SQA Advanced Unit Specification

General information for centres

Unit title: Oilfield Drilling Techniques and Operations: An Introduction

Unit code: HV4N 47

Unit purpose: On completion of the unit the candidate should be able to demonstrate an understanding of the basic equipment and techniques used in standard drilling operations.

On completion of the unit the candidate should be able to:

1 explain the design features of drilling equipment
2 describe the techniques used in the selection and use of drilling fluids, cements and bits

Credit points and level: 1 SQA Advanced credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from National 1 to Doctorates.*

Recommended prior knowledge and skills: Entry to this unit is at the discretion of the presenting centre. However it is recommended that candidates should undertake, in parallel, the unit HV4R 47 *Petroleum Geology and Geophysics: An Introduction*.

Core skills: There are opportunities to develop the core skill of *Communication* at SCQF level 6 in this unit, although there is no automatic certification of core skills or core skills components.

Context for delivery: If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

Assessment: Assessment for this unit will consist of written responses to a given set of questions. The assessments can either be stand alone for each outcome or integrated into an end-of-unit assessment.

SQA Advanced Unit Specification: statement of standards

Unit title: Oilfield Drilling Techniques and Operations: An Introduction

The sections of the unit stating the outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the design features of standard drilling equipment

Knowledge and/or skills

- Lifting and hoisting equipment
- Rotary drive systems
- Drilling fluid circulation systems
- Drill strings
- Pressure control equipment

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- describe the main design features of two of the following in terms of their components, use and relevant safety factors:
  - lifting and hoisting equipment
  - rotary drive systems
  - drilling fluid circulation systems
  - drill strings
  - pressure control equipment

Candidates must demonstrate knowledge and understanding by undertaking an unseen, closed-book assessment, taken under supervised conditions, that assesses the knowledge elements as specified above. This assessment will be taken under closed-book, supervised conditions.

Assessment guidelines

Questions used to elicit candidate evidence may take the form of an appropriate balance of short answer and extended response questions.

Outcome 2

Describe the techniques used in the selection and use of drilling fluids, cements and bits

Knowledge and/or skills

- Composition of drilling fluids and their application
- Cement types and their application
- Casing types and their application
- Bit types and their application

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- describe composition of a drilling fluid for a typical application
- describe composition of a cement for a typical application
- describe the function of a specific casing string
- describe composition of a drilling bit for a typical application

Candidates must demonstrate knowledge and understanding by undertaking a case study which supplies sufficient information to allow a decision to be made on which combination or combinations of items would be appropriate in a given situation.

Assessment guidelines

The format of this assessment would be a completion case study. It is suggested that the two items taken together to form the assessment case study would be either:

1 drilling fluid and drill bit
2 cement and casing

The case study used in this instrument of assessment would be an incomplete specification for either item one or two above.

The candidate would be required to complete a recommendation as to which combination or combinations of drilling fluid and drill bit **or** cement type and casing, would be most appropriate for the given situation.

Administrative information

Unit code: HV4N 47

Unit title: Oilfield Drilling Techniques and Operations: An Introduction

Superclass category: YB

Original date of publication: November 2017

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

For further information, please call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

SQA Advanced Unit Specification: support notes

Unit title: Oilfield Drilling Techniques and Operations: An Introduction

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this unit

This unit is a mandatory unit within SQA Advanced Certificate and the SQA Advanced Diploma in Petroleum Engineering. It is designed to provide candidates with an understanding of how to apply the techniques used in the selection and use of drilling fluids, cements and bits.

Outcome 1

This outcome will deal with the correct identification of standard equipment types and will lead to an understanding of common/standard applications. The outcome will also explain the construction and operation of key components of the drill string and their common configurations to form drill strings.

Outcome 2

This outcome will introduce candidates to:

- the composition of a drilling fluid for a typical application
- the composition of a cement for a typical application
- the function of a specific casing string
- the composition of a drilling bit for a typical application

It is anticipated that associated equipment and processes would be included in the delivery material to allow the candidate to complete the case study.

Guidance on the delivery and assessment of this unit

This unit will probably be delivered as part of a group award designed to provide candidates with technical knowledge and skills for employment in the petroleum engineering industries.

It is expected that during the delivery of this unit basic systems involved in land and marine drilling will be described at the commencement of the unit, but not assessed.

While the use of case study material is particularly recommended for both learning and teaching components of this unit, other suggested teaching and learning methods for this unit could include: the use of visual aids, information communication technology (ICT), group lectures and discussion, practical demonstrations, question and answer sessions, directed study, industrial/site visits.

Formative work for this unit could include group discussion and role play emphasising workplace health and safety issues and events specific to petroleum engineering. Such an approach could be beneficial to those candidates without industrial experience.

Assessment strategies for this unit

The assessment for this unit may be carried out in two ways.

First, it is possible to assess each outcome individually as it is completed. Second, it is possible to combine the assessment for each outcome into a single end-of-unit assessment. The total time allocation for the integrated assessment must not exceed the sum of the individual times for separate outcome assessments.

Opportunities for developing core skills

There is the opportunity to develop the core skill of *Communication* to SCQF level 6 in this unit when candidates are explaining and describing within the evidence requirements.

Open learning

If this unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance. A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

General information for candidates

Unit title: Oilfield Drilling Techniques and Operations: An Introduction

This unit is about describing and applying the techniques used in the selection, maintenance and use of drilling fluids, cements and bits.

There are no formal pre-requisites for this unit but you ideally should be taking *Petroleum Geology and Geophysics: An Introduction* in parallel with this unit.

You will gain knowledge and understanding of the following:

In Outcome 1, you will deal with the correct identification of common equipment types and will lead to an understanding of common applications. The outcome will also explain the construction and operation of key components of the drill string and their common configurations to form drill strings.

Outcome 2 will describe the composition and use of drilling fluids for typical applications, including storage, handling and management of cuttings. The outcome will also identify types of cement and casings, and their applications and will deal with the choice of bit type for given application(s).

Assessment for this unit will consist of written responses to a given set of questions.

The assessments can either be stand alone for each outcome, or integrated into an end-of-unit assessment.