From: Knox, Tom [knoxt@bp.com]
Sent: Tuesday, May 25, 2010 10:41 AM
To: Ray Merewether; Richard L Garwin
CC: Arun Majumdar; Keese, David L; George Cooper; Harold Brown; John Holdren; Fleckman, Kim B.; Hurst, Kathleen T; Marcia McNutt; Tatro, Marjorie; Dick Garwin; Rod O'Connor; Steven Chu; Alexander Slocum; Alex Slocum; Bickel, Thomas C; Hunter, Tom; MC252_Email_Retention
Subject: RE: The junk shot

Dear all,

The Junk shot is no longer on the flow sheet. It is not an option under consideration.

Regards,

Tom

Inspection & Diagnostics Theme Leader

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From: Ray Merewether [mailto:Ray_Merewether@seektech.com]
Sent: 25 May 2010 15:32
To: Richard L Garwin
Cc: Arun Majumdar; Keese, David L; George Cooper; Harold Brown; John Holdren; Fleckman, Kim B.; Knox, Tom; Hurst, Kathleen T; Marcia McNutt; Tatro, Marjorie (Sandia National Laboratories); Dick Garwin; Rod O'Connor; Steven Chu; Alexander Slocum; Alex Slocum; Bickel, Thomas C; Hunter, Tom
Subject: RE: The junk shot

Dick,

The junk itself will go in at modest pressures well outside the red zone. It is only after this junk is in place that things begin to get interesting. In particular, the decision tree needs to be extended to include opening the rams to relieve pressure or beginning to produce on either the choke or kill to relieve pressure. Making those decisions in the heat of the battle may involve too much delay. So either the choke or the kill needs to be plumbed into a gas separator and flare. The RIT goes to the Q4000.

- Will the RIT still be in use while the dynamic kill proceeds?
- Has any cross connect been valved in so that the Q4000 mud riser and the RIT can share the separator?

The dual problems of keeping the junk out of the casing hangers while limiting the BOP internal pressure are what motivated me to propose engineered, buoyant, weak junk last week. Weak junk would provide a fast pressure relief mechanism inside the BOP. Way faster than humans + hydraulic valve actuators.

Ray

-----Original Message-----
From: Richard L Garwin [mailto:rlg2@us.ibm.com]
Sent: Tuesday, May 25, 2010 6:07 AM
To: Ray Merewether
Cc: Arun Majumdar; Keese, David L; George Cooper; Harold Brown; John Holdren; kim.fleckman@bp.com; Knox, Tom; Hurst, Kathleen T; Marcia McNutt; Tatro, Marjorie; Dick Garwin; Rod O'Connor; Steven Chu; Alexander Slocum; Alex Slocum; Bickel, Thomas C; Hunter, Tom
Subject: Re: The junk shot

Raye, Alex,

If they are going to do the Junk Shot, they will experience the Shut-In pressure at the mudline, which BP estimates is 8400-8900 psia.

BUT the DO NOT ENTER zone for dynamic kill is shown on the Salazar charts as 8000 psi. So Junk Shot is incompatible with DO NOT ENTER.

What is the decision tree that permits the Junk Shot?

Dick Garwin

From:
Ray Merewether <Ray_Merewether@seektech.com>
To:
"Tatro, Marjorie" <mltatro@sandia.gov>, "Hurst, Kathleen T" <kthurst@sandia.gov>, Alex Slocum <[redacted]>, Alexander Slocum <slocum42@MIT.edu>, Arun Majumdar <Arun.Majumdar@hq.doe.gov>, "Bickel, Thomas C" <tbickel@sandia.gov>, Richard L Garwin/Watson/Contr/IBM@IBMUS, Dick Garwin <[redacted]>, George Cooper <gcooper@berkeley.edu>, "Hunter, Tom" <tohunte@sandia.gov>, John Holdren <[redacted]>, Marcia McNutt <mcnutt@usgs.gov>, "Rod O'Connor" <rod.oconnor@hq.doe.gov>, Steven Chu <[redacted]>, Harold Brown <[redacted]>, "Keese, David L" <dlkeese@sandia.gov>
Cc:
"kim.fleckman@bp.com" <kim.fleckman@bp.com>, "Knox, Tom" <knoxt@bp.com>
Date:
05/25/2010 02:28 AM
Subject:
The junk shot

I?d like to ask people to try to demolish the following argument.

See the attached collage of the LMRP, BOP, and BigBore II well head

This morning I had given up on doing anything with the mud kill data and began to think about the junk shot. I think that there is so little flow resistance in the BOP + LMRP + riser, that the straight mud kill has almost no chance of working. So I think that it is 99% certain that the dynamic kill will go forwards and then 99% certain that mud alone won?t work. Then in the heat of the battle, the decision will be made to do the junk shot. That is just the way the politics is going to play out. So while we have seen detailed analysis of the test mud flows and the dynamic kill itself, I have seen no analysis or decision tree for the junk shot and yet it is very probably going to be done.

So I began to ponder how to do the junk shot in the least risky and most

likely to succeed manner. I came to a simple paradigm. From the perspective of getting mud down hole and especially down the outer annuli, one wants to put maximum junk into the shear rams and the blind shear rams and if possible, introduce no junk into the space underneath the pipe rams. That is important because the leak is likely through some very intricate passages in the casing hangers at the wellhead. In fact, the passages are so intricate, I don?t understand how the volume flow rate is sustained unless the 9-7/8 hanger is lifted up by the flow rate. Could someone at BP sketch in on their file ?Macondo Well Drawing - 2-PD-33294-04cp (2).pdf (attached) just where they think the leak is? All of the leak drawings I have seen are very schematic and show none of the details of the hangers. If lifting the 9-7/8 hanger is part of the mechanism, it is almost like a check valve and the likelihood of getting mud down the annuli is very small.

It the hangers get covered by the junk shot, it will be difficult to force mud back through the hanger. Viscous drag will pile junk on the hanger leak path everytime the mud flow is increased. If mudflow is stopped and oil production resumed it will unclog but that won?t be very helpful. It will reclog if the flow is downhole/upstream. I?ve been there and done that too many times with valves and strainers on my pressure vessels and accidental junk. From this perspective it becomes important NOT to drop the pipe if indeed it is still in the pipe rams. The pipe can provide a great deal of isolation between the shear rams above and the pipe rams below the pipe rams.

The other measures available to keep junk out of the hangers is to introduce junk preferentially on the upper kill port and introduce mud on the lower choke port and if necessary to use both the choke and kill lines to introduce mud to purge them with mud before pumping down hole.[attachment "Macondo Well Drawing - 2-PD-32294-04CP (2).pdf" deleted by Richard L Garwin/Watson/Contr/IBM] [attachment "LMRP BOP BigBore II.png" deleted by Richard L Garwin/Watson/Contr/IBM] [attachment "LMRP BOP BigBore II.pdf" deleted by Richard L Garwin/Watson/Contr/IBM]