From: Pat Campbell
Sent: Fri May 14 06:19:58 2010
To: Patteson, Mark R
Subject: BP Macondo 252-1 Well ---PRIVATE & CONFIDENTIAL---
Importance: High
Attachments: BP Macondo_PJC to MPatteson.pdf

Mark: I would appreciate it if you have time to take a look at this note from me to you.

Thanks in advance,

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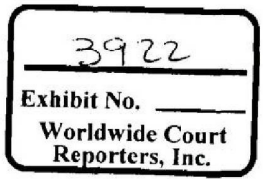

SUPERIOR
ENERGY SERVICES, INC.

Pat Campbell
Executive Vice President
Technology Solutions Group

Date: 12 May 2010 -----**PRIVATE & CONFIDENTIAL**-----

Mark Patteson
BP Production Company
200 Westlake Blvd.
Houston, TX 77079

Subject: Mississippi Canyon Macondo 252-1 Well
Reference: Superior / WWCI

Dear Mark:

I'm writing to share my thoughts with you about the current Macondo 252-1 well blowout. A number of WWCI's personnel are participating in initiatives being developed simultaneously (in parallel) to address different situations with respect to well control. Among those initiatives are:

- Relief Wells
- Pollution containment / collection via 'cofferdam' and 'Top-Hat' and Hot Tapping
- Junk-Shot manifold
- Direct Capping BOP on BOP
- Capping LMRP to BOP
- Selection, contracting, and rigging vessels
- Deployed firefighting spreads, personnel, and hydrocarbon/gas monitoring equipment on response vessels

Other Superior companies are providing:

- Prospect Engineering is providing engineering support for thermal studies
- CSI Technologies is providing engineering support for confidential analysis as assigned.
- BTI is a significant provider of specialty hardware solutions for other suppliers to BP (i.e. Cameron Iron Works and others).

As the person directly responsible for the divisions and departments that make up the "Technology Solutions Group" within Superior's corporate structure, I've had direct access to a lot of the work undertaken from the onset of the event up to the present time. During that period I've learned a lot, but my knowledge is neither comprehensive nor exhaustive. It's entirely possible that "I've got it wrong" with respect to some facts or issues. I still feel that I should share with you (BP) a few observations regarding the Macondo 252-1 well. My comments are based on my personal experience of having been direct participant in > 1000 well control events and managing many others during my career. I went on jobs with the Bobby Joe Cudd Company, Red Adair Company, Boots & Coots, Inc., and Wild Well Control, Inc. Not all wells were high-rate, high volume, oil & gas well blowouts. Nor have any of those well control events taken place in 5,000 ft. water depth.

In all cases certain fundamental rules apply no matter what the venue, and no matter whether on dry land, inland waters, or deep water locations.
As Boots Hansen told me early in my career… *"When I arrive at a wellsite I don't have to know in advance what to do to solve the problem. The well will reveal that to me. What I absolutely MUST know when I arrive is what NOT to do immediately".*

Forgive the analogy to war that follows. I think if ever there was a 'war' this would qualify.

Offensive strategy is employed by leaders with a 'will to win'. In order to maximize the odds of success, leaders base their strategic planning on obtaining better information than their opponent. They evaluate strengths, weaknesses, elements of surprise, and attempt to determine in advance the opponent's response to various offensive positioning, maneuvering, and actions (advance scenarios).

Defensive strategy is generally employed when a group is outnumbered, out-armed, or in a poor location to mount an offensive. Defensive strategy can be just as complex as offensive strategy, although it's usually invoked when there's little corroborated data concerning the capabilities of the opponent. When one is not armed with sufficient knowledge to have maximum confidence in their ability to predict the result in advance, with a high degree of confidence, the defensive posture is usually invoked.

Although I'm certainly not an 'insider' as far as BP's planning is concerned, it's my understanding that that a number of BP initiatives are being considered for "pro-active" deployment and implementation.

It's my personal opinion that *the risk associated with most of the initiatives is too high* and that too little is known with certainty about the wellbore status (the opponent in this case), to attempt to perform the work associated with most of those initiatives.

If containment and spill management (pollution domes) has a significant ratio of success for spill reduction, I would continue to drill the relief wells and focus other efforts on remaining spill remediation and collection until intercept and kill of the blowout well.

It's not possible or reasonable to try to detail all the 'whys' and 'wherefores' in this letter. The issues are far too complex. I'll provide an attachment with some of my thoughts and I hope you can take a few minutes to review it.

Best regards,

Pat Campbell
Pat Campbell

pjc

CC:

Attachment 1
BP MC GoM Macondo 252-1

Pollution Dome Collection:
Objective: *Place collection dome over main leak point on the riser lying on the seabed and route the escaping hydrocarbons to the surface for collection.*

1. Excellent project.
2. Continue full speed ahead

Hot Tap Pollution Collection:
Objective: *Place a saddle clamp on the 21 ¼" OD riser with tapping, flow, and injection manifold. Make Hot Tap penetration. Connect hoses and recover produced hydrocarbons.*

1. Excellent project.
2. Continue full speed ahead
3. In my opinion this will eventually be the successful methodology for capture/ recovery of blowout hydrocarbons

Junk-Shot Manifold:
Objective: *Inject bridging agents from a pre-placed, ROV controlled manifold directly into the high-pressure choke and kill lines on the Deepwater Horizon's BOP Stack.*

1. Excellent Project.
2. Continue with manifold placement, rigging, preparation of 3" ID choke and kill valves for cycling; testing
3. Perform diagnostic pumping to learn flowing pressure at the injection point, see if pumped fluid (with markers of some type) will reveal useful information about the internal wellbore geometry (i.e. is the injected fluid traveling down the casing x DP annulus and then exiting via the DP, etc. etc.).
4. Do not inject solid objects (preloaded in the manifold sections) unless the diagnostic pumping results increase BP's confidence about predictability of successful results of injection of junk.

Capping BOP on BOP:
Objective: *Remove the remaining damaged riser and the flex joint (LMRP) on the Deepwater Horizon's BOP Stack and cap the blowout well directly by installation of a second BOP assembly on top of the original assembly presently on the well.*

1. Excellent Project
2. Continue with configuration and testing of the capping BOP and make all preparations for deployment
3. Continue to refine procedures and hardware that may help reduce risks associated with installation of the system.
4. Do not initiate this action if the pollution capture system is operating well.
5. Only initiate this action in response to a change in the pollution capture system or circumstances that suggest a deteriorating situation with respect to the flow path, volumes emitted from the wellbore, change in flow rate (velocity) from the wellbore.

Capping BOP on Flex Joint:
Objective: *Remove the remaining damaged riser and install a modified capping BOP (or BOP & Valve) assembly, directly on the flange of the riser flex-joint of the Deepwater Horizon BOP stack.*

1. Excellent project.
2. Continue with configuration and testing of the capping BOP and make all preparations for deployment

3. Continue to refine procedures and hardware that may help reduce risks associated with installation of the system.
4. Do not initiate this action if the pollution capture system is operating well.
5. Only initiate this action in response to a change in the pollution capture system or circumstances that suggest a deteriorating situation with respect to the flow path, volumes emitted from the wellbore, change in flow rate (velocity) from the wellbore.
6. One would only elect this alternative solution if the flex joint could not be removed from the existing Deepwater Horizon BOP stack.

I have no knowledge of, or contact with, anyone who may be doing forensic work on BP's behalf to determine facts related to the blowout or the events preceding the initiation of the blowout or related to the cause of the blowout.

Any reasonable person would or might ask: Why do you make the above listed statements?

The shortest possible answer: Too little is known about the wellbore geometry, flow path to the sea-floor exit point, flowing pressure and flow rate.

I've read several accounts by individuals that were present on the Deepwater Horizon when the event began. The common threads seem to be:

- Loud Hissing or roar
- Immediate "Thud" combined with strong "Shudder" on the rig
- Gas and oil very quickly at the surface in large volumes after briefly unloading some water and mud.

I've personally been on 6 well events having exactly those same characteristics. Some have been onshore and some have been offshore. None were on semi-submersible MODU's. I worked on such wells with Boots Hansen, Coots Matthews, Clayton Berry, Sam Bowden, and Rick Baker. Each time it happened there was no doubt in our mind about what was occurring.

A mechanical failure in the wellbore that could be:
Casing parting; casing collapsing; casing bursting; liner top/seal failed, or the wellhead casing hanger seals failed. Which one occurred might be revealed by:

- Time to max shut-in pressure at the surface (Wellhead & Tree)
- Time to surface of hydrocarbons (if not already present at surface)
- Time to achieve max rate (velocity) for flow
- Time to manifest itself by visual flow outside the well's casing
- Time to record increased solids (formation) in the flow path

I should say… 'We've been on hundreds of jobs where this occurred prior to our arrival". I'm just noting the ones where I've personally been present when the failure occurred. These wells have included unforeseen consequences like:

- Casing jumping out of the wellhead slips and going into full compression some distance down hole
- Casing parting shallow and moving up across all the shut-in devices (BOPs)
- Burst casing initiating an underground blowout because the well was shut-in, and not being diverted or otherwise relieved at the time of the occurrence.

For similar serious incidents where access has been available or reasonably available, the conservative response would be:

- Remove the non-functioning or damaged equipment
- Prepare new equipment and horizontal diverter lines

- Cap the well and then divert the hydrocarbon flow to separators and pipelines; or flare pits, or collection points away from the wellhead location
- Rig up a Hydraulic Workover (HWO) unit, known as a snubbing unit, on top of the capping assembly and RIH to determine the depth of damage, the type of damage and whether one can run a kill string to bottom to perform a dynamic kill using weighted fluid.
- A dynamic kill imposes the lowest possible forces on damaged or suspect points up the wellbore. Unlike a top kill/bullhead kill, the forces in a dynamic kill are minimized during the process in order to reduce the possibilities for further damage or broaching or bursting shear discs, or minimizing the forces to certain types of wellhead seals in those cases where loading of the cross sectional area of the seal may cause casing failure or deformation in the casing or other negative results that come into consideration as a part of the hanger and seal design. I don't know the design of the 9 7/8" hanger and seal assembly in the Macondo well. I have no idea if loading due to pump injection pressure or exposure to shut-in well pressure could be excessive, or even if it's a factor.
- By running a kill string under pressure while the well is flowing certain very important data are learned about the structural integrity of the wellbore, prior to conducting the kill ops. Unfortunately, that won't be an option on this well due to the water depth and other complicating factors.
- I have a pretty good idea that if the 9 7/8" seal is not in place that the forces of a top kill could have very bad results if shut-in well pressure / kill pressure arrives behind the 9 7/8" casing. Those pressures could cause other failures (i.e. exposed casing shoe), that have potential for contributing to a relatively shallow underground blowout (UGBO). That occurrence could have a negative impact on the drilling of the second relief well.

Conclusion:

1. In the Macondo well there is only +- 300 PSI margin between the capability of the wellhead seal assembly and the anticipated shut in pressure of the well. That margin should be considered to be negligible and that basically it can't be relied on[1].
2. There is essentially no margin between the bust pressure of the 9 7/8" casing and the anticipated shut-in pressure at the sea floor[1].
3. There are two (2) pre-placed rupture discs in the combination casing string. They are potentially subject to failure if excessive pressure (wellbore or induced by pumping) would occur.
4. At the outset of most of the initiatives listed, it will be unknown if the flow is coming from behind the 9 7/8" casing or inside the 9 7/8" casing.
5. At the outset of most of the initiatives listed, it'll be unknown whether the 6 5/8"DP, or the 9 7/8" Casing, or both the 6 5/8" DP & 9 7/8" Casing are projected upward through the existing BOP stack, or whether one or both have fallen down hole below the stack elevation.
6. Why did numerous seal and shear components in the BOP stack of the Deepwater Horizon suddenly fail to seal or shear to stop the flow from the well? In view of Transocean's history of successful function tests and Hydrostatic pressure tests of the BOP components, why did *ALL* suddenly all seem to have failed to work at the very same time? The most likely answer is that the 9 7/8" casing parted at a fairly shallow depth, moved upward, and lodged in or through the BOP stack.
   a. Close annular preventer(s): The flow just routes to the DP x Casing annular area.

b. Close 6 5/8" pipe or variable bore rams: They can't function due to 9 7/8" casing lodged across the elevation of the 6 5/8" pipe & variable rams.
c. Close non-sealing super shear rams (casing shear rams): They don't function or they partially function because both 9 7/8" casing AND 6 5/8" DP are BOTH present at the same elevation. The combined mass is too great for the super shears to sever.
d. Blind rams: Can't close due to obstruction in the BOP Stack at that elevation. I've encountered similar experiences with non-functioning and or non sealing BOPs lots of times. Failures to obtain a 100% *seal* occur all the time for a broad variety of reasons. Failure to *function* is extremely rare and almost always is traced back to simple hydraulic or air over hydraulic land-based BOP Control Systems that were not maintained or that lost all fluid, or that lost pre-charge in the stored energy part of the system. I hardly think any of that is applicable to a very comprehensive electro-hydraulic (MUX) control system on this rig that routinely functioned properly.

1 Assumes no offsetting sea water hydrostatic.

Without the ability to gather important data resulting from diagnostic work prior to initiating a capping and/or kill attempt, BP can't determine with certainty that the capping and/or kill attempt won't worsen the flow rate situation. In my personal view the multiple variables that can't be determined in advance present a risk I wouldn't voluntarily initiate. If the well forced me to act, I'd do so. I'd have every option fully prepared and even perhaps 'pre-deployed' to a location near the Macondo well. All this assumes a reasonably successful deployment and operation of the pollution containment system.

I just want to reiterate that this is my personal view of the situation based on what I know or have been told. My comments don't speak for others, and don't speak for Superior Energy Services, Inc., or Wild Well Control, Inc., or any of Superior's other subsidiaries that are now, or may be in the future, providing any professional services or goods to BP on the project.

I'm very well aware that each of these initiatives has their own set of complex issues. It's not reasonable here to go into the level of detail that would be required to fully explore the risk matrix and the potential for both positive and negative results for each of the initiatives. I know that BP has task force personnel assigned to each of these parallel initiatives that include the most knowledgeable and respected industry sources working on the specific solution to their own part of the project.

Please accept this in the spirit in which it is offered. Just like everyone at BP, I'd like to see the most rapid and successful conclusion to the Macondo blowout. I just wanted to convey this privately to you. I'm very familiar with the immense pressure that's exerted from every source imaginable to take every action possible to bring it to a conclusion at the earliest possible minute. On land blowouts you can ignite it and work around it and cap it while it's burning. That's not an option here. If you can collect a high percentage of the liquid hydrocarbons it's not too much different from capping and diverting on a land well while waiting for a relief well intercept.

No one wants to wait for a relief well intercept, but quite often there is no acceptably low-risk alternative. I'm not suggesting that it would be easy to collect a high percentage of the hydrocarbons with the dome and/or the Hot Tap and to get the rest with burning in-situ, skimming, corralling, and collection. If that aspect of the response effort's working smoothly and if the well blowout doesn't deteriorate on its own, then it

would parallel what BP and countless other operators have done in similar situations onshore, in inland waters, from fixed bottom-supported platforms, and from floating drilling rigs.

Thanks for the opportunity to provide my comments.

Sincerely,

Pat Campbell
Pat Campbell