

From: Morten Haug Emilsen
Sent: Mon Aug 09 19:54:49 2010
To: 'Wall, Dave'
Subject: RE: BP Incident Investigation
Importance: Normal

Sounds good Dave,

Also, if you have any comments before you're here, they are very much appreciated.
I believe the decision has been made, and that my report should reflect the conclusions in the main report. Maybe the solution is to tune down the discussion around the bumps and focus on the main results in my version.

I'm planning to finalize the report by EOB Wednesday and do not have a lot of time.
Anyway, further updates can also be done from home

Looking forward to seeing you again and appreciate your excellent support.

Best regards,
Morten

-----Original Message-----

From: Wall, Dave [mailto:dave.wall@bp.com]
Sent: 9. august 2010 14:42
To: Morten Haug Emilsen
Subject: RE: BP Incident Investigation

Morten,

I will be in the office first thing on Wednesday. I will make it my first priority on Wednesday morning to discuss the bumps with you.

Dave

David Wall
VP HSE & IM
EPT - HSE, Operations & Engineering
07748180428

-----Original Message-----

From: Morten Haug Emilsen [mailto:Morten.Haug.Emilsen@addenergy.no]
Sent: 09 August 2010 12:52
To: Wall, Dave
Subject: RE: BP Incident Investigation

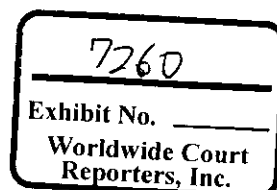
Dave,

I'm in Houston and are happy to see that our main conclusions are unchanged. The flow path is through the shoe, the well got underbalanced at 20:50. In addition, the reported gain of 39 bbl between 20:50 and 21:08 matches quite well with the simulations (this information was not available last time I was here).

We had a hard time explaining the pressure bumps after 21:30, and our initial assumption was that rig crew tried to close the annular. At the same time we had a hard time explaining how they could struggle with a leaking annular in

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nearly 20 minutes before they eventually closed the VBR. This has changed, and I can agree as it makes more sense seen from the guys at the rig floor.

However, I am not convinced that the first pressure build-up (21:30-21:35) is caused by hydrodynamic conditions in the wellbore (more heavy 14 ppg mud being pushed on the back side of the drillpipe replacing the 8.6 / 14 ppg mud) while the second pressure build-up (21:42 - 21:47) is caused by a partly sealing annular.

The curves are too similar too be caused by two different mechanisms. (If they are, it is incredible!). In detail, the pressure build-ups contain two gradients, the latter slightly steeper than the first one, before they are flattening out. Enclosed is a couple of slides showing how similar they are.

This detail at the very end will not change the main conclusions.

Anyway, I am here to review the new simulations and update my report accordingly, and in that respect I am looking for more information to be convinced that this is the case.

The changes made to my original model is that they moved the restriction from the BOP to surface. Ok. In addition, they reduced the net pay from

15 to 13 ft to hold back the gas. Ok. The gas reached surface a little bit too early in the original work. The pressure decline seen while pumping at a steady rate right before they shut down the pumps at 21:30 cannot, for the new simulations, be reproduced without playing with a restriction at surface. Initially this decline was reproduced by gas reaching the backside of the DP and hence cause a lighter column on the back side. According to the new simulations, the first gas reaches surface at 21:47 (no Gas Buster or vent line is modeled that will cause additional delay in gas surfacing), this is little bit too late according to gas alarm and witness statements regarding noise. Also, the gain from the new simulations shows 28 bbl at 21:08, a little bit on the low side.

I read the Chapter in the report dealing with the CFD modeling and tried to get a feeling for the timing required from start of the release to the most likely condition for ignition and explosion, that is get inside the LEL - UEL envelope. Plots were presented both for 190 and 240 seconds. Assume the time is related to first gas at surface. My interpretation is that it could be 3-4 minutes of flow before the first explosion occurred, most likely at 21:49.

As you have seen, the modeling results are very sensitive to the amount and location of the hydrocarbons in the wellbore, and smaller changes wrt. choking effects and well productivity will affect the results.

Further, we will probably not get any closer by modeling the real incident where variations in inflow due to cement channels, pop-off skin effects, wiper plug movements etc. could have influenced the flow. My main concern is though, that we are now explaining two similar pressure build-ups with two different mechanisms, and I have a hard time supporting that conclusion.

I heard that you are on your way over here, and we might have time for a chat before I travel back home on Thursday.

This was just to give you my comment on the new information just received. Any feedback will be appreciated.

Thanks,

Best regards,
Morten

-----Original Message-----

From: Wall, Dave [mailto:dave.wall@bp.com]

Sent: 6. juli 2010 15:31

To: Morten Haug Emilsen

Subject: RE: BP Incident Investigation

Morten,