

## A 3-step approach to effective training can help tame unpredictable nature of HPHT environments, wells, kicks

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OVER THE PAST few years, Aberdeen Drilling School (ADS) has conducted dedicated HPHT training for challenging wells around the world, in the UK sector of the North Sea (Conoco Phillips, Shell UK and Talisman Energy), the Azeri sector of the Caspian Sea (BP, JAOC), Egypt (BP, BG/Rashpteco, ENI), Norway (Statoil, ENI Norge, Norske Shell), Canada (Canadian Superior), India (Transocean, Reliance, GSPC) and Nigeria (Shell).

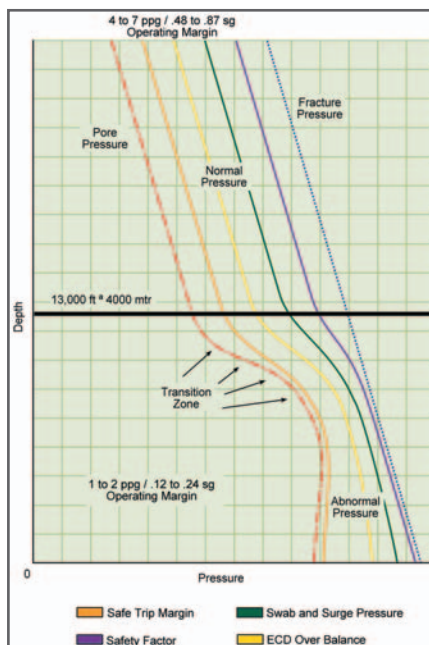
The difficulties and hazards associated with drilling in HPHT environments are universally recognised in the industry. The unpredictable nature of the kicks and the speed at which a well can become underbalanced requires that drillers accept a new philosophy. The key to preventing an HPHT kick is to create an atmosphere within the operation – especially at the rig site – that enables and motivates the team involved to concentrate on the small changes in surface response during the drilling of the transition section through to the target sections.

Communication to the driller from everyone monitoring returns is of the utmost priority. This is where value can be added to this type of operation tour-by-tour. This enablement encourages the driller to get the well shut-in as quickly as possible at the very first indication that the well is flowing for any reason.

It is no longer acceptable for HPHT wells to be flow-checked with the well open during the drilling of these pressure transition sections. Getting the well shut-in and flow-checking on the trip tank through the choke has become accepted practice in the HPHT section of the well.

Once the well is shut-in with the BOP, drilling supervisors can assess the situation to allow for proper well control and gather the evidence that enables the well to be properly controlled.

It will take time to gather the evidence. What are the shut-in conditions (shut-in



**In HPHT environments, the unpredictable nature of the kicks and the speed at which a well can become underbalanced requires special crew training.**

drill pipe pressure, shut-in casing pressure, kick tolerance)? Is there a ballooning or supercharging problem? Are thermal effects causing the well to flow? These points must all be analysed before a well kill plan can be implemented.

Another current key operational challenge is “choke control and response” during HPHT kicks, especially when using oil-based drilling fluids. Toolpushers need specific knowledge and practice to recognise the different challenge in keeping BHP constant because of the different time delay responses in the dynamic U-tube.

The increased risk of kicks and underground blowouts makes the issue of well control in HPHT wells a major concern. Given such conditions and the requirements for special procedures and equipment for HPHT drilling, it is not surprising that personnel training should be a vital component of the preparation to help ensure a safe and successful well.

ADS bases its operational HPHT training on a 3-level approach:

### 1. ENGINEERING/PLANNING HPHT WORKSHOP

This training is designed primarily for the operator’s drilling engineers and drilling supervisors, allowing the personnel involved in the planning and supervision of the well operations to review and discuss both the generic and well/equipment-specific HPHT well control challenges facing them, and to review and challenge the procedures in their joint operations manual and/or well program.

### 2. ‘WHOLE CREW’ HPHT TRAINING

As the name suggests, this is an opportunity for the entire team – the rig- and office-based engineering and supervisory personnel, the drill crews and key service company representatives – to communicate and raise awareness of issues relating to the HPHT environment and the well to be drilled. This training can be run as part of the range of pre-spud activities but is just as often conducted after the HPHT well has spud.

### 3. ON-THE-RIG HPHT COACHING

Follow-up refresher training – with formal and informal sessions on the rig – is often carried out for crews close to the critical section of the well. The ADS trainer (or “HPHT coach”) is on hand to:

- Give brief “overview” presentations of the problems that may be encountered in HPHT wells;
- Help the client implement the agreed HPHT procedures;
- Ensure that all the relevant rig personnel understand the importance of their role;
- Encourage good communication between all the parties.

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