

From: Roberts, Jamie Y
Sent: Tue May 25 19:13:30 2010
To: Knox, Tom
Cc: Webster, Simon
Subject: RE: The junk shot
Importance: Normal

Hi Tom,

We happened to be in a meeting with Sec Chu just now and Secretary questioned us on the junk shot and your note. Kent and the MMS explained that junk shot was still in consideration and procedures would be amended and all necessary approvals sought should it be required. I think everything is fine...just be aware that Sec Chu is on the distribution list and he is here at the Houston Command Center for the next couple days during the procedure.

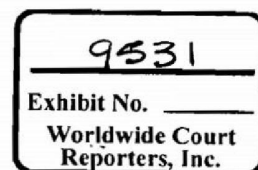
Sec Chu and Andy Ingles just met and Andy told the Secretary that James Dupree should be arranging for him and the gov't scientists to receive the necessary data they require. Hopefully that helps allievate some of the requests directed towards you. (or maybe that increases your requests...not sure which team you are supporting here?).

thanks,
Jamie

From: Knox, Tom
Sent: Tuesday, May 25, 2010 2:04 PM
To: Roberts, Jamie Y
Cc: Webster, Simon
Subject: RE: The junk shot

Jamie,

Thanks for this. I do agree that the Junk Shot is not currently a front runner for the top kill but is always a contingency plan and could be instigated when needed. The context for my response is that I have been copied on a series of wide ranging conversations between many of the advisors from the National labs both within and without the incident team. I have been trying to keep the engineering team aware of these conversations so that they understood what issues might be raised out of the blue and possibly distract them at a key moment. Unfortunately the system did not seem able to cope with this easily. Today there was a flurry of activity around the Junk Shot which seemed to be running out of control and escalating towards a higher level demand for explanation and data at a critical stage of the execution of the top kill option. My intervention was meant just to calm the frenzy around the Junk Shot. If I have caused any consternation I am happy to do whatever it takes to clarify or to keep out of the conversation altogether. However, the National Labs folks have put me on their distribution list and at times are pushing for direct information from me, I am not in the position to provide any data but don't believe that totally ignoring them



CONFIDENTIAL

BP-HZN-2179MDL07383732

TREX 009531.0001

TREX-009531.0001


is a good idea either.


I would greatly appreciate guidance on these matters as I am not wholly comfortable with the position. I did talk to my boss, Simon Webster, about this tonight as I appreciated that my e-mail might be questioned. Hopefully, the question will be moot in that the current top kill option will be successful and the Junk Shot will not be needed.

Best regards,


Tom

Inspection & Diagnostics Theme Leader
Inherently Reliable Facilities
Exploration and Production Technology
Sunbury-on-Thames

 Tel: +44 (0)1932 771916

 Fax: +44 (0)1932 763439

 Mobile: [REDACTED]

 E-mail: tom.knox@bp.com

Postal Address: Building H, BP Exploration, Chertsey Road, Sunbury-on-Thames, UK, TW16 7LN

From: Roberts, Jamie Y
Sent: 25 May 2010 19:27
To: Knox, Tom
Subject: FW: The junk shot

Hi Tom,

I was forwarded the stream of emails below. I just wanted you to be aware that the US Dept of Energy Secretary Chu is on that email chain. There is a chance that he may take your comment out of context. I believe the correct response is that the junk shot is not on the current approved operations for the top kill procedure but is it not still an option if needed and appropriate approvals will be sought if the time comes? correct?

Thanks for clarifying,
Jamie

Jamie Roberts
Executive Assistant for Kent Wells
BP NAG SPU
office: 281.504.0778
cell: [REDACTED]

CONFIDENTIAL

BP-HZN-2179MDL07383733

TREX 009531.0002

TREX-009531.0002

From: Knox, Tom
Sent: Tuesday, May 25, 2010 9:42 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 (Sandia National Laboratories); 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

Inherently Reliable Facilities


Exploration and Production Technology

Sunbury-on-Thames

 Tel: +44 (0)1932 771916

 Fax: +44 (0)1932 763439

 Mobile: [REDACTED]

 E-mail: tom.knox@bp.com

Postal Address: Building H, BP Exploration, Chertsey Road, Sunbury-on-Thames, UK, TW16 7LN

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

CONFIDENTIAL

BP-HZN-2179MDL07383734

TREX 009531.0003

TREX-009531.0003

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 <Slocum42@gmail.com>, 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,

CONFIDENTIAL

BP-HZN-2179MDL07383735

TREX 009531.0004

TREX-009531.0004

Dick Garwin <RGarwin@ostp.eop.gov>, George Cooper <gcooper@berkeley.edu>, "Hunter, Tom" <tohunte@sandia.gov>, John Holdren <jholdren@ostp.eop.gov>, Marcia McNutt <mcnutt@usgs.gov>, "Rod O'Connor" <rod.oconnor@hq.doe.gov>, Steven Chu <schu@hq.doe.gov>, Harold Brown <hbrown@cox.net>, "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

CONFIDENTIAL

BP-HZN-2179MDL07383736

TREX 009531.0005

TREX-009531.0005

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]

CONFIDENTIAL

BP-HZN-2179MDL07383737

TREX 009531.0006

TREX-009531.0006