the largest modeling errors? (Cementing Engineer)
9. Explain how the open hole calliper data was used in the OptiCem modeling?
10. What are the differences between the OptiCem hydraulic model and Halliburton's drilling fluids Hydraulic model? What is the accuracy of the models? (Cementing Engineer)
11. How does Halliburton test nitrified cement slurry at actual wellbore conditions? (Cementing Engineer)
12. What is Halliburton's QA/QC procedure for cement and cement additives? (Cementer, Cementing Engineer)
13. How do you ensure cement slurry pumped meet design criteria? (Cementer, Cementing Engineer)
14. What is the calibration process for sensors on the cement unit – pressure, volume density, additive volumes? When was the last time the unit was calibrated? Do you have records of the calibrations? (Cementer)
15. Describe how the cement unit and the nitrogen unit were rigged up on the DWH for the foamed cement job? What is the size and volume of the cementing line from the unit to the rig floor? From the nitrogen tie in point to the cementing head? (Cementer)
16. Has Halliburton performed any post-job testing using materials from the DWH cement job? Testing to simulate the DWH cement job? What tests were performed? What were the results? (Cementer, Cementing Engineer)
17. Did you compare the actual job to the pre-job OptiCem model? How did you feel this job went? (Cementing Engineer)
18. What is your experience in using Nitrified cement for deep water production intervals? How many jobs have you pumped under these types of conditions? How does the complexity of this job compare to others? (Cementer, Cementing Engineer)
19. What is the percent of failures for nitrified cement jobs? What is the primary failure mode? What is the nature of the failure? What are the success factors? How did this job compare? (Cementer, Cementing Engineer)
20. Mud Logging - (Halliburton Mud Logger)
  - a. What is the procedure for monitoring the volume of fluids pumped and returned during riser displacements?
  - b. What sensors were you monitoring during the riser displacement and at time of incident? Anything strange?
21. Do you calculate the decrease in standpipe pressure when displacing the riser with seawater? Do you compare the calculated results to actual results?
22. What sensors have alarm settings during riser displacements? Were they turned on during the riser displacement?
23. How is flow out sensor calibrated? How accurate is the flow out rate in gpm?

## Critical Questions

### Cameron – Driller & Controls System Engineer

1. If the well is flowing and the blind shear ram closes, what can the blind shear ram tolerate and still seal?
2. With knowledge of the system leaks, what affect would they have on the BOP to perform it's primarily function?
3. With knowledge of the system modifications, what affect would they have on the BOP to perform it's primarily function?
4. Describe in detail, how the AMF system senses loss of electrical power, communication and hydraulic pressure?
5. Based on the service work you have performed on the Deepwater Horizon, what are the most problematic components?