

**From:** David S. Decroix  
**To:** wxg@lanl.gov  
**CC:** awolf@lanl.gov, Neu, Mary P; Decroix, David S; Zylvoski, George A; Black, Stephen J; dqosulli@lanl.gov  
**Sent:** 5/21/2010 7:59:16 PM  
**Subject:** Re: Fwd: Further on the NIC Flow Rate Working Group and their request for lab support

Hi Scott,

Don (cc'd here) has been engaged on whether or not we should be involved with the DOI request, so I'm not sure if we (LANL) want to engage with NETL on this or not. Please check with him.

That said, briefly here is what Andy and I talked about...

One of the unresolved issues has to do with the coupling of the reservoir flow to the well bore annular flow. We know the pressure, temperature, and EOS of the fluid, but there are many complexities in describing the flow from the reservoir to the bottom of the well bore.

In a telecon with BP yesterday afternoon, they have modeled the porous media flow from the reservoir, through the "skin", to estimate a flowing pressure at the bottom of the well bore. The "skin" is the concrete, etc. that is part of the well "completion." The state of the "skin" is a big unknown; they are not sure how much of the concrete is fractured, some portion may be missing (blown away), etc. BP has many scenarios they have modeled for different "skin factors".

With regards to the flow calculations, BP has the pressure measured at the top of the well bore, strictly speaking at the bottom of the BOP. Depending on the well failure scenario, we analyzed four scenarios, one can either prescribe the bottom hole pressure, the BOP pressure, and thus calculate the resultant flow rate. OR we can specify the one of the pressures (bottom of the BOP), specify a flow rate, and calculate the other pressure required (calculate the P at the reservoir). How this well bore/annular flow regime couples to what is known, or not known, at the well reservoir is something I think could be looked into.

But, as stated below, there is A LOT that is unknown about the state of the well bore completion zone, so I don't know if it is that useful to embark upon this type of modeling effort. Large uncertainty exists with what data is available, and thus calculations/models could vary widely. I don't know how much added value we could contribute here. As BP has said many times, "I can see as far down the well hole as you can..."

Hope this helps,  
Dave.

p.s. I can be reached best by pager today, [REDACTED]. D.

> Dave  
> You may want to tell Scott about our discussions to couple a reservoir model (zyvoloski) with the well-bore flow folks (you, ammerman). A multilab collab could easily come together.

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> -----  
> Andrew Wolfsberg (from my Blackberry)  
> awolf@lanl.gov  
> 505-667-3599 (office)  
> [REDACTED] (mobile)  
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HIGHLY CONFIDENTIAL AND MAY CONTAIN CUI - SEE PTO #50



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TREX 009710.0001

> From: Scott Gibbs <wxg@lanl.gov>  
> To: Neu, Mary P; Wolfsberg, Andrew V  
> Cc: Black, Stephen J  
> Sent: Fri May 21 12:22:14 2010  
> Subject: Fwd: Further on the NIC Flow Rate Working Group and their request  
> for lab support

> Any thoughts?

> Begin forwarded message:

> From: "Aoki, Steven"  
> <Steven.Aoki@nnsa.doe.govmailto:Steven.Aoki@nnsa.doe.gov>  
> Date: May 19, 2010 5:52:27 PM MDT  
> To: "Warner, Bruce (LLNL)" <warner2@llnl.govmailto:warner2@llnl.gov>,&br/>> "Don O'Sullivan" <dgosulli@lanl.govmailto:dgosulli@lanl.gov>,&br/>> "Gibbs, Scott" <wxg@lanl.govmailto:wxg@lanl.gov>,&br/>> Margie Tatro <mltatro@sandia.govmailto:mltatro@sandia.gov>,&br/>> Michael Burns <burns\_michael\_j@lanl.govmailto:burns\_michael\_j@lanl.gov>,&br/>> "Robert Sharpe (LLNL)" <sharpe@llnl.govmailto:sharpe@llnl.gov>,&br/>> Scott Perfect <perfect1@llnl.govmailto:perfect1@llnl.gov>,&br/>> Sheldon Tieszen <srtiesz@sandia.govmailto:srtiesz@sandia.gov>,&br/>> "Steve Black (LANL)" <sblack@lanl.govmailto:sblack@lanl.gov>,&br/>> "Bickel, Thomas" <tbickel@sandia.govmailto:tbickel@sandia.gov>,&br/>> "Wapman, Derek" <wapman1@llnl.govmailto:wapman1@llnl.gov>,&br/>> "William S. Rees" <wsr@lanl.govmailto:wsr@lanl.gov>,"  
> George Guthrie (Hq. Doe. Gov)" <George.Guthrie@Hq.Doe.Govmailto:George.Guthrie@Hq.Doe.Gov>,&br/>> "Markowsky, James" <James.Markowsky@hq.doe.govmailto:James.Markowsky@hq.doe.gov>  
Subject: Further on the NIC Flow Rate Working Group and their request  
for

> lab support

> Dear Colleagues:

> George Guthrie from NETL sat in on today's phone call organized by the  
> National Incident Command (NIC) for the Deepwater Horizon event.  
> Subsequently, I spoke to David Moore who is coordinating this task for  
> the  
> NIC.

> Basically, what the NIC is looking for from DOE and the labs is to build  
> a  
> model of the impedences in the well bore all the way from the reservoir  
> to  
> the leaks in the riser. We would then be asked to use that model to  
> calculate a rate of release of oil to the ocean that could be compared  
> with estimates obtained from analysis of video taken of the leaks and  
> other approaches to modeling the flow. Ultimately, the objective is to  
> obtain an integrated estimate of the amount of oil released, together  
> with  
> uncertainty ranges.

> Data on reservoir pressures, well bore configuration, presence of tubes  
> or  
> foreign objects in the well, etc. would be provided by the NIC, i.e.,  
> the  
> labs would not be asked to solicit information form BP or other parties.

> In my conversation with David Moore, I made two points:

> -- We would not want to do anything that would jeopardize our ability to  
> address our primary objective, namely supporting BP in its effort to  
> stop



> the leak, specifically including undermining BP's confidence in its working relationship with the labs and senior scientific team.  
>  
> -- My understanding is that at this time there is still considerable uncertainty about conditions in the well, BOP, etc., and therefore an attempt to calculate the net flow out the top would probably have very large error bars.  
>  
> All of this suggests we may want to have different people -- maybe even different laboratories -- working on this project than on the ongoing effort to stem the leak. There could be a review by both groups at one or  
> more appropriate points along the way to make sure the flow calculations were not based on unrealistic assumptions.  
>  
> With this rough plan in mind, would Sandia and Livermore be  
> interested/able to participate? (I note Will Rees's earlier e-mail giving  
> the LANL view.) At this point, we are probably looking to NETL or DOE HQ to identify a team lead and coordinate with the NIC.  
>  
> Thanks very much for your input.  
>  
> Steve  
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