



Deep Water Spill - Waiting for Top Kill

Posted by [Heading Out](#) on May 26, 2010 - 7:30am

Topic: [Environment/Sustainability](#)

Tags: [deepwater horizon](#), [oil spill](#), [original](#), [top kill](#) [[list all tags](#)]

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Essentially that is what is being tried. The well has a certain ability to get oil through the Blowout Preventer (BOP) at a given (though debated) flow rate. If the volume is increased, by pumping mud into the well below the BOP, then the well will "back up" and the oil will flow back down the well. As it does more mud enters the well. This is dense enough that, as the column grows longer it pushes down on the oil, and applies enough pressure, due to this weight, to overcome the pressure in the rock. Without that positive difference, there is nothing to drive the oil out, and thus the well is "killed."

Note: Live discussion has moved to <http://www.theoil Drum.com/node/6115>

Update 5/26 by Gail, 2:36 EDT: Top kill has been [started](#).

Update 5/26, by PG, 10:50 EDT; "Later this morning I will review that with the team, and I will take a final decision as to whether or not we should proceed," BP Chief Executive Tony Hayward told the NBC "Today" show on Wednesday. [BP readies another attempt at stopping oil spill \(Yahoo News\)](#).

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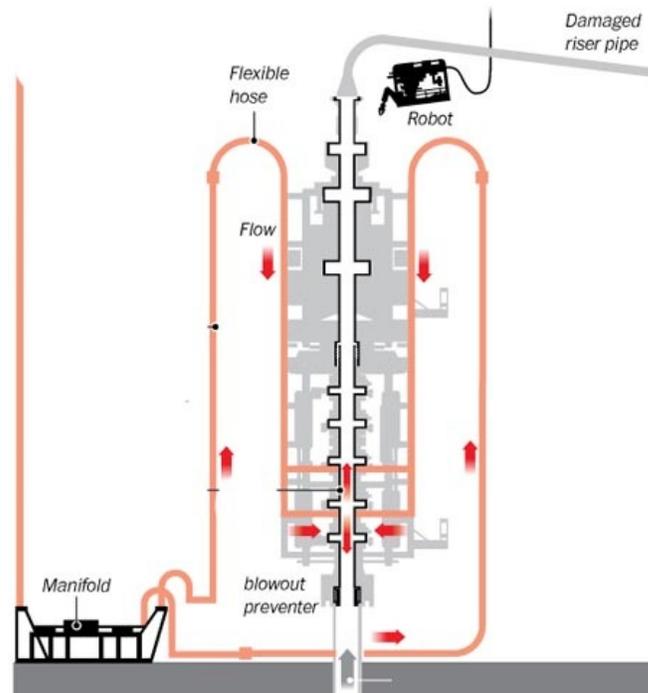
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One thing that should be noted, however, is that most illustrations show a section of the BOP such as the one just below (which I modified from [one in the WP](#)). Life is actually more complex since there are large rams sitting in the side ports that appear as notches on the main flow line. The actual position of the rams and the condition of the pipe that runs through the assembly are somewhat in question (through BP used gamma rays to check it out), and this flow channel complexity may play a little part in the response to the Top Kill injection. Hopefully it will tend to act as "roots" and make it more difficult for the flow to reach the riser, and then leak onto the seabed, and more likely for the flow to be directed down the well.



Section through the BOP, showing the anticipated mud flow path (initially from BP)

In his presentation Kent Wells noted that there is not just flow from [the Q4000](#) available, but that additional vessels, including the [HOS Centerline](#) are connected into the Q4000 and available to add additional flows and volumes of mud if needed.



HOS Centerline

This can carry up to 30,000 barrels of mud, and deliver this to the Q4000 at a flow rate of 50 bbl/min. It is supported by a second vessel, the [M/V Blue Dolphin](#), which carries 11,800 bbl of mud, that can deliver it at a rate of 80 bpm, using 9 pumps. If needed this has more than enough capacity and flow for the job required.

It is equipped with eight skid-mounted 3,000 brake horsepower [fracturing units](#) can store 2.75 million lb of proppant. The vessel can provide up to 23,000 hydraulic horsepower and 80 bbl/min blending rates to meet high-rate fracturing and stimulation requirements of ultra-deepwater projects. At more than 300 ft (91 m) in length, the multipurpose vessel includes additional storage for up to 11,800 bbl of fluids or completion brines, 12,600 gal of raw acid and 6,300 gal of solvent. The Blue Dolphin has a maximum on-the-fly acid blending capacity of 50 bbl/min.

“The advanced capabilities of the Blue Dolphin vessel have made it the flagship of BJ Services’ stimulation fleet,” said Ronney Coleman, vice president for North America pressure pumping services, BJ Services. It is the first 20,000-psi pressure-rated stimulation vessel specially designed for Lower Tertiary conditions, which include long, multiple-pay zones and intense pressure and temperature variations.

With such capabilities there is more than enough pressure and volume to overcome what pressures and flow rates are found in the well.

However it should be remembered that the mud has to get to the well through delivery lines from the surface, and the riser and supply lines will themselves exert a resistance to the flow at higher rates. So the amount likely to be used will, at least at the beginning, likely be restricted to the 50 barrels per minute (2,000 gallons per minute (gpm)) flow which has been reported. (The oil flow at 5,000 barrels a day, is equivalent to 150 gpm.)

At the moment the rig is undergoing [final diagnostic tests](#) to ensure that the valves, fittings, hoses pumps etc are all operational and that there are no leaks. (At these pressures – perhaps 10,000 psi or so – the drilling mud can cut into metals, so that a leak can very rapidly grow to unacceptable size).

“What we learn during the diagnostic phase will be absolutely crucial to us,” Wells said.

The top kill procedure, which may begin as early as tomorrow, might take as little as 12 hours or as much as a “couple of days” to carry out, Wells said.

The operation may, if seen to be needed, include a variation of the “junk shot” since there are rubber strips on hand, that could be added to the mud flow and which would, if caught in the BOP, restrict further the flow path out of the riser, and make it easier to get the mud down the well. (Like adding additional roots to your drain to make it back up faster).

Over the next few hours, engineers will test the pressure at each opening, aiming to design a pumping procedure that will “outrun” the flow of oil and gas, forcing it back down into the petroleum reservoir.

Should pressure from the well outrun the drilling fluids, engineers may inject heavy fluid mixed with rubber scraps through valves above the mud flow to hold it in the well, Wells said.

Even if the mud starts down the well as planned, there may be complexities in the flow, based on where the oil appears to be coming from.

Doug Suttles [commented on Tuesday](#)

Flow from the Macondo well is not travelling up the main well bore, BP operations boss Doug Suttles said Tuesday, a revelation that would support theories that a cement failure played a part in the blowout.

“We actually believe the flow path is between two strings of the casing and not up the main wellbore,” Suttles said.

Suttles said BP could not be certain of the flow path but diagnostic tests on the well seem to indicate the flow is not coming up main bore.

As the complexity of the job becomes evident there are also reports that the Government are [stepping back](#) from taking over the problem, should this try fail.

After days of lambasting the company's handling of the spill, the Obama administration appeared to step back from Interior Secretary Ken Salazar's threat on Sunday to "push out" BP if it did not do enough to plug the leak.

The U.S. government needs BP's deepwater technology to try to shut off the oil well, said Carol Browner, President Barack Obama's adviser on energy and climate change.

"Obviously, we need the BP technology, but we are not relying on them ... we have our own minds in there," she told CNN, referring to the team of government scientists working with BP to battle the disaster.

Some longer term punishment is, however, apparently now [being considered](#).

ProPublica is reporting that that the Environmental Protection Agency is considering whether to bar BP from receiving U.S. government contracts, a move it said would cost the company billions of dollars in revenues and could end its drilling in federally controlled oil fields.

But hopefully the leak will be stopped before the President [visits on Friday](#). And then we won't need to consider those nukes. (After all only 3 out of 4 [worked in the Soviet Union](#), and one site may still be burning, all those years later.)

BP has also [released a statement](#) about the incident. As they note:

"I understand people want a simple answer about why this happened and who is to blame. The honest truth is that this is a complex accident, caused by an unprecedented combination of failures," said Chief Executive Tony Hayward. "A number of companies are involved, including BP, and it is simply too early – and not up to us – to say who is at fault."

Among the possible mechanisms, BOP is considering:

1. The cement that seals the reservoir from the well;
2. The casing system, which seals the well bore;
3. The pressure tests to confirm the well is sealed;
4. The execution of procedures to detect and control hydrocarbons in the well, including the use of the BOP;
5. The BOP Emergency Disconnect System, which can be activated by pushing a button at multiple locations on the rig;
6. The automatic closure of the BOP after its connection is lost with the rig; and
7. Features in the BOP to allow Remotely Operated Vehicles (ROV) to close the BOP and thereby seal the well at the seabed after a blow out.

The House Committee has also [released a memo](#) about this investigation:

A memo released by Democrats on the House energy committee said that BP has found three “flow indicators” from the well before the explosion, one of which occurred 51 minutes before the blast, a time when more fluid began to flow out of the well than was being pumped in. When the pump was shut down, 41 minutes before the explosion, the well continued to flow instead of stopping, and drill pipe pressure “unexpectedly increased”. Then, just 18 minutes before the explosion, abnormal pressures were observed by the rig crew. Eleven men died as a result of the explosion.

It should be noted, since there were comments on both PBS and ABC News tonight about the change in the oil color coming out of the riser in the last two days, that the clear difference in the photos they showed was the lack of the injected dispersant in the later pictures, and BP have stated that they have cut back on the volume of this, [under EPA orders](#). Since it was mixing with the oil and changing its color, this may be part of the change that folk have been noticing.

And, after some debate today, BP has announced that they will continue [the live feed](#) from the seabed during the time that the top kill is initiated.



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