



# ABERDEEN DRILLING INTERNATIONAL

## Essentials of Plug & Abandonment

### OVERVIEW

This 2-day Essentials of Plug & Abandonment course aims to provide participants with an enhanced understanding of the principles, methodologies, practicalities and risks associated with well abandonment. The course offers a review of the underlying principles of well abandonment before considering the concepts involved in a temporary abandonment (suspension) and subsequent abandonment requirements needed for an increasing inventory of ageing wells.

### DESIGNED FOR

This course has been designed for technical personnel outside of the plug & abandonment industry, such as those from drilling, production, workover, facilities management, and QHSE departments.

### COURSE DELIVERY

Conducted over 2 days, the course is delivered through presentation of a series of interactive lectures supported by videos and animations, case studies, group exercises and discussions.

### CERTIFICATION

Successful completion of the course will result in an Aberdeen Drilling School certificate which is valid for life and does not need to be repeated or renewed.

### ENTRY REQUIREMENTS

There are no formal pre-requisites for this type of training. For in-house training, candidate suitability and assumed base knowledge will be discussed and agreed with the client in the early stages of course development.

### LEARNING OBJECTIVES

At the end of this course, participants will be able to:

- Fully appreciate how 'human factors' can impact on well abandonment integrity
- Understand the differences between permanent abandonment and temporary abandonment (suspension)
- Describe the governing principles, techniques and processes of well abandonment
- Describe the relevant associated risks and their issues such as materials placement, fluid degradation, corrosion and mud contamination
- Explain the need for and the principles of well barriers including materials used, number of barriers and physical requirements
- Understand the principles of barrier verification and testing
- Appreciate the local legislative procedures and understand the role and application of statutory notifications in the abandonment process
- Know the risks and mitigation involved in well abandonment



- Understand some of the special cases and considerations that are taken into account when abandoning a well, including the different approaches and risks associated with the abandonment of recent and ageing well stock

## INDICATIVE COURSE CONTENT

The course covers the following modules:

### Human Factors and Communication

Plug and Abandonment operations are managed and executed by a multidisciplinary team consisting of Asset Managers, Well Engineers, Completion Engineers, Logistics Technicians and other functions. Managing communications between these disciplines and recognising the human elements of the decision making process will ensure that this important part of the process is executed effectively. This module gives an overview of the current learnings in Human factors to ensure that participants are prepared for P&A operations.

### Legislative Requirements

Successful abandonment operations do not depend solely on technical efficacy, but are also impacted by local legislative requirements and industry standards. This module will focus on UK O&G Guidelines to ensure that the participants are familiar with the requirements.

### Well Abandonment

This module explores the reasons behind Plug and Abandonment operations, how they may be planned and executed and at what point in time the P&A work will be executed (both in terms of the well lifecycle and the environmental timeline).

### Barriers

The success of a P&A operation relies on the placement, management and verification of a number of permanent barriers. This module uses the basics of O&GUK Guidelines, Norsok D-010 and industry best practices to explain the principles of barriers, the reasons behind robust verification to ensure that abandonment operations are carried out in line with the industry directive of well abandonment into perpetuity.

### Abandonment Methodology

Building on the theory of barriers, this module explores the various techniques used to ensure a verified barrier (or barriers) is in place. Focusing mainly on cementing techniques and exploring other techniques such as the use of deformable packers and metal to metal sealing technology. This module will also explore the risks associated with abandonment techniques and suggest possible mitigation. Lastly, the module will explore the concept that a *barrier is not a barrier until it is verified* and indicate the various verification techniques that may be used to ensure that a barrier is in place for good.

### Abandonment Considerations

Plug and Abandonment operations include (by definition) several unknowns that may need consideration during operations. Such factors as casing corrosion and erosion, annulus pressure effects, and environmental issues are explored during this module to enable the participants to gain an understanding that contingency planning and rapid reaction may be a requirement in P&A operations.



### Equipment requirements

This module explores the various types of abandonment equipment that may be used (or may be available) and will include such systems as well control equipment, perforating equipment and hole washing techniques.

### Environmental Impact

To close out the course, the participants will consider the environmental impacts that may be present even after the well is abandoned and deregistered. Such impacts as oil-based mud deposits, remaining wellhead architecture and cement deposits are considered to enable the participants to appreciate that effective P&A operations are paramount for ensuring that the environment is returned to its native state after the wells have been removed.

### SAMPLE COURSE AGENDA

	Morning	Afternoon
<b>Day 1</b>	<ul style="list-style-type: none"> <li>• Introduction               <ul style="list-style-type: none"> <li>○ Course Objectives</li> <li>○ Human Factors</li> </ul> </li> <li>• Well Abandonment               <ul style="list-style-type: none"> <li>○ Why?</li> <li>○ How?</li> <li>○ When?</li> </ul> </li> <li>• Barriers</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent Abandonment               <ul style="list-style-type: none"> <li>○ Methodology</li> <li>○ Risks</li> <li>○ Verification</li> </ul> </li> <li>• Temporary Abandonment               <ul style="list-style-type: none"> <li>○ Methodology</li> <li>○ Risks</li> <li>○ Verification</li> </ul> </li> </ul>
<b>Day 2</b>	<ul style="list-style-type: none"> <li>• Abandonment Complications               <ul style="list-style-type: none"> <li>○ Aging stock</li> <li>○ Corrosion, erosion and effects on the well</li> <li>○ Change of well usage</li> <li>○ Annular Pressure</li> <li>○ Well Integrity</li> </ul> </li> <li>• Equipment requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Legislative Requirements</li> <li>• Environmental Impact</li> <li>• Case Study (generic or client-specific)</li> <li>• Wrap-up and Feedback</li> </ul>

For in-house training, the course structure described above can be modified depending on the client's training objectives.