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To: Fred_kouhi@comcast.net

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Subject: Gulf Oil leak

Fred,

Here's some thoughts that reportedly were provided by a retired senior Mobil VP of Engineering.

Bob

This well had been giving some problems all the way down and was a big discovery. Big pressure, 16ppg+ mud weight. They ran a long string of 7" production casing - not a liner, the confusion arising from the fact that all casing strings on a floating rig are run on drill pipe and hung off on the wellhead on the sea floor, like a "liner". They cemented this casing with lightweight cement containing nitrogen because they were having lost circulation in between the well kicking all the way down.

The calculations and the execution of this kind of a cement job are complex, in order that you neither let the well flow from too little hydrostatic pressure nor break it down and lose the fluid and cement from too much hydrostatic. But you gotta believe BP had 8 or 10 of their best double and triple checking everything.

On the outside of the top joint of casing is a seal assembly - "packoff" - that sets inside the subsea wellhead and seals. This was set and tested to 10,000 psi, OK. Remember they are doing all this from the surface 5,000 feet away. The technology is fascinating, like going to the moon or fishing out the Russian sub, or killing all the fires in Kuwait in 14 months instead of 5 years. We never have had an accident like this before so hubris, the *folie d'grandeur*, sort of takes over. BP were the leaders in all this stretching the envelope all over the world in deep water.

This was the end of the well until testing was to begin at a later time, so a temporary "bridge plug" was run in on drill pipe to set somewhere near the top of the well below 5,000 ft. This is the second barrier, you always have to have 2, and the casing was the first one. It is not known if this was actually set or not. At the same time they took the 16+ ppg mud out of the

riser and replaced it with sea water so that they could pull the riser, lay it down, and move off.

When they did this, they of course took away all the hydrostatic on the well. But this was OK, normal, since the well was plugged both on the inside with the casing and on the outside with the tested packoff. But something turned loose all of a sudden, and the conventional wisdom would be the packoff on the outside of the casing.

Gas and oil rushed up the riser; there was little wind, and a gas cloud got all over the rig. When the main inductions of the engines got a whiff, they ran away and exploded. Blew them right off the rig. This set everything on fire. A similar explosion in the mud pit / mud pump room blew the mud pumps overboard. Another in the mud sack storage room, sited most unfortunately right next to the living quarters, took out all the interior walls where everyone was hanging out having - I am not making this up - a party to celebrate 7 years of accident free work on this rig. 7 BP bigwigs were there visiting from town.

In this sense they were lucky that the only ones lost were the 9 rig crew on the rig floor and 2 mud engineers down on the pits. The furniture and walls trapped some and broke some bones but they all managed to get in the lifeboats with assistance from the others.

The safety shut ins on the BOP were tripped but it is not clear why they did not work. This system has 4 way redundancy; 2 separate hydraulic systems and 2 separate electric systems should be able to operate any of the functions on the stack. They are tested every 14 days, all of them. (there is also a stab on the stack so that an ROV can plug in and operate it, but now it is too late because things are damaged).

The well is flowing through the BOP stack, probably around the outside of the 7" casing. As reported elsewhere, none of the "rams", those being the valves that are suppose to close around the drill pipe and / or shear it right in two and seal on the open hole, are sealing. Up the riser and out some holes in it where it is kinked. A little is coming out of the drill pipe too which is sticking out of the top of the riser and laid out on the ocean floor. The volumes as reported by the media are not correct but who knows exactly how much is coming?

2 relief wells will be drilled but it will take at least 60 days to kill it that way. There is a "deep sea intervention vessel" on the way, I don't know if that means a submarine or not, one would think this is too deep for subs, and it will have special cutting tools to try to cut off the very bottom of the riser on top of the BOP. The area is remarkably free from debris. The rig "Enterprise" is standing by with another BOP stack and a special connector to set down on top of the original one and then close. You saw this sort of thing in Red Adair movies and in Kuwait, a new stack dangling from a crane is just dropped down on the well after all the junk is removed. But that is not 5,000 ft underwater.

One unknown is if they get a new stack on it and close it, will the bitch broach around the outside of all the casing??

In order for a disaster of this magnitude to happen, more than one thing has to go wrong, or fail. First, a shitty cement job. The wellhead packoff / seal assembly, while designed to hold the pressure, is just a backup. And finally, the ability to close the well in with the BOP somehow went away.

A bad deal for the industry, for sure. Forget about California and Florida. Normal operations in the Gulf will be overregulated like the N. Sea. And so on.