BP Hard Cap Installation, and Plausibility Arguments Regarding Major Well Bore Problems with Relief Wells

by Dr. Stephen A. Rinehart
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Background

In December 2005 (http://www.sciencedaily.com/releases/2009/08/090804090942.html), scientists aboard IODP (Integrated Ocean Drilling Program) Expedition 312 approached mantle depths while drilling to investigate super-fast seafloor spreading rates. The research expedition penetrated volcanic rock (gabbros) and reached a fossil magma chamber lying 1.4 kilometers beneath the seafloor. The Moho, or mantle, lies beneath the gabbros layer of ocean crust at depths that vary from about 5-10 km. beneath the ocean floor, to about 40 km. beneath the continents, to as much as 70 km. beneath some mountain ranges. This shows that one could possibly expect to be drilling the Earth's mantle at 18,000 ft+ (BP's Macondo could have been drilled much deeper than 18,000 feet). The deeper you drill the higher the temperatures and pressures which will be encountered. There are other wells within a 50-mile radius of Macondo which may have had reservoir pressures of 14,474 psi, at temp of 212 F at a depth of 15,000 ft (Ref: JPT (Journal of Petroleum Technology, June 2009, www.onepetro.org))

Several weeks ago, a BP VP (Mr. Kent Wells) presented a video description (http://bp.concerts.com/gom/kentwellstechnicalupdate061010a.htm) of a large heavy-wall cylindrical pressure vessel which he called an "overshot" device. I think this is what Admiral Thad Allen is calling a "Hard Cap" with which BP is planning to replace the current "containment dome" with a huge (75 ton) cylindrical pressure vessel. What caught my immediate attention in the BP video was that the wall of this **pressure vessel was ten-inch thickness steel (steel not specified)**. The dimensions stated by Mr. Wells for the BP "Overshot" device are:

Diameter: 58 inches

Wall Thickness: 10.0 inches

Length: 408 inches

Weight: 75 tons

There is an 18.75 in diameter flange welded to bottom of the pressure vessel to match the API flange on the current BOP top flange.

Pressure Vessel (BP Hard Cap) Design Calculations

To look at an estimate of the possible maximum design pressures which could be accommodated by this particular BP pressure vessel, go to the website:

www.pveng.com/ASMENotes1.html and scroll down close to the bottom of the webpage and click on "Design Tools" and "Pipe and Shell Design Tool" which should open an Excel Spreadsheet:

http://www.pveng.com/new/ASME/ASME9/Pipe&Shell_Design_Tool.xls

in which you can read in the following data (ver E4.02):

Dimensions:

58.0 inches - outside diameter

10.000 inches – nominal wall thickness

408 inches – length

0.125 inches – corrosion allowance

Material and Conditions:

HY125 KSI – this is a special high strength steel (requires Gov approval)

125,000 – allowable stress (attempt at max plastic limit design no safety factor)

0.85 – long seam weld efficiency (default value)

0.85 – circular seam weld efficiency (default value)

0.0% - undertolerance allowance

41,975 psi – interior pressure (max well bore pressure before blowout)

Calculated Properties:

Volume (cu ft) – 267.78

Weight (lb) – 174,491.60 (87.2 tons)

Required Thickness:

Required Minimum Thickness 9.997 inches (10.0 inches!)

Check: Acceptable thickness

Remarks: Since the type of steel was not specifically stated, an assumption was made to see what was the maximum design pressure we could achieve if we used a super high strength steel. **The bottom line is that with a 125,000 psi super steel with an internal pressure of 41,975 psi (well bore blow-out pressure), the required thickness is indeed ten inches.** No information was given as to the dimensions of the elliptical (or hemi-head) design and I assume relief values (no video shown of the other end of this pressure vessel). Mr. Kent Wells also mentioned there were two other designs also being fabricated (nothing else stated).

I did not post this article to the Internet several weeks ago, as I was waiting to see **who would state the actual well head blowout pressure was 40,000 psi** (not just some wild range of 20,000 psi to 100,000 psi). For several weeks this specific number was not mentioned on oil spill websites until I heard a video on the website www.rense.com on July 01 (Thursday) by a Mr. Lindsey Williams (appears to have been pulled or unavailable "Guests 6-28-10 through 7-4-10) who stated that his "oil source" said the wellhead pressure has now been measured at 40,000 psi (use your own discernment on this one). Mr. Williams also stated there were fissures/cracks, and that if not

stopped the well could flow for another 30 years (implying some 675 billion barrels of oil in a super reservoir, or it is being produced within Earth's mantle and flowing into reservoir from underneath as abiotic oil). A reservoir of this size would be several orders above any public disclosures by BP or the U.S. Government.

Summary:

1. There is no question that what BP/Adm Allen is calling a "Hard Cap" or "Overshot Device" is a specially designed and fabricated high pressure cylindrical vessel to initially mate with flanges on current BOP, while a bottom kill with relief wells is being drilled/attempted. If the bottom kill is successful, then these heavy-walled pressure vessels could replace the BOP on Macondo, as well as possibly serve as a "BOP" on both relief wells being drilled, since they also can hit high pressure gas.
2. Pressures of 40,000 psi could fracture thousands of feet of a granite rock cap once crack propagation are initiated into the granite cap through a deep drilling program. The problem is, once a crack is initiated in rock within a high pressure formation, the cracks can propagate a large distance, both horizontally (think shale oil), as well as vertically, at relatively small pressures. Thus, we can have high pressure oil and gas coming into the well bore well above the bottom of the well (i.e., at the bottom of the 18-inch casing).
3. A very high blowout pressure may explain some mud or oil flow possibly observed in cracks outside the immediate well bore area, and the fact that the Thomas Jefferson noted some anomalies around the well bore in a recent survey. If the well is relatively free-flowing through the current BOP (path of least resistance) there may be only a limited flow through these outside cracks and fissures. This does not resolve the issue reported by Matt Simmons on CNBC (with Dylan Ratigan) that there is another area of a major blow-out miles away from what we are being shown.
4. The idea of using a high-pressure cylindrical vessel may be to adjust the relief valves at the top of the vessel (option not available with current containment dome or damaged BOP), until a slight oil/gas flow is initiated through the fissures (surrounding the immediate well bore), and start a massive mud injection to try and seal these fissures before attempting the final bottom kill. This may require an "aircraft carrier full of mud," and so we may have had to wait until the Loch

Rannoch was on site and possibly retrofitted with large mud pumps. It would be a major unknown as to what size these fissures are, and how deep they run (but over 10,000 ft), so one would need a significant capacity of additional mud.

5. If this BP pressure vessel is being designed to withstand 40,000 psi internal pressure using a super strength steel (or K-Monel), BP/Gov did indeed drill a well beyond 20000 ft TOD and probably into a major abiotic oil reservoir where the blowout pressure exceeded 26,660 psi (20,000 psi rated API flange and assuming a 1/3 increase to ultimate plastic limit state design = 20,000 + 6,660 = 26,660 psi).
6. If the pressures in the bottom of the Macondo well bore exceed 27,000 psi, there is probably no attempt being made to drill a relief well into the bottom of this well bore. It would buckle any drill string, and you are risking another catastrophic failure by exceeding all known rated API safety flanges—unless some special high pressure flanges and valves have been fabricated in the past 50 days (cannot drill into high-pressure well without proper safety equipment, and this one is something not seen before). What has to be done is to intercept the well bore at a much higher point (much larger well bore area), where the pressures will be below 20,000 psi and preferably below 15,000 psi. Unfortunately, this makes sealing the Macondo well a low probability success, as the well bore may already have been sandblasted open, and major cracks have propagated horizontally at the bottom of the well. So it all comes down to what the well bore pressure/temperature is along the entire well bore, how many high pressure zones are in play, how much of the granite cap is fractured, and what is the topography along the well bore. Has the Mississippi Canyon wall been fractured?
7. The Macondo Well has all the earmarks (based on current response, length of time to drill the relief wells, high pressure hard cap designs/fabrication) of being a super high-pressure blow-out that is into the Earth's mantle. The "red oil" that is being seen floating on the GOM surface could be from the Earth's mantle (Where is the chemical signature for this oil after 70 days?). If this well had only been in the range of 14,500 psi well bore pressures, we would have already drilled the relief well and sealed it off (by day 40 at the latest, with 7,000 barrels of mud). However, since this has not happened, one can assume the situation is in a transition of going from very bad to worse with maybe three options left. (1) Try and seal it with massive amount of super heavy mud (try and seal cracks/fissures), while

attempting to adjust the well bore pressures with a massive cylindrical pressure vessel(s) on both relief wells and Macondo; (2) attempt to seal it (way down-hole) with a small nuke, if the granite cap is not fractured (maybe start with one-kiloton weapon); or (3) let it flow for thirty+ years, and contaminate the world's oceans/environment (unacceptable or not?!). If the granite cap is badly fractured, this could preclude using a 10-kiloton nuke (or any weapon to try and seal well bore) near the bottom of the well bore. If bottom kill does not work, this mega-disaster has implications of biblical proportions because there may not be an option other than trying to capture as much oil as possible with a fleet of specifically-designed super tankers (both clean-up and separation/storage) for decades to come.

8. There were technical discussions a decade ago about how to separate "red oil" from its environment, so it could be produced (Canada has significant amounts of red oil) (see also: "Slipping Out of Oil Noose" by Larry Elgin and Dr Stephen Rinehart www.wnd.com/news/article.asp?Article_ID=22911, May 21, 2001).
9. The question of implementing a massive oil containment in Florida Keys (last "choke point" before entry into Atlantic Ocean) needs to be addressed now by world governments, to try and contain the oil from spreading into Atlantic Ocean and beyond. Possibly the only Command and Control Structure left to manage this effort is within DOD itself, led by U.S. Navy. Oil tar balls are being reported at Jensen Beach on Florida's East Coast (already getting late in the day). Assets need to be mobilized worldwide.
10. Air quality issues are and will continue to be a major issue, despite no real information forthcoming from USGS. There is currently a hot pipe (i.e., BP well blow-out) running through a massive methane hydrate formation (1200m thick?) that is possibly heating the formation and venting large amounts of methane gas underwater in addition to the one-half ton of methane being produced by the well for each ton of oil (ref; Dr Samantha Joye – Univ. of Ga. Researcher aboard RV Walton). This could be the real origin of the massive underwater methane/oil plumes, and there may be more than one major source. NOAA/EPA has two codes for running Air Quality predictions (in fact there are several options/predictions being run). The output of a code from OILSPILL (surface oil) is input to AIRMAP to predict onshore concentrations of benzene, hydrogen sulphide and methylene chloride, depending on actual wind son data. Where are the predictions and IVV/validations by independent

Universities of air quality on Gulf of Mexico? (Numerous websites have commented on total lack of data, other than TV station in New Orleans.) Benzene is a known carcinogen (unsafe at 10 ppb or less) and hydrogen sulphide can cause deaths at 300-350 ppm. It is a major irritant, and dangerous at levels of 50 ppm.