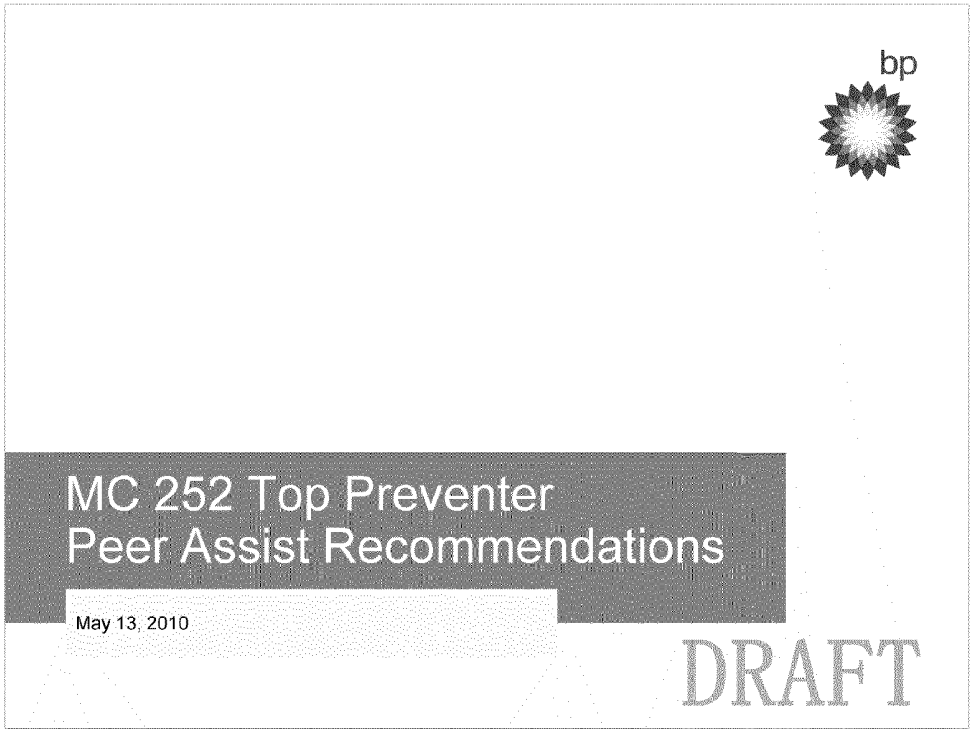
From: Wellings, James S
Sent: Fri May 14 21:31:00 2010
To: Frazelle, Andrew E; Cantrell, Kirk (Delta Marine Tec); Charles Curtis (charles.curtis@c-a-m.com); Fleece, Trent J; Franklin, Bob; Heironimus, Mark B (LEWCO INTEGRATED TECH SYSTEMS); Holt, Charles A; 'John Mackay'; Kerry Girlinghouse (kgirlinghouse@wildwell.com); MC252_Email_Retention; Patteson, Mark R; Paul King (paul.king1@deepwater.com); Pere, Allen L; Rob Turlak (rob.turlak@deepwater.com); Roberts, Chris A (Frontline Group); Simpson, Richard; Sneddon, Iain (Aberdeen); Stoltz, Dan; tbutler@oceaneering.com; Wellings, James S; Wilson, Gabe S (Frontline Group)
Subject: BOP on BP Peer Review - Update on Closeout Of Issues
Importance: Normal
Attachments: Top Preventer Peer Assist Recommendations Actions.ZIP

The additional resources we need:

1. Hydrate Expert to help work hydrate mitigation plan
2. Rigging Expert - Pull LMRP with DDII Anchor Winch
3. DDII Rig Team Members for procedures and reviews (part time, video conference).

Jim Wellings
Wells Team Leader
bp GoM Drilling and Completions
Exploration and Appraisal Group
200 Westlake Park Blvd (WL 4)
Houston, Tx 77079
+1 281 366 2000 Main Phone
+1 281 366 2983 Direct Phone
[redacted] Cell Phone
james.welllings@bp.com



Overall Feedback

- Amazing amount of work been done – great job in short time
- Key risks had all been identified - no significant additional risks identified by review team
- Review team believes the operation is feasible and can be managed safely
- Schedule pressures need to be given careful thought and stop points/decision points clearly understood
- Key risks
  - Dynamics (BOP placement, weather, timing etc.)
  - Subsea visibility and close control
  - Hydrate Management Inhibition
- BOP/valve on Flex Joint not evaluated in this review

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General Recommendations

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- Education on Hydrates by experts explaining risks and issues that operations team need to be aware of? (Proximity, timing, pressure, temperature effects) – Jon Turnbull to line up Hydrate Meeting
- Decide on which new ideas we need to pursue and which should be dropped? (e.g. shroud around base of BOP) – Team Reviewed
- What lessons from cofferdam would help on ROVs, hydrates, SIMOPS etc.? Jon to set up meeting.
- Quantify and model the glycol flowrate, volumes, duration needed for effective placement and inhibition. Jon to set up meeting with Trevor Hill.
- Establish the boundary conditions and determine if we have best tools, and chemicals for the job? Jon to set up meeting with Trevor Hill. Consulted BP Castrol Lubricants. Advise Biotac OG is best grease for bottom of BOP.
- Develop a decision flow chart that shows who makes decisions and anticipates what ifs – considering rehearsing these
- Develop resource plan defining essential personnel on rig etc.
- Conduct critical operations during daylight hours – In plan
- Engage ROV contractor in training, trialling etc. – In progress
- Consider separate teams for critical work fronts that need to be progressed, e.g. hydrate inhibition - Considering

Preparation for BOP on BOP

bp

- Document requested on Status of Horizon BOP - yes
- DP system - need TO analysis and report - Working
- Assess Watch circle tightness - Working
- Wellhead stress weight and bending calculations required - Working
- Loop current study for leaving stack on stack – to be modelled – Rejected – Handled in riser analysis. For stack on stack, loop current only goes 1500' from surface. Will not impact stack on stack.
- BOP Test requirements/certification – to be defined (timing issue) – DDII team.
- Evaluate DD3 stack as an option – Rejected. Stack currently being run.
- Evaluate use anchor winch 7 to pull off location to avoid clash issues – Need DDII resource and also look at Q-4000 to pull LMRP using yellow pod as release method.
- To manage Gas around vessels consider Water spraying moonpool area etc. – Rejected. Semi-submersible and plume management procedures in place.
- Review inhibition system to confirm adequacy and build in additions if needed – Need hydrate expert and lessons learned from Enterprise and top hat.

Deploy BOP Stack

bp

- Manage potential leak path of Riser Fill up valve – Valve will be closed prior to stabbing and 90 deg up so gas can not enter. Riser kept in continuous hole fill mode on trip tank to force water out valve (if it leaks).
- Decide whether Glycol or methanol will be used for Hydrate inhibition – Need hydrate specialist
- Confirm whether hot water could be used – ref. Enterprise study – Rejected. Choke and kill lines are not insulated and water will cool too quickly. Need methanol or glycol. Oil flow from well is 180 deg. So water will cool oil and make hydrate problem worse. Exxon Larry said hot water will not work.
- Identify critical parts that could be hydrated and could cause a problem if hydrates expands or preventing locking/unlocking of connector – Cameron completed.
- Hydrate inhibition – Assess adequacy/opportunity for backup – Methonal at connector and glycol down choke and kill lines.
- Determine how long can we can operate in the plume area while waiting for hydrates to disassociate – 10 minutes
- Evaluate opportunity for gas diverter on base on of BOP – flat plate with funnel guide – Rejected. BOP is closed at bottom.
- Check Interference with C/K male pins on Horizon BOP – Done. No interference

Deploy LMRP Pulling Assembly

bp

- Determine what is likely to be most successful way of pulling LMRP (Winch, Q4000 crane, derrick)? Need resource (2 people) to look at Q4000. If we want to use the yellow pod to release, then need Q-4000. Need resource from DDII rig team to look at using No. 7 anchor winch on the DDII. NEED CLEAR DIRECTION ON WHAT VESSELS ARE AVAILABLE. CAPPING TEAM WAS GIVEN THE DDII ONLY. NO OTHER VESSELS EXCEPT A ROV VESSEL WITH SAWS TO CUT DRILL PIPE IN BOP AFTER LMRP REMOVED.

Navigate to Location

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- Enterprise interference – confirm stand off distance – Richard Simpson to advise
- Approach path to be evaluated (current issues) – Richard Simpson to advise

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Pull LMRP

bp

- What if LMRP already released? Confirm it's locked when cutting riser – Put in Riser Cutting/Sling attachment scope of work.
- Develop unlatch plan (lessons from ROV operations during initial response)
  - Capabilities and functionality of Q4000 run yellow pod to activate connector? Line distance/SIMOPS – As per Deploy LMRP Pulling Assembly
  - Explote opportunity to access blue pod? – Rejected. Too long with lots of failure issues.
  - Consider lifting LMRP with Q4000? Deploy LMRP Pulling Assembly
  - Risk of activating wrong functions from pod – Not possible according to Cameron. Pod only stabs in one way. Need team to evaluate Top Kill team. Back-up is hot stab and subsea accumulator to release.
  - Accumulator back-up – Need contact to organize.
  - Lessons from unlatch incidents – Cameron and TOI working.
  - Checking hydraulics – need 14 gpm? To shift shuttle valve to unlock LMRP. Use hot line from rig or subsea accumulator.
- Assess operation of ROV around plume with diamond saw – Done. ROV and saw are working under the plume and the only part of the diamond saw to contact the plume is the wire.
- Drill pipe falling could cause a problem, seal face damage – consider leaving AX ring to protect seal face – LMRP on Horizon has a AX gasket loaded with hydraulic gasket hold/release function. The gasket will come out with the LMRP unless the yellow pod can operate the gasket release function or the ROV hot stab can be used to release this. The team evaluated this and feel drill pipe impacting the AX ring gasket seal area is slim to none. The team would prefer to remove the AX with the LMRP and have a double resilient seal AX gasket in the DDII HC connector. In the unlikely event the AX seal area on the Horizon HC male pin is dinged, the double resilient seal gasket will still seal. Have seal tite product as back up.
- Evaluate LMRP stability with pod which will upset value? Yellow pod will not be retrieved after install. If unsuccessful attempt to stab yellow pod. Will evaluate.
- ROV ring removal in plume – visibility, lifting forces when lifted, ROV Tooling reference points, model for trial ring placement and ring placement tool (horseshoe)? Oceaneering to evaluate.

Install BOP

bp

- Develop decision tree on rigid vs. hydraulic release of ring gasket – Completed. Use hydraulic release and remove gasket with LMRP.
- Hydrates in diverter joint - Could glycol be injected into diverter joint? Pump down boost line? Yes we can and put this in the plan.
- Risk of riser plugging with hydrates – Pump glycol down boost line.
- Evaluate feasibility/value of snubbing in the stack with clump weight/compensated crane?? Too complicated and labor intensive. Low probability of success.
- Landing BOP – consider design funnel on base of BOP to help centralize. Increases hydrate risk due to stabbing at a higher elevation in the oil column. Looking at lazer guided BOP positioning.
- Determine how long to wait before latching to give time for warming/dissociation - Not required.
- Evaluate use of shroud to hold hydrate inhibitor if methanol used? Not needed.
- Degree of control with stack placement? Less than 1 foot – closer is better for hydrate temp management and need to land BOP quickly – (temperature should help on venturi effect) – In plan
- Guidance system such that BOP is positively in place before landing assuming loss of visibility, involving ROV operators and consider how Horizon stack could be utilised? Lasers on outside of HC connector. Lase foot print onto Horizon LMRP landing plate (upper plate on BOP)
- Lateral movement is a risk with currents – use marker to rehearse accuracy of placement – In plan
- How to manage loss of visibility when landing BOP? Referencing between stacks? Lasers.
- DDII is the right rig for this work but need rig DPO operators involved in procedures - Working

Shut-in Well

- Hydrate potential if there is a small leak at the connector? Methanol
- Pressure Build up when well shut-in – how to manage bleed of pressure, risks to rig,
- Develop an Exit strategy if things go awry

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Risks – Individual's risks raised at start of meeting

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- Station Keeping
- Making up Flange
- Hydrates on BOP/Seals
- Flex-joint connection
- Stabbing/Pressure integrity
- What's in LMRP
- What happens on LMRP Release
- Connector Damage
- Latching & Bending moments
- Making it work
- Failure to understand downsides
- Reconnecting Stack
- Seal Damage
- Disturbance of something in stack
- What we don't know
- ROV Camera Visibility
- Plume
- Safety of 176 People on Rig
- Equipment
- Unable to Re-connect