

”SHARING TO BE BETTER”
”SHARING TO BE SAFER”



“Sharing to be better”

Under the direction of OLF, a joint industry task force of Operator and Drilling Contractor personnel has been formed to recommend ways to reduce the number and potential severity of well control events on the NCS.

One team recommendation was communicating actual well control incidents that have recently occurred on the NCS so lessons are shared and understood.

This is the fourth in a series of five case histories. This incident highlights the importance of taking time to properly assess changing well conditions and to consider fully the consequences before acting. Are you prepared for a change?

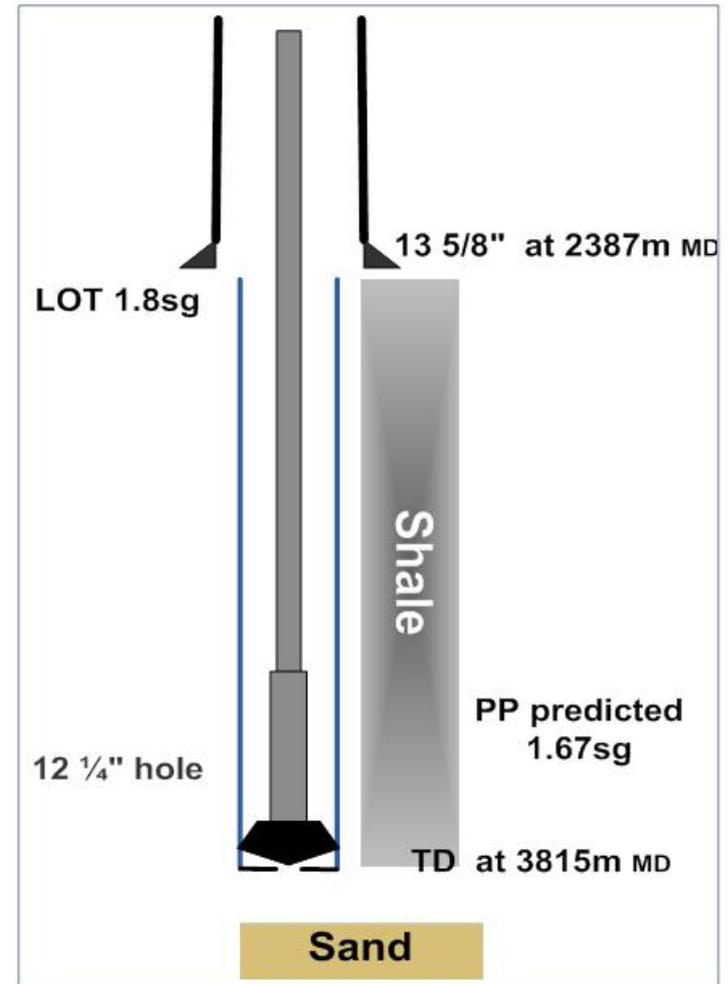
Please take some time at your next safety meeting to review this case history and discuss the questions raised during the presentation.

It is hoped that sharing of incidents is helpful and any feedback is welcome.

Gas influx from shales..
reacting to changes in the well!

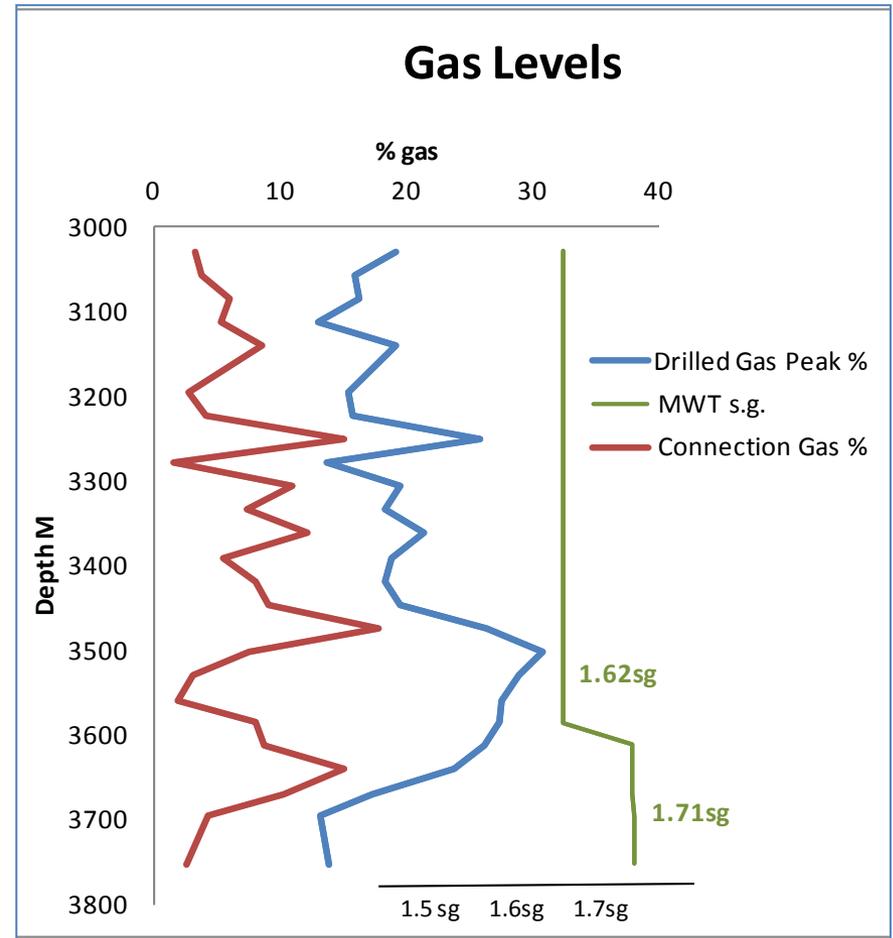
Drilling 12 ¼" Hole

- Semi-Sub in 120m water depth
- Drilling 12 ¼" hole in shale
- NABM mud
- LOT 1.8sg (predicted 1.87sg)
- Pore pressure 1.67sg predicted
- Mud weight 1.62sg - 1.71sg
- Section TD 30m above reservoir
- 12 ¼" - Sub-HPHT
- Next section would be HPHT



Gas while drilling

- High drilled gas
- Lower connection gas
- Mud weight increased 1.62sg to 1.71sg while drilling

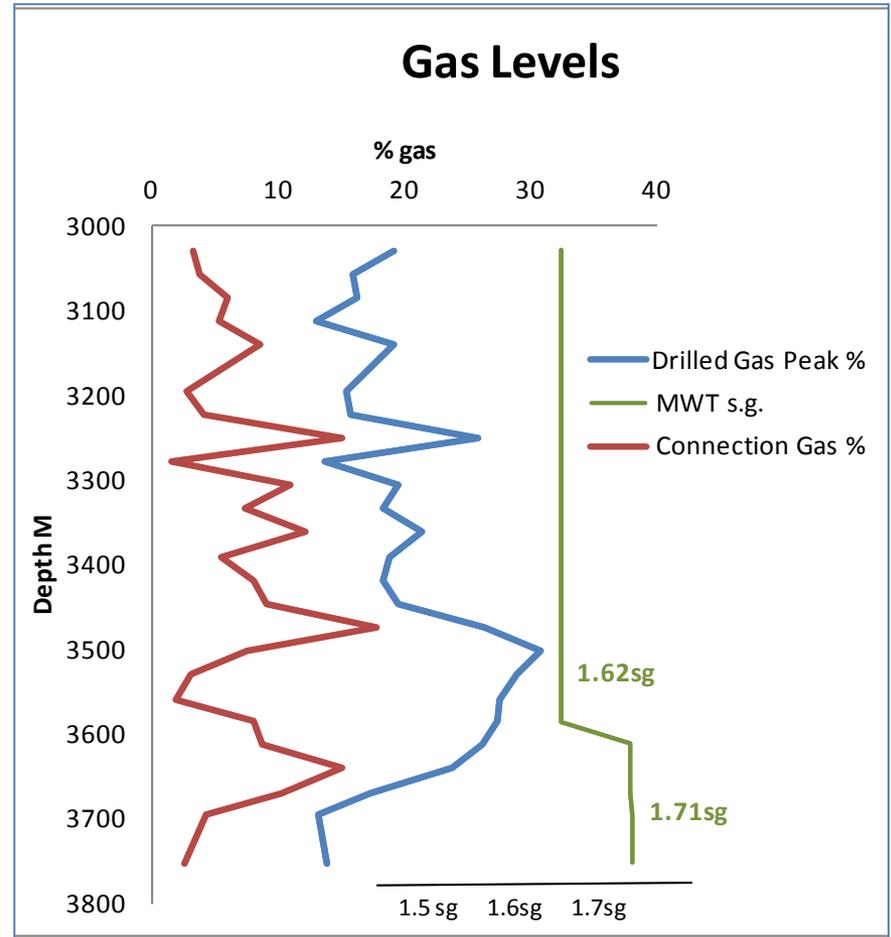


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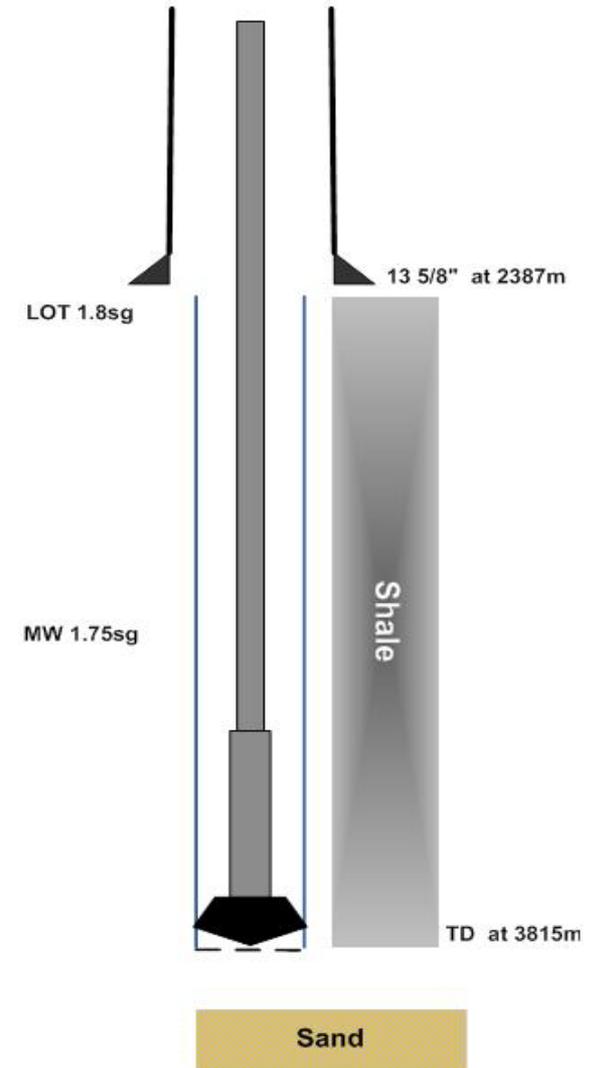
What issues would you consider before increasing the mud weight in these circumstances?

Do you think it was successful?



Circulating at TD

- At TD well was circulated 3 x bottoms up
- Gas levels remained constant at 30%
- The mw was raised to 1.75sg
- The well was circulated 9 x bottoms up
- Gas levels remained constant at 30%
- No 'dummy connections' were carried out.

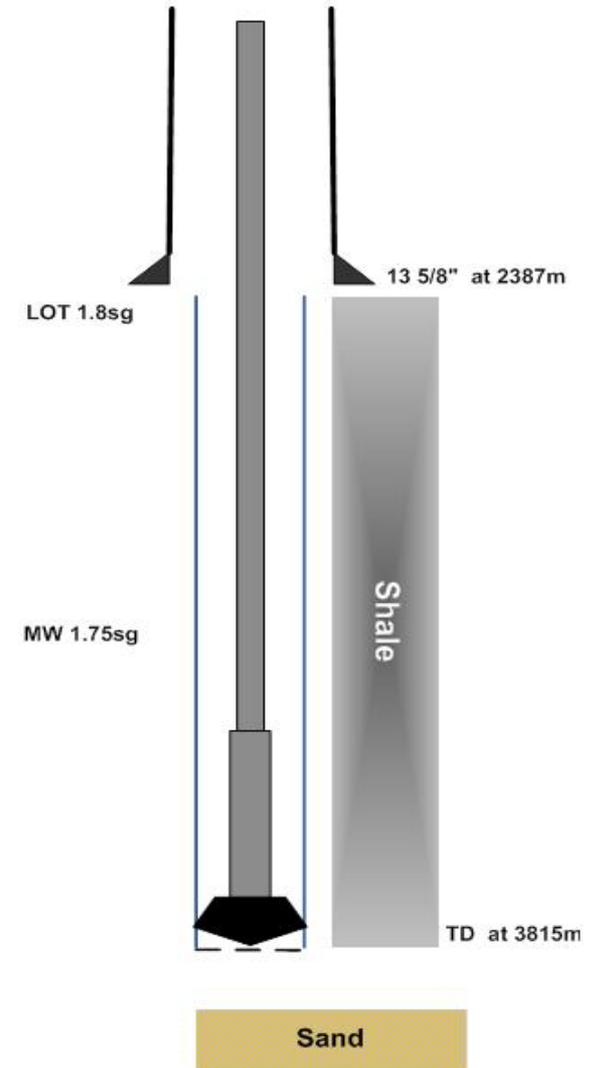


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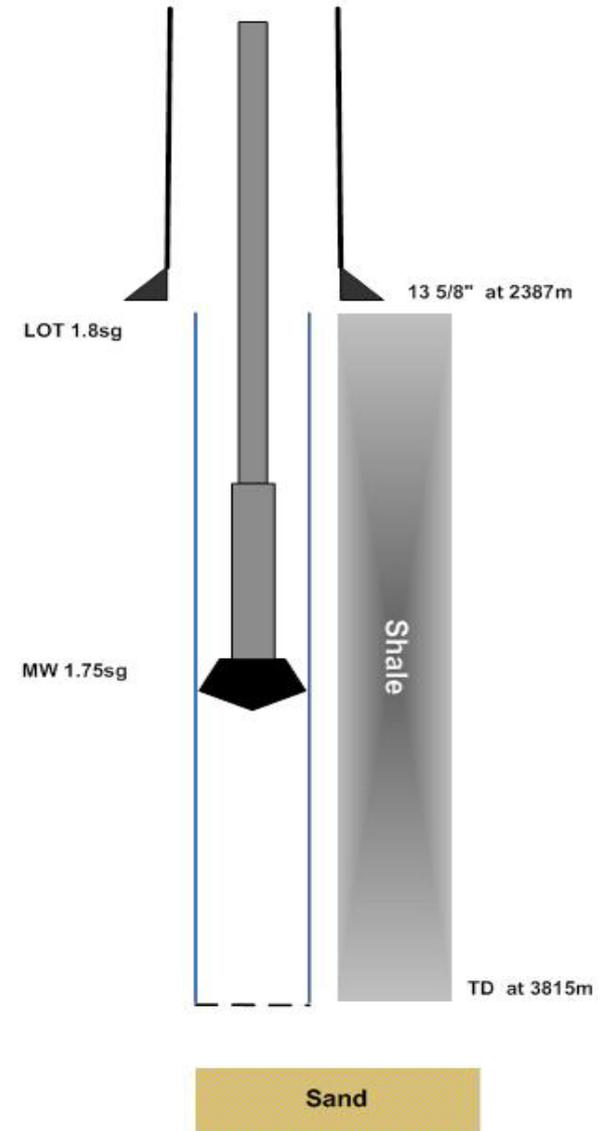
What dangers lay in increasing the mud weight?

What is the significance of a 'dummy connection'?



Short Trip

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- Trip was wet (no pumping during trip out)
- Swab calculated at -5pts
- Well was circulated when back at TD
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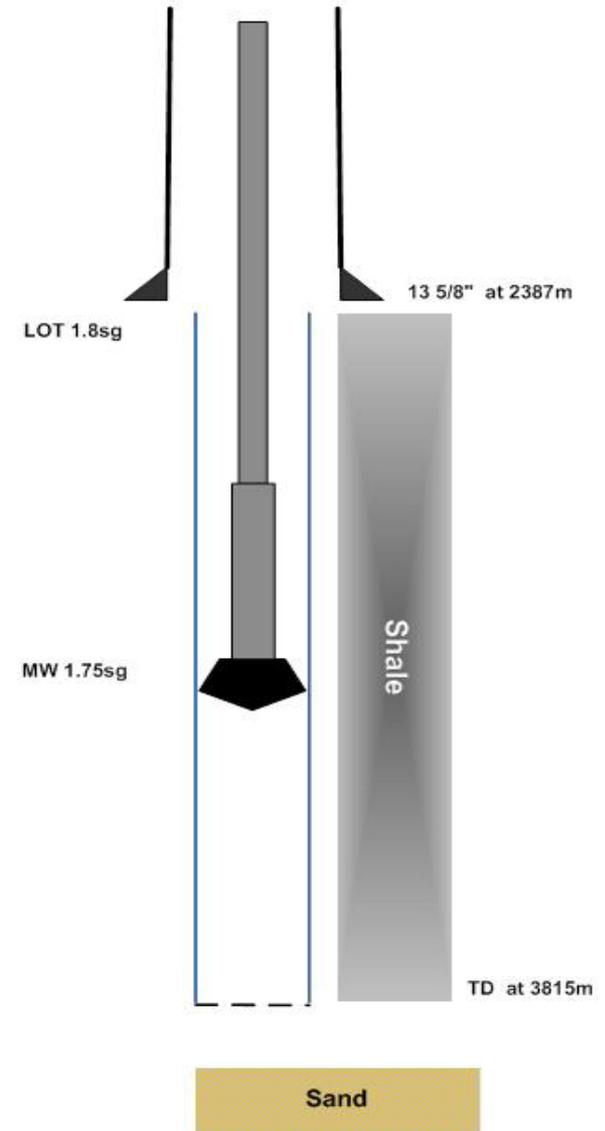
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Why would you carry out a short trip?

What precautions would you take – would you pump out or not?

What result might you expect when circulating bottoms up?

Which way should you route returns?



The Result!

The Result!



What Happened?

- Circulated bottoms up after wet trip through open riser
- Gas bubble circulated to surface
- Gas breakout near surface in Oil Based Mud
- Mud loggers picked up increase too late
- BOP closed but gas already in riser
- Well went on losses after event -240cum (*1500bbls*) lost
 - Well shock on BOP closure

Estimated 80 litres gas at bottom hole conditions reached surface with estimated 16,000 litres surface volume

Issues 1

- ***Gas levels and Mud Weight Increases***
 - *Gas levels were consistently high and a mud weight increase MAY have been appropriate BUT a decision to raise the mud weight must have a proper rationale*
 - *Review effectiveness of previous mw increases*
 - *Carry out ‘dummy connections’ to assess connection gas levels*
 - *Compare connection gas and background gas levels*
 - *Assess risks of fracturing and losses if LOT low*
 - *Assess risks of ballooning – will the situation get worse*
 - *Treat pore pressure transition zones with particular care*
 - ***Take time and consider the issue BEFORE raising the mud weight***

Issues 2

- **Short trip and circulation**

- *A short trip and circulation can provide valuable information about well conditions but its purpose and the likely results need to be considered up front..*
 - *Gives important information about overbalance from bottoms up gas levels*
 - *Can assess the safety of carrying out a subsequent full trip by assessing the on bottom gas levels after the short trip*
 - *Pumping out minimizes swab risks and is normal in narrow window or HPHT conditions*
- ***GAS from TD should ALWAYS be considered after circulating after a short trip***
- ***Under these conditions bottoms up should ALWAYS be circulated through the choke with the BOP shut***
- ***Possible gas in the riser should ALWAYS be diverted over board. Free gas to Drill Floor is not an option.***

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 - *STOP - LISTEN TO THE WELL*
- Too many changes in the operations - poor communication to rig crew
 - *YES: Changes in well programmes are often unavoidable due to well conditions - poor communication can result. Management of change procedures should address communication and risk awareness issues*

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 - *Changing well conditions not properly understood*
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- Solution – Good Management of Change
 - *Take time to understand new conditions*
 - *Have a clear rationale for actions*
 - *Always carry out consequence and risk assessment*
 - *Involve and inform*

Are you
prepared
for a
change?

