BP Biggest Errors

September 19, 2010

These are the biggest in terms of most obvious, blatant, or just, "My God, what were they thinking?" type of error. The impact of each of these may be controversial, but they were clear blunders.

1. Sending the Schlumberger 's Cement Bond Log (CBL) crew home the morning of April 20, 2010

This did not cause the blow out. Nor was it obligatory for BP to run a CBL prior to temporarily abandoning the Macondo well. Many wells are temporarily abandoned in the Gulf of Mexico without a CBL run. Also, as been pointed out by numerous experts in this area, CBL interpretation is subjective, and valuable time can be wasted on an unnecessary squeeze job.

According to BP, it was decided at a morning meeting on April 20 that the CBL would not be run. Look at the risk factors! This was cement job in a high temperature/ high pressure environment, there had been numerous loss circulation occurrences in the drilling of the section , a relatively small volume of foam cement was planned, there had been inadequate testing of the cement, an insufficient number of centralizers had be used and the testing of the well integrity/ cement job was yet to be done. So, logically, do you send the CBL crew home at this point?

This error demonstrates BP's indifference towards the well integrity testing on April 20. The negative test was done as a final check of the casing system. Obviously, BP could have sent the crew home after the negative test was done and it passed. But what was the logic behind sending them home prior to the testing? A particularly bad decision given insufficient number of centralizers used in the cement job.

A negative test places the well in an underbalanced condition to see if the hydrocarbons will flow into the well. Dr. Smith likened the test to finding a hole in a boat. Obviously, if the well did not pass the negative test, it would mean that the cement bond log would be run to know where to squeeze.

On April 19, the BP operations leader , John Guide, appears to have easily accepted cementing job was a success with weak supporting evidence. Transocean Offshore Installation Manager Jimmy Harrell testified at the Marine Board hearings that on April 19, BP submitted a plan to displace the drilling mud and cement a plug at 8367' without a negative test. Harrell testified that the negative test was conduct after he insisted on it and BP agreed.

Two key BP employees have refused to testify in front of the Marine Board, Bob Kaduza, the Company Man for BP on the Macondo Rig, and Brian Morel, the land-based BP Well Design Engineer who was on board the Deepwater Horizon until the morning of April 20. They would known the most about these decisions. Don Vidrine, the other Company Man for BP has not testified, citing his medical reasons. My understanding is that he was badly burned in the explosion.

2. Cementing without sufficient centralizers

Crisis hit on April 15 around 12:40 pm when it was first known that "45 pieces" had arrived on the Deepwater Horizon Rig as evidence by John Guide's email. The 45 pieces were 15 centralizers, and 30

stop collars. John Guide email is particularly incriminating as it states using these centralizers would "come off" or as I interpret his email, "be seen by others" as last minute additions. Assembling them on the casing was going to take approximately 10 hours. It appears, they had enough time to assemble everything, but no time to spare.

BP in their investigation report, does not mention John Guide's contention not to run the extra centralizers, because they might come off when the production casing was run. BP claims that the engineering staff erroneously concluded that they were the wrong type to run, lacks credibility and certainly has not been substantiated by any emails. Certainly, we are not considering particularly complicated equipment- see picture to left.

The number of centralizers to be run is based on an American Petroleum Industry standard of at least a 70% standoff ratio. A perfectly centered well would have 100% standoff, and a well string touching the side of the formation would have zero standoff .

This API guideline is apparently embedded in the Halliburton's Opticem program. The program indicated that 21 centralizers were needed. John Guide defended his decision to use only the six inline centralizers stating that the additional ones that arrived on April 15 were the wrong type.

BP's story is pretty crazy, because they decided to run 6 centralizers with integrated stop collars onboard without asking the Halliburton representative to make another Opticem run. To make another run had to be easy because none of the other data would changed. The Halliburton representative (Jesse Gagliano) with extensive experience in cement modeling, then working in the BP office, wasn't even told of the change in plans. He heard about it from a Halliburton employee onboard the Deepwater Horizon and made a run without knowing exactly where the centralizers would be placed. So, days before the accident, BP is ignoring the Halliburton engineer that is supposed to work with them on the well design.

A more logical explanation may be that BP ran the Opticem model on their own. This program is available from Halliburton and most likely BP has numerous copies. So, I believed they made their own runs on April 15 and chose to ignore them.

BP's investigative report greatly down plays the importance of centralizers, and considers the foam cement was improperly designed by Halliburton. I feel this shows how self-serving their investigation was, as if the hydrocarbons flowed downward from the pay zones, then channeling of cement in the annulus would provide easy passage through this part of the pathway.

3. The 450 barrel loss control fluids used as a spacer on the negative test

Form-a-Set and Form-a-Squeeze are called loss control materials (LCM). Approximately 450 gallons of these fluids were made up during the drilling of the final section of the well, from March 25 to April 9, 2010. BP had at least 11 days to decide on the disposal of these fluids. How in those 11 days could no one in the BP organization see what a terrible idea it was to use a highly viscous fluid as a spacer?

BP was legally able to dispose of these fluids at sea since they were spent well fluids (having passed through the well) and aqueous based fluids. MI-Swaco sent a compliance engineer to the rig to test the fluids prior to their disposal in the Gulf. But the alternative was to return it to shore, where it would be processed as hazardous materials.

Although legally BP did not break any rule or law, I believe, the use of the LCM as a spacer combined with setting the drill pipe at 8367' was for maximum oil based mud recovery showed BP had little regard for the intent of the negative test. Their only concern was to move off location with the well as temporally abandoned as quickly as possible. It was a project that had gone approximately 43 million dollars over budget.

BP decision to use the 450 LCM fluids as a spacer most likely blocked or at least greatly suppressed pressure readings through the kill line, leading to the erroneous conclusion that there was well integrity.

Also, the large spacer, was highly thixotropic (resistant to initiate flow) and viscous, creating an unstable interface between the spacer and displacing seawater (see Appendix Q of BP's Investigation Report). The 9:00 pm shut in of the well, would have resulted in the greatest resistance to flow where temperatures were the lowest, in the kill line at the sea floor. The LCM contained fibers which according to BP's report, where more than 1 mm thick. The resumption of flow most likely resulted in the sea water with gas fingering through the LCM spacer. Thus the LCM material as it flowed up the well, acted like a leaky cork, and by 9:48, the LCM material. sea water and gas flowed violently from the well.

These two chemicals are manufactured by MI-Swaco, a company jointly owned by Schlumberger and Smith International. BP provided the rheology of the mix of the two fluids in their report, Appendix Q. MI-Swaco's testing of the spacer was limited fluid properties to ensure the spacer could be flowed through the well and would disperse when flowed overboard.

In their defense, they state in Appendix Q that the use of the fluids as a spacer was for "beneficial reuse" which I guess now is the official explanation. The benefit to the reuse is left unexplained. Sorry, but this does not pass the laugh test.

Summary

Sending CBL crew home early, insufficient centralizers and the LCM spacer - these 3 errors are exclusively BP's judgment errors.

The industry is very aware of all three errors. They are very aware of many others, some more controversial than others.

None of these three errors will be repeated in the future. Not one of them. It is just not going to happen. So no great lesson learned. The lasting impact of the accident will be a mindset of everyone working in operations and design, is that if poor decisions are made, they can't count on the pinchers (BOP) 100% to keep the well under control. In that environment, they might as well make all decisions, with a given that the BOP will not save the day.

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