



Well Control Barrier Philosophy

Introduction

The well control barrier philosophy outlined in this document is common across the IWCF syllabi for Drilling Well Control (DWC) and for Well Intervention Pressure Control (WIPC) programmes.

This well control barrier philosophy aims to meet the recommendations from the International Association of Oil and Gas Producers (IOGP) in report number 476 issued in August 2016.

IWCF will incorporate the barrier principles of ISO, Norsok and API as applied during different phases of the well life cycle.

IWCF will use the relevant barrier terms and definitions included in the following standards:

- ISO 16530-1
- Norsok D-010.

Local legislation, company standards and policy may differ. These differences must be addressed for each operation.

Well Barrier Terminology

IWCF uses the terms 'well barrier elements' and 'well barrier envelopes. These can be 'primary' or 'secondary'.

IWCF will not create new terms or definitions. While the reference sources outlined above have slightly different wording in their definitions, they are similar in principle.

The terminology that is reflected in the syllabi and in the assessments is outlined below:

A "well barrier element" is a physical element that, when combined with other well barrier elements will prevent flow.

- A primary barrier is the first well barrier that prevents flow from a source.
- A secondary barrier is the second well barrier that prevents flow from a source.

A "well barrier envelope" is made up of well barrier elements that together prevent flow.

Minimum Requirements

There must always be two independent and tested well barriers (primary and secondary) to prevent flow. Both must be risk assessed, verified, approved and monitored during any operation on the well.

Well barriers must be tested in line with the well owner's performance standards and where applicable legislative requirements.

Any deviation must follow a Management of Change (MOC) process, be specified and documented including:

- Mitigation actions and responsibilities must be in place and understood by all personnel.
- A note of approval from senior person of the well owner management team who is accountable for the integrity of the well.



Verification

To verify a well barrier element, it must be installed where it is intended to be used and must be function and integrity tested when installed.

A mechanically activated well barrier element must be able to contain well bore fluids by their own control system regardless of power failure.

Integrity testing a mechanical well barrier element is done by applying pressure against the barrier in the direction of flow. Where this is not possible, integrity can be confirmed by decreasing pressure on the downstream side of the barrier (inflow testing/negative testing).

If this cannot be achieved, other methods can be used if there is a formally endorsed risk assessment. For example:

- pressure testing, not in the direction of flow from the well
- verification of location (for example, tagging of cement)

For a shear/seal device to qualify as a mechanical well barrier element, it must be able to first shear tubulars and then seal the well bore.

To qualify a hydrostatic well barrier, the fluid level and properties must be monitored and maintained.

Operating Principles

At all times, personnel working on the well should understand:

- How to install and verify the well barrier elements.
- The acceptance criteria for the correct positioning and testing of the well barrier elements.
- Which elements are primary and secondary barriers during any specific work on the well.
- The consequences of well barriers changing during the operation.
- The consequence of well barrier failure
- The immediate actions they must take if a well barrier fails.