

From: Gai, Huawen
Sent: Thu Jul 16 12:49:13 2009
To: Bondurant, Charles H; Gansert, Tanner
Subject: RE: Macondo likely abandonment pressure?
Importance: Normal

Chuck, Tanner,
Great to talk with Chuck on this and know that there are more chances of encountering M55 and M54 which likely to be 30' sands at probably 19100' and 19500' respectively, and the fluids properties of these sands should be treated similar to those of the M56.
Tanner as we just chatted I will summarise the discussions based on the work you guys did regarding all these reservoir sands do support the dispensation for Mark.
Thanks gents again for your great support.
Regards
Hu

From: Bondurant, Charles H
Sent: Tuesday, July 14, 2009 8:25 AM
To: Gai, Huawen; Gansert, Tanner
Subject: RE: Macondo likely abandonment pressure?
Right now if there is anything there it is beyond the resolution of our seismic. Therefore it is difficult to answer your question with that type of accuracy.

Chuck Bondurant

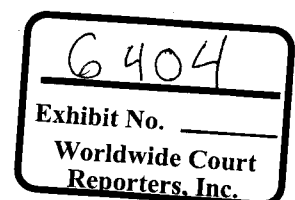
BP Geologist EGoMX
Westlake 4 02065B
Office # (281) 366-7848

From: Gai, Huawen
Sent: Tuesday, July 14, 2009 8:12 AM
To: Bondurant, Charles H; Gansert, Tanner
Subject: RE: Macondo likely abandonment pressure?
Thank you Chuck. Would you say it's less than 2% chance? I can reference it and justify the primary objective. Hu

From: Bondurant, Charles H
Sent: Tuesday, July 14, 2009 8:09 AM
To: Gai, Huawen; Gansert, Tanner
Cc: Bozeman, Walt; Depret, Pierre-Andre; Peijs, Jasper
Subject: RE: Macondo likely abandonment pressure?
At this time we do not feel that the M57 will be commercial. It is a small amplitude blob not even 50 acres in size. Also, we map the M57 as a large regional seal in the EMC so the amplitude is suspect.

Chuck Bondurant

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From: Gai, Huawen
Sent: Tuesday, July 14, 2009 8:03 AM
To: Gansert, Tanner
Cc: Bozeman, Walt; Depret, Pierre-Andre ; Peijs, Jasper; Bondurant, Charles H
Subject: RE: Macondo likely abandonment pressure?

Tanner,

This is very helpful. How far M57 may be above the well objective M56? Is it possible to estimate the probability of finding M57 "commercial"? With these I should be able to quantify the risks.

If M57 is to be found commercial, we may assess it separately for chances of picking it up in a single completion either commingle of DHFC.

Thanks again

Hu

From: Gansert, Tanner
Sent: Tuesday, July 14, 2009 7:30 AM
To: Gai, Huawen
Cc: Bozeman, Walt; Depret, Pierre-Andre ; Peijs, Jasper; Bondurant, Charles H
Subject: FW: Macondo likely abandonment pressure?

Hu

Below are some estimates for the fluid type probabilities, please note that the 10% for condensate at M57 would be in 5-10 sands that are not laterally extensive/mapable.

As for the water issue, I would say that there is 99% probability that there would be more than 5% water cut when the reservoir pressure is ~5-6000 psi.

Please let us know if you need further clarification.

Thanks,

Tanner

From: Depret, Pierre-Andre
To: Gansert, Tanner; Peijs, Jasper; Bondurant, Charles H
Cc: Bozeman, Walt; Tadepalli, Sharma V
Subject: RE: Macondo likely abandonment pressure?

All,

In function of the pest work as well as the AVO work from Sharma, it is most likely to be an oil reservoir with a GOR around 750 to 800 scf/stb as seen around isabela or santa cruz.

Santa Cruz shows some reservoir GORs at 1300 scf/stb. Those sands are a bit shallower than the main reservoir zone. Please, also keep in mind that we expect high GOR ranges in shallowest section due to potential biogenic gas and very low thermogenic.

So trying to answer your question:

Probability of GOR at 1300 range = low to medium at the level of M56 main reservoir zone, but could be happening in shallower sections above M56 if we have thermogenic mixing with a bit of biogenic. So may be ~ 25% ?

Probability of being a condensate reservoir = Low at the level of M56 in function of my work and Sharma's work. However, we could find condensate into sands shallower than M56, like M57 (Medium probability?) So may be ~ 10%.

I hope this helps. If this is not clear and you need precision or else, please let me know.

Thanks,
PA

From: Gansert, Tanner
Sent: Thursday, July 09, 2009 8:51 AM
To: Depret, Pierre-Andre ; Peijs, Jasper; Bondurant, Charles H
Cc: Bozeman, Walt
Subject: FW: Macondo likely abandonment pressure?

All,
Below is some correspondence regarding calculation of abandonment pressures at Macondo to assist with a dispensation for the collapse design of the production casing. To summarize:
The casing will not meet the design criteria if reservoir pressure falls below 5150 psi. Reservoir pressure necessary for production of oil based on the range of fluid properties endorsed by XX (Min and Max GOR of 800 and 1300 scf/bbl) are greater than the minimum as long as there is some water production in late life, so there should be no problem. The serious problem would occur if GOR is much greater than 1300 scf/stb and the fluid encountered at Macondo was not oil but condensate. I realize that this is outside of the fluid property range that has been proposed for Macondo, but since at one point it was considered a possibility I wanted to evaluate it.
Pierre, based on Hu's request below can you estimate the probability of the fluid being at the high end of the proposed GOR range and confirm whether or not finding condensate at Macondo is a possibility.

Thanks,
Tanner

From: Gai, Huawen
Sent: Wednesday, July 08, 2009 10:42 AM
To: Gansert, Tanner
Cc: Bozeman, Walt
Subject: RE: Macondo likely abandonment pressure?

Hi Tanner,
Thanks for the great work. As it doesn't seem to be entirely conclusive, I would like to have some probability estimates as below if possible, so that we can quantify the risks. I'd be able to draft some comments and firm up some criteria... This should help Mark out - What do you think?

Probability of GOR at 1300 range =

Probability of water cut at $\leq 5\%$ at abandonment time (whenever that is - not sure this is a good way to frame it) =

Probability of being a condensate reservoir =

Regards
Hu

From: Gansert, Tanner
Sent: Wednesday, July 08, 2009 9:33 AM
To: Gai, Huawen
Cc: Bozeman, Walt
Subject: RE: Macondo likely abandonment pressure?

Hu,

Below is a table outlining estimates of abandonment pressures at Macondo for various fluid types. You will notice that in the event of an oil discovery with the most likely GOR of 800 scf/stb, the abandonment pressure is greater than the minimum pressure of 5150 psi necessary to pass the casing design criteria. However, increases in GOR necessitate increasing water cut to maintain abandonment pressure above the 5150 psi minimum. At the Maximum expected GOR for an oil discovery (1300 scf/stb) a 5% water cut is needed for abandonment pressure to be greater than 5150 psi.

Considering that at abandonment conditions water cut is typically much greater than 5%, abandonment pressure in the event of an oil discovery would likely be greater than 5150 psi. Although subsea pumps are not planned at this time for Macondo, if they were proposed in the future, the abandonment pressure may fall below 5150 psi.

Additionally, due to observations indicating that phase prediction is only about 50% accurate, there is the possibility that the fluid at Macondo is a gas condensate. The probability of a condensate discovery at Macondo may be quite low, but the abandonment conditions for a 11,000 scf/stb fluid (as discovered in M56 at Isabela) would be in the range of 2250 psi, significantly lower than the minimum pressure needed to pass the casing design criteria.

Please let me know if you have any questions,

Regards,

Tanner Gansert

<< OLE Object: Picture (Enhanced Metafile) >>

From: Gai, Huawen

Sent: Tuesday, June 23, 2009 9:06 AM

To: Gansert, Tanner

Subject: RE: Macondo likely abandonment pressure?

Hi Tanner,

Steve Morey spelt out an estimated lower level of BHP for the casing to pass the design criteria. If you could confirm that there is no possibility that the reservoir pressure is going to reach that low, and give an estimated possible mark which is way above his level, then we can use your guidance to close the loop rather than a detailed reservoir modeling run. Just a thought.

Regards

Hu

From: Gai, Huawen

Sent: Monday, June 22, 2009 1:09 PM

To: Gansert, Tanner

Subject: Macondo likely abandonment pressure?

Hi Tanner,

Do you have the above estimate please? I'm assisting Mark Hafle on a dispensation for using the production casing proposed as the collapse mode limit would not meet the BP DWOP policy requirements. If you could give me some guidance on the above we can put this to bed. Thanks.

Regards

Hu