
From: Willson, Stephen SM [Stephen.Willson@bp.com]
Sent: Monday, June 21, 2010 4:31 PM
To: William Burch; Merrill, Robert C
Cc: Cecil, Chris; Albertin, Martin L.; Vinson, Graham (Pinky)
Subject: RE: How depletion and reduction in fracture pressure may affect the hydraulic kill and cementing options
Attachments: M56E Post-Blowout Fracture Pressure.ppt

Bill / Bob: the attached might help with the discussion tomorrow. Steve

<<M56E Post-Blowout Fracture Pressure.ppt>>

From: William Burch [mailto:bburch@wildwell.com]
Sent: Monday, June 21, 2010 11:08 AM
To: Merrill, Robert C; Cecil, Chris; Albertin, Martin L.; Vinson, Graham (Pinky); Willson, Stephen SM; Mix, Kurt; Sprague, Jonathan D; Barnett, David (UNKNOWN BUSINESS PARTNER); Rygg, Ole (Unknown Business Partner); Cunningham, Erick; Wollam, Ryan A; Quitzau, Robert (UNKNOWN BUSINESS PARTNER); Chester, Doug K; Sims, David C; William Burch

Subject: How depletion and reduction in fracture pressure may affect the hydraulic kill and cementing options
When: Tuesday, June 22, 2010 1:30 PM-2:30 PM (GMT-06:00) Central Time (US & Canada).
Where: WL4 02127 HIVE

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Where: WL4 02127 HIVE

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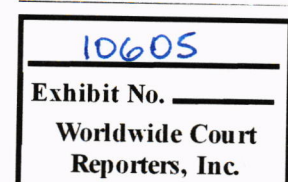
The objective of the meeting is to discuss the work done on depletion and possible reduction in fracture pressure; review how depletion may affect the hydraulic kill; propose changes to the operational guidance on cementing; and evaluate if further well control modeling, dynamic kill or cementing simulations, or reservoir modeling work is needed (while keeping in mind that the production riser system may be installed prior to intercept – i.e. eliminating the dual gradient strategy.)

It is not envisioned that the depletion discussion would affect the proposed ranging runs or other operational steps prior to intercept but I appreciate input if I'm overlooking key items.

If this conflicts with other meetings, please let me know a better time. Del is checking to see if the HIVE is available – if not, we can meeting in WL4 02110.

If there are other people in operations or reservoir, geology, rock mechanics, or other departments that would be great additions, please forward this to them to attend. Thanks very much,

Bill



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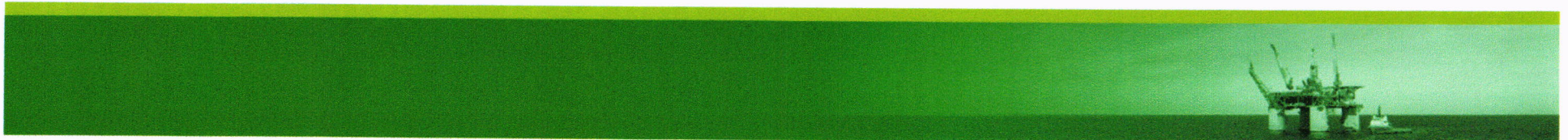


M56E Post-Blowout Fracture Pressure

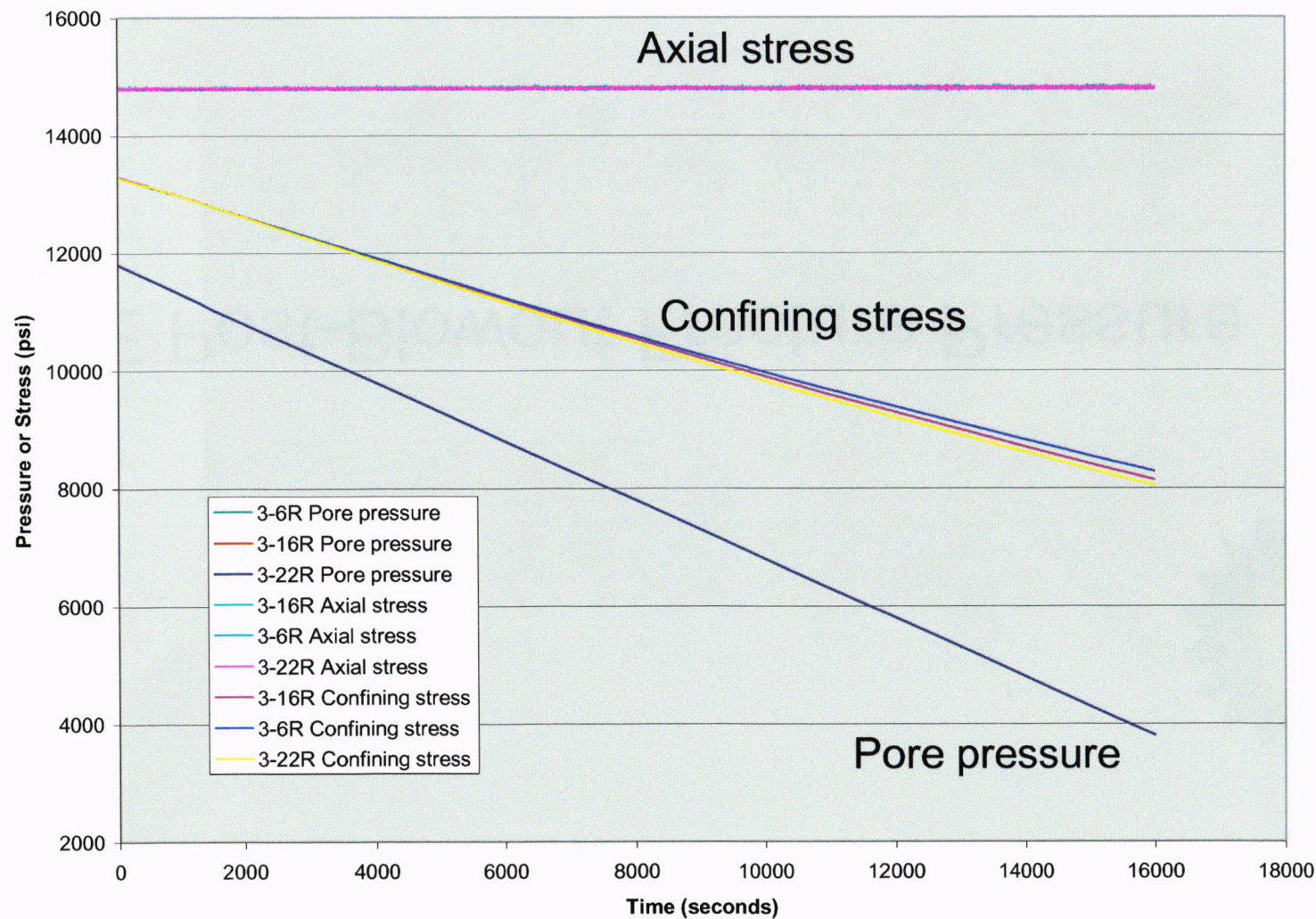
Steve Willson

Exploration & Production **Technology**

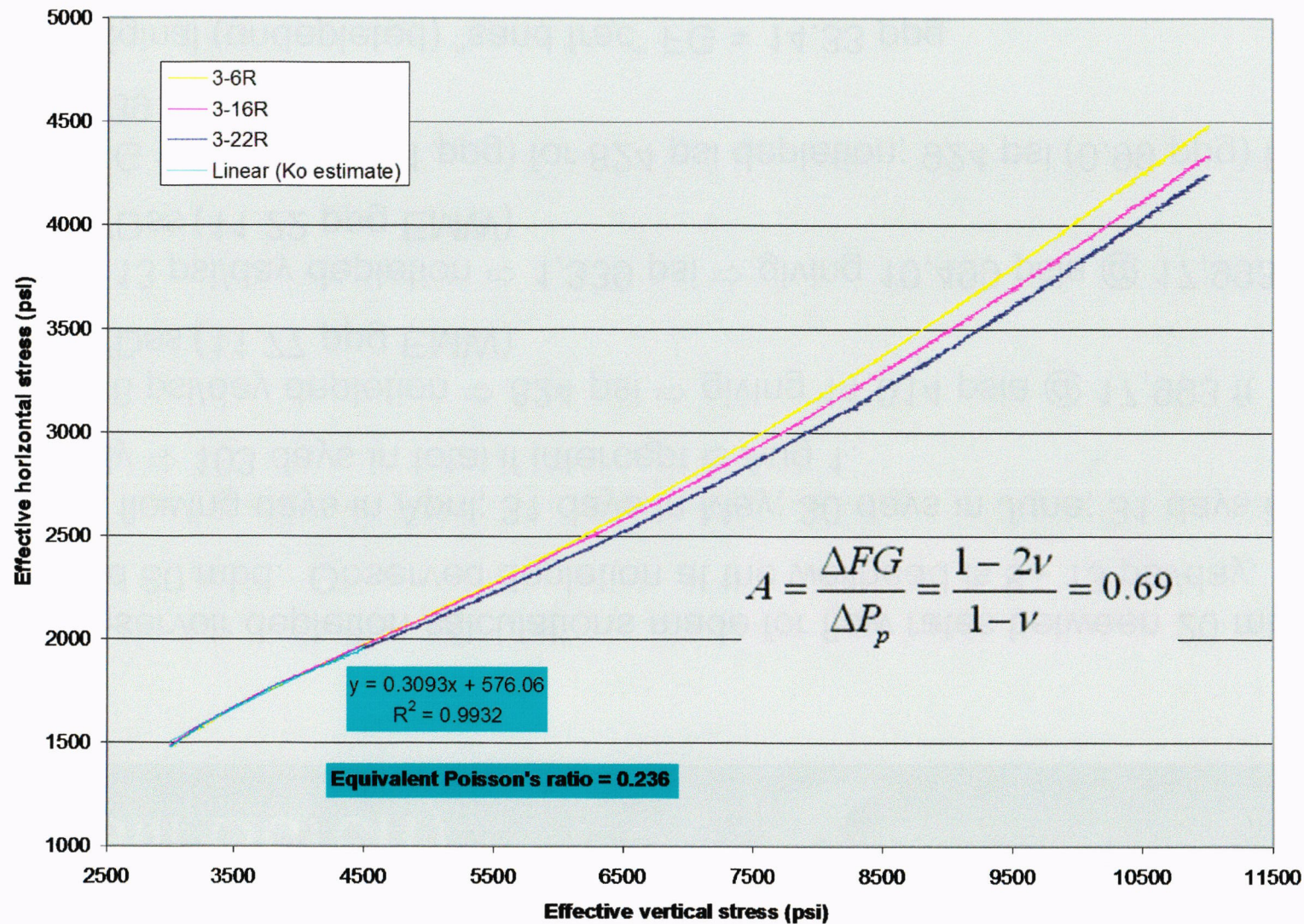
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Uniaxial strain compressibility tests on Macondo RSWCs



Poisson's ratio calculation over 1500 psi depletion range

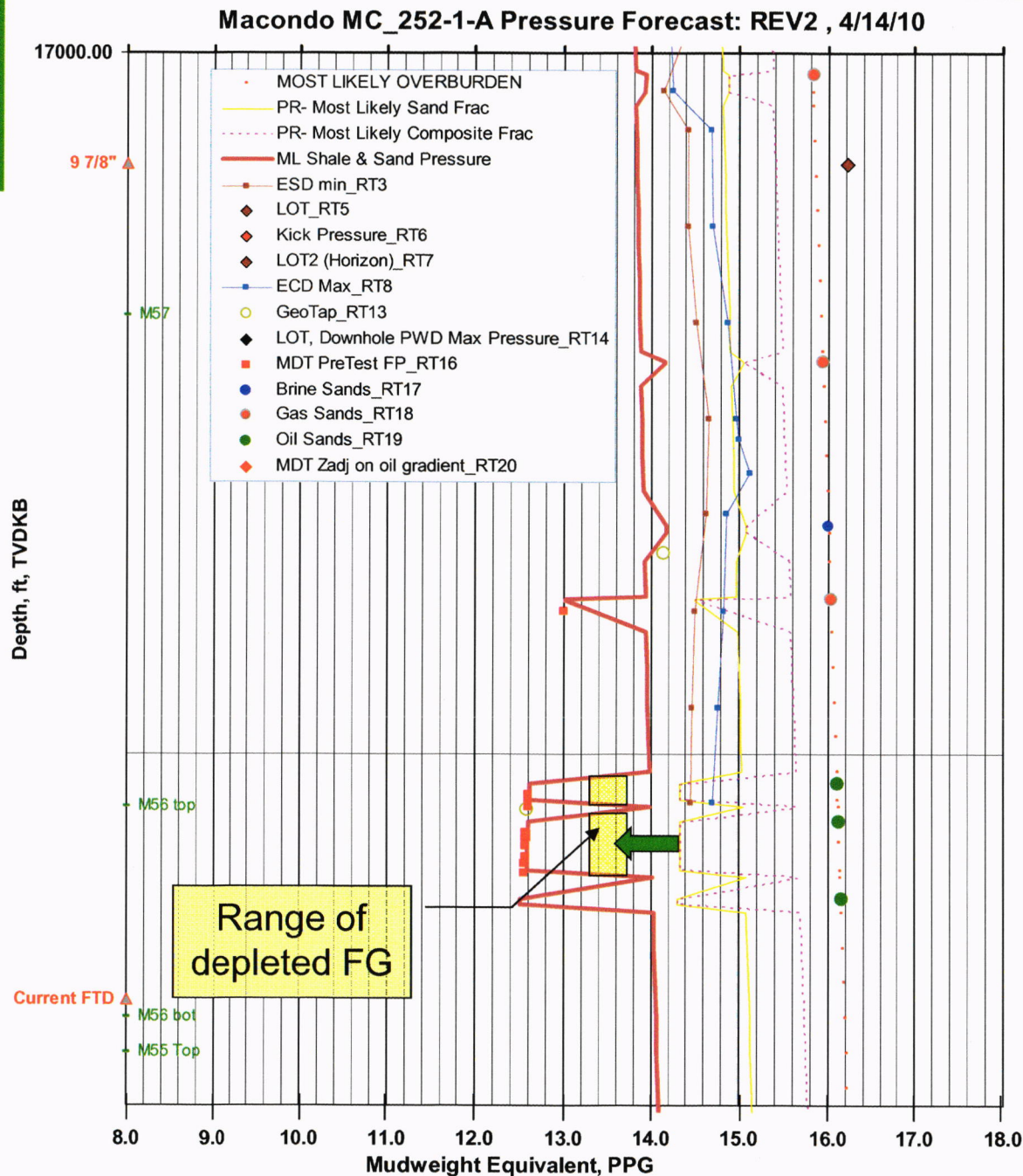


Estimated depletion (from Bob Merrill & Bill Burch)



- Reservoir depletion calculations made for flow rates between 20 mbd and 80 mbd. Observed depletion at the wellhead is 8 - 13 psi/day.
- 11 flowing days in April; 31 days in May; 30 days in June; 31 days in July \Rightarrow 103 days in total if intercept is Aug 1.
- At 8 psi/day depletion \Rightarrow 824 psi \Rightarrow giving 11,014 psia @ 17,993 ft TVDss (11.77 ppg EMW)
- At 13 psi/day depletion \Rightarrow 1,339 psi \Rightarrow giving 10,499 psia @ 17,993 ft TVDss (11.22 ppg EMW)
- $\Delta FG = 568$ psi (0.61 ppg) for 824 psi depletion; 924 psi (0.99 ppg) for 1339 psi depletion
- Original (undepleted) "sand frac" FG = 14.33 ppg
- Range of depleted fracture gradient = 13.72 ppg – 13.34 ppg

Post-well PPFG



- Fracture gradient in the M56 Sands = 14.33 ppg
- With depletion, $\Delta FG = 0.69 \Delta PP$
- Depleted fracture gradient = 13.72 ppg to 13.34 ppg
- Drilling with a 14.2 ppg EMW at TD will most likely fracture the M56 formation due to depletion.