From: Ray Merewether

Sent: Fri May 14 19:34:01 2010

To: SCHU

Cc: 'Marcia K McNutt'; Hunter, Tom (Sandia); Knox, Tom

Subject: junk shot risk

Importance: Normal

Steve,
A plan was in place to try the dynamic kill followed by the junk shot. This was the "safe" order of those two events. I pointed out that producing off the choke and/or kill lines was far safer and would provide more information about the restriction in the BOP. If I understand the numbers below, if a junk shot is successful, the pressure at the based of the BOP will rise to reservoir (11kpsi) and the case seals will blow.

Are you sure you don't want me in Houston?

Ray

From: SCHU [mailto:SCHU@hq.doe.gov]
Sent: Friday, May 14, 2010 10:46 AM
To: Richard L Garwin; Keese, David
Cc: Bodette, Amy; Majumdar, Arun; Stuart, Bryn Barbara; Keese, David; 'gcooper@berkeley.edu'; 'jholdren@ostp.eop.gov'; 'katz@wuphys.wustl.edu'; Hurst, Kathy; 'Marcia K McNutt'; OConnor, Rod; 'slocum42@GMAIL.COM'; Valdez, Salli; Bickel, Thomas; Hunter, Tom (Sandia); Rediger, Tony; Andy Bowen; Ray Merewether; Aoki, Steven
Subject: RE: CONFIDENTIAL Daily Status Call

To all,

Measuring flow rates will be important to know how much the impedance is in the BOP and above. This can give us an idea of the parameters needed to reverse the flow, using the top-kill approach. Pressure and flow measurements can be used to over-determine some of the parameters (wouldn't that be nice!) and to better understand the exposure to a failure of the riser pipe in the dog bone kink, the casing seals in the down-hole pipe, and other potential failure points.

A few ideas on flow and pressure measurements.

1) Ask the ROV to pan back so that the current video frame rate can capture the speed of bubbles, particles, turbulent eddies at the outer edge of the flow streams in the two places where oil is leaking out. In the meantime, get a faster camera on an ROV to take close in pictures. Simulation may then be used to give us better estimates of the overall flow.

2) If it is possible to inject dyes, particles etc. into the BOP, LMVR and the holes near the dog-bone kink, this will help us measure the flow rate by timing how long ***pulses*** of dye or particles takes to get on the end of the riser.

3) Direct Doppler acoustic measurements would be valuable. I am in favor of getting the Woods Hole people and their measurement stuff down there quickly.

4) If BP is going to insert a pipe into the riser, then it would be great to have that inert instrumented to measure the flow rates.

5) I learned in a briefing with POTUS that the dispersant is being inserted by physically moving the tube injecting the dispersant from side to side. The idea of dick Garwin of better mixing the dispersant as it is added

to the oil emerging form the pipe needs to be further explored. At the very least we should find out how the dispersant is being sprayed in and "atomized".

Steve

Steven Chu
Department of Energy

From: Richard L Garwin [mailto:rlg2@us.ibm.com]
Sent: Friday, May 14, 2010 12:58 PM
To: Keese, David
Cc: Bodette, Amy; Majumdar, Arun; Stuart, Bryn Barbara; Keese, David; 'gcooper@berkeley.edu'; 'jholdren@ostp.eop.gov'; 'katz@wuphys.wustl.edu'; Hurst, Kathy; 'Marcia K McNutt'; OConnor, Rod; SCHU; 'slocum42@GMAIL.COM'; Valdez, Salli; Bickel, Thomas; Hunter, Tom (Sandia); Rediger, Tony
Subject: RE: Daily Status Call

With apologies to Steve Chu, Tom Hunter, and Marcia McNutt, who already have this communication from yesterday.

Please see especially portion about gamma-ray observation of ram locks. If I understood the BP person who spoke with me on Wednesday in front of the pictures about gamma scans, NO lock was confirmed to be in place. I could readily have misunderstood; but have we seen the "counts" data?

Dick Garwin

From: *Richard L Garwin/Watson/Contr/IBM*
To: *"Hunter, Tom" <tohunte@sandia.gov>, mcnutt@usgs.gov*
Cc: *<katz@wuphys.wustl.edu>*
Date: *05/13/2010 05:20 PM*
Subject: *Two communications to BP, please.*

Good to see you in Houston, Tom, Marcia, and Jonathan. I hope Tom and Jonathan caught their planes-- Marcia, too.

FYI:
1. As I mentioned, when we were having the briefing Wednesday morning in the room lined with photographs, i wandered to the left wall of the room to review the gamma-ray scans of the 19-inch casing just downstream of the kink. I clearly had no 9-inch production tube in it at that point. They are maneuvering to scan upstream of the kink, where I believe they are likely to find an interior tube of 9-inch diam, 0.6 in thick.

For ACTION
2. My interlocutor told me that "x-ray" transmission measurement of the locking-pin sockets showed that NONE of the locking pins was fully engaged. Tom Hunter recalls being informed otherwise. This MUST be clarified promptly by BP.

For ACTION
3. The two-page handout at the meeting showed 2250 psia (psi absolute) in seawater at ocean floor.
Then 2650 psia below the riser flange, 3800 at base of BOP ("measured test ram"), 11850 psia "measured reservoir".

Of the dP (Delta-P) of 8050 psi between reservoir and entrance into BOP, "hydrostatic" drop is 3200 psi and "Remaining Restriction" is 4850 psi. This is attributed to "well skin". If the "junk kill" or any other means to set the rams or close the riser valve succeeds, the pressure at the base of the BOP will rise by to Reservoir Pressure, less the Hydrostatic dP = 3200 psi. It will thus rise to precisely (11,850 - 3200) = 8650 psia. The pressure at the base of the BOP will no exceed the ambient seafloor pressure of 2250 psia by 8650-2250 = 6400 psi. Is BP absolutely sure that the BOP and especially the casings at seafloor will safely withstand a dP of 6400 psig?

The pressure rise to 6400 psi above seafloor ambient is certain if the flow is stopped in or above the BOP. A rupture of the casings would be irreversible. If the "skin resistance" holds constant, this would result in a flow increase by less than

30%. It would not impede eventual well kill by the auxiliary kill well.

For CONSIDERATION:
4. Producing oil/gas through tubing connected to 3-inch Kill and Control lines at the base of the BOP would essentially kill the oil flow from the riser into the sea. It could reduce the well-top pressure to near-ambient, thus increasing the well flow by the same 30% but eliminating the flow into the sea. If the "well skin" holds, this would be an excellent solution until the well is killed by a kill well or mudded in. I suggest strong consideration of this option.

5. I have just heard on NPR at 5:10 pm EDT that BP will try sticking a tube into the end of the riser to suck out the oil. This seems like a good idea, with a fairly low-pressure packer to seal the tubes and either an ocean bottom pump to reduce pressure at the upstream end of the riser to below the 2250 psia at sea floor. Alternatively, with not too small a riser attached, the buoyancy of the oil/gas mixture in the riser will create a strong suction at the joint with the old riser.

6. I want to get this urgent note to you. Now I'll look at the details of mudding with marbles or with plastic-encase mud sausages injected via the kill and control lines a the base of the BOP. II need to look up the frictional pressure drop in idealized "porous media" made of marbles or mud sausages.

Tom, if you find this worthy of action, please communicate urgently with BP.

Thanks very much. Dick Garwin

From: "Keese, David L" <dlkeese@sandia.gov>

To: "'Steven Chu (schu@hq.doe.gov)'" <schu@hq.doe.gov>, "'slocum42@GMAIL.COM'" <slocum42@GMAIL.COM>, "'arun.majumdar@hq.doe.gov'" <arun.majumdar@hq.doe.gov>, "'gcooper@berkeley.edu'" <gcooper@berkeley.edu>, "'katz@wuphys.wustl.edu'" <katz@wuphys.wustl.edu>, "'Marcia K McNutt'" <mcnutt@usgs.gov>, "'jholdren@ostp.eop.gov'" <jholdren@ostp.eop.gov>, "Rod.oconnor@hq.doe.gov" <Rod.oconnor@hq.doe.gov>, Richard L Garwin/Watson/Contr/IBM@IBMUS

Cc: "Stuart, Bryn Barbara" <bbstuar@sandia.gov>, "Valdez, Salli" <svaldez@sandia.gov>, "Hunter, Tom" <tohunte@sandia.gov>, "Bodette, Amy" <Amy.Bodette@hq.doe.gov>, "Tony.rediger@hq.doe.gov" <Tony.rediger@hq.doe.gov>, "Bickel, Thomas C" <tbickel@sandia.gov>, "Hurst, Kathleen T" <kthurst@sandia.gov>, "Keese, David L" <dlkeese@sandia.gov>

Date: 05/14/2010 12:46 PM

Subject: RE: Daily Status Call

Folks,
As promised here is the background material for the telecon. Thanks!
David

David L. Keese
Chief of Staff to the Lab President
P.O. Box 5800 MS 0109
Albuquerque, New Mexico 87185-1221
Telephone: (505) 844-1899
Pager: (505) 951-5291

From: Hurst, Kathleen T
Sent: Friday, May 14, 2010 10:30 AM
To: 'Steven Chu (schu@hq.doe.gov)'; 'slocum42@GMAIL.COM'; 'arun.majumdar@hq.doe.gov'; 'gcooper@berkeley.edu'; 'katz@wuphys.wustl.edu'; 'Marcia K McNutt'; 'jholdren@ostp.eop.gov'; Rod.oconnor@hq.doe.gov; RLG2@us.ibm.com
Cc: Keese, David L; Stuart, Bryn Barbara; Valdez, Salli; Hunter, Tom; Hurst, Kathleen T; Bodette, Amy; Tony.rediger@hq.doe.gov
Subject: RE: Daily Status Call

Dear All,

Thank you for your responses regarding the start time for today's telecon. Please be advised the telecon is now scheduled to begin at 2:00pm East Coast Time. Here are the details:

May 14, 2010
2:00pm (ET)
202-586-5004

Note: Background material will be sent to you in advance of the telecon.

Let us know if you have any questions.

Thank you.
Kathy

Kathleen T. Hurst
Executive Assistant to Thomas O. Hunter
President & Laboratories Director
Sandia National Laboratories
Albuquerque, New Mexico
Email: kthurst@sandia.gov
Tel: 505-284-1950
Fax: 505-844-1120

From: Hurst, Kathleen T
Sent: Friday, May 14, 2010 9:06 AM
To: Hurst, Kathleen T; Steven Chu (schu@hq.doe.gov); slocum42@GMAIL.COM; arun.majumdar@hq.doe.gov; rig2@us.ibm.com; gcooper@berkeley.edu; katz@wuphys.wustl.edu; Marcia K McNutt; jholdren@ostp.eop.gov
Cc: Keese, David L; Stuart, Bryn Barbara; Valdez, Salli; Hunter, Tom
Subject: RE: Daily Status Call
Good morning. Telecon call-in number is 202-586-5004. The call may need to be moved to **2:00pm (East Coast Time)**. Any problems with that? Please let me know.

Thank you.
Kathy

From: Hurst, Kathleen T
Sent: Thursday, May 13, 2010 8:19 PM
To: Steven Chu (schu@hq.doe.gov); slocum42@GMAIL.COM; arun.majumdar@hq.doe.gov; rig2@us.ibm.com; gcooper@berkeley.edu; graham.openshaw@tecpm.com; jholdren@osp.eop.gov; katz@wuphys.wustl.edu; Marcia K McNutt
Cc: Keese, David L; Stuart, Bryn Barbara; Valdez, Salli; Hurst, Kathleen T; Hunter, Tom
Subject: Daily Status Call
All,

Tom Hunter requests your participation in a telecon tomorrow, **May 14, 1:30pm (East Coast Time)**, subject: provide status of the Deepwater Houston activities. Telecon call-in number and background reading will be forwarded to you Friday morning.

Thank you.
Kathy

Kathleen T. Hurst
Executive Assistant to Thomas O. Hunter
President & Laboratories Director
Sandia National Laboratories
Albuquerque, New Mexico

Email: kthurst@sandia.gov
Tel: 505-284-1950
Fax: 505-844-1120
[attachment "Info Framework 5-14-2010 1000hrs.pptx" deleted by Richard L Garwin/Watson/Contr/IBM]
[attachment "Communication Plan.docx" deleted by Richard L Garwin/Watson/Contr/IBM]