

SQA Advanced Unit Specification

General information for centres

Unit title: Oil Well Management

Unit code: HV5T 48

Unit purpose: On completion of the unit the candidate should be able to understand the techniques and equipment used to complete a well for production operations and be able to predict its economic viability.

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

- 1 evaluate the options available to complete a well for production, and describe the nature and function of the equipment used
- 2 evaluates the potential economic performance of a well, using well performance techniques

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

**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: While entry to this unit is at the discretion of the centre, it is recommended that candidates have completed the units in HV4R 47 *Petroleum Geology and Geophysics: An Introduction*, HV4T 47 *Petroleum Reservoir Engineering: An Introduction*, HV4N 47 *Oilfield Drilling Techniques and Operations: An Introduction* before undertaking this unit.

Core skills: There are opportunities to develop the core skills of *Communication, Problem Solving, Numeracy* and *Information Technology*, all 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 be a single case study that covers all the outcomes. Candidates will submit an individual report which identifies the well type evaluated, proposes the appropriate method to complete the well and evaluates the economic viability of the well.

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SQA Advanced Unit specification: statement of standards

Unit title: Oil Well Management

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

Evaluate the options available to complete a well for production and describe the nature and function of the equipment used.

Knowledge and/or skills

- ◆ Well types
- ◆ Sub surface safety systems
- ◆ Well completion equipment

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can evaluate one well type that can be found, select the equipment required to complete the well, incorporating any sub surface safety considerations. This outcome will be assessed in a single case study that also covers Outcome 2.

The case study should be developed by the centre and presented to the candidates. It must include a description of a particular well which requires to be completed along with the associated performance data. The well could be single flow, multi flow, multi branch or multi function and candidates will be required to identify the type. They will then be expected to use the information given to identify the equipment needed and to recommend the method required to complete the well. The final part requires the candidate to use one of the performance models to evaluate the viability of the well.

The same case study may be used for a class group but candidates must submit individual reports, which should acknowledge the resources used.

Assessment guidelines

See Outcome 2.

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Outcome 1

Evaluate the options available to complete a well for production

Knowledge and/or skills

- ◆ Well types
- ◆ Sub surface safety systems
- ◆ Well completion equipment

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can evaluate one well type that can be found and select the equipment required to complete the well.

Candidates will be given a description and performance data for one well type from the following: single flow, multi flow, multi branch or multi function.

Candidates must:

- ◆ identify the well type from the information provided
- ◆ use the information given to identify the equipment needed, and describe the nature and function of the equipment
- ◆ recommend the method required to complete the well

The final part requires the candidate to use one of the performance models to evaluate the viability of the well incorporating any sub surface safety considerations.

This outcome is integrated with Outcome 2 in that the well type description and performance data given will be the same for both outcomes. Candidates will also use the well type and equipment identified in this outcome to evaluate the viability of economic performance of the well type in Outcome 2.

Assessment guidelines

It is highly recommended that this outcome is assessed together with Outcome 2 in a single case study.

The same case study may be used for a class group but candidates must submit individual reports, which should acknowledge the resources used.

Outcome 2

Evaluate the potential economic performance of a well using well performance techniques.

Knowledge and/or skills

- ◆ Production rate decline models
- ◆ Well inflow performance relationships
- ◆ Tubing lift performance models

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can: evaluate the potential economic performance of a well, using one of the following performance models: Exponential, hyperbolic and exponential declines and ultimate recovery

This outcome will be assessed in conjunction with Outcome 1 using a single case study. The same case study may be used for a class group but candidates must submit individual reports, which should acknowledge the resources used.

The case study should be developed by the centre and presented to the candidates. It should include a description of a particular well which requires to be completed along with the associated performance data. The well could be single flow, multi flow, multi branch or multi function and candidates will be required to identify the type. They will then be expected to use the information given to identify the equipment needed and to recommend the method required to complete the well. The final part should require the candidate to use one of the performance models to evaluate the viability of the well.

Assessment guidelines

The case study should present the candidate with the description of a particular well type and a range of performance data. Candidates should then analyse and interpret the information, before submitting a report. The outcome of the case study should lead to the candidates' outlining the completion of one well type. For Outcome 2 candidates are not expected to perform complex calculations, rather they should be able to interpret data to allow them to evaluate the economic viability of a well.

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Administrative information

Unit code:	HV5T 48
Unit title:	Oil Well Management
Superclass category:	YB
Original date of publication:	November 2017
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History of changes:

Version	Description of change	Date

Source: SQA

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SQA Advanced Unit Specification: support notes

Unit title: Oil Well Management

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 mandatory within the SQA Advanced Certificate and SQA Advanced Diploma in Petroleum Engineering. It is designed to provide candidates with an understanding of the techniques and equipment used to complete a well for production operations and the techniques available to assess the economic viability of a well.

Outcome 1

Well types:

Single flow; completion zones; repair and isolation; life cycle analysis. Multiple flow; dual and triple strings; isolation; tubing and annular flow conduits. Multi branch; liner styles; isolation; selective entry tools; complexity classification. Multi function; production/injection/disposal/monitoring combinations; downhole separation and disposal.

Well completion equipment:

Tubing, packers sleeves and nipples: premium and non-premium connections; design criteria; corrosion and erosion constraints; thermal effects; setting mechanisms; running and pulling tools; sizes; selection criteria.

Christmas trees: surface, subsea; monoblock component; vertical/horizontal valves and actuators; control systems; access; fire resistance; specifications.

Subsurface safety systems: storm chokes; SCSSVs; tubing/wireline retrievable; control systems; balls, flappers; seals; nipples; testing; reliability.

Outcome 2

It is intended that this outcome should equip candidates to interpret data rather than have to carry out complex calculations.

Decline models: exponential, hyperbolic and harmonic declines, ultimate recovery.

Inflow performance: drawdown, productivity index, maximum well potential, gas/oil ratio and water/oil ratio effects.

Lift Performance: vertical lift performance.

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.

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.

Outcome 1 and 2: A single case study should be used to cover both outcomes. Candidates should be given a description of a particular type of well along with the appropriate performance data, which would allow them to identify the type of well they are dealing with, detail the most appropriate equipment and method for completing the well and to predict the likely economic performance of the well.

Opportunities for developing core skills

There are opportunities to develop the core skills of *Communication*, *Problem Solving*, *Numeracy* and *Information Technology*, all at SCQF level 6 in this unit, although there is no automatic certification of core skills or core skills components. *Communication* and *Information Technology* can be enhanced if the candidates produce a written report when completing the case study. The case study itself will require the interpretation of data hence developing the core skills of *Numeracy* and *Problem Solving*.

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.

SQA Advanced Unit Specification

General information for candidates

Unit title: Oil Well Management

This unit is about understanding the techniques and equipment used to complete a well for production operations.

You will gain knowledge and understanding of the following:

Well types:

Single flow; completion zones; repair and isolation; life cycle analysis. Multiple flow; dual and triple strings; isolation; tubing and annular flow conduits. Multi branch; liner styles; isolation; selective entry tools; complexity classification. Multi function; production/injection/disposal/monitoring combinations; downhole separation and disposal.

Well completion equipment:

Tubing, packers sleeves and nipples: Premium and non-premium connections; design criteria; corrosion and erosion constraints; thermal effects; setting mechanisms; running and pulling tools; sizes; selection criteria.

Christmas trees: surface, subsea; monoblock component; vertical/horizontal valves and actuators; control systems; access; fire resistance; specifications

Subsurface safety systems: storm chokes; SCSSVs; tubing/wireline retrievable; control systems; balls, flappers; seals; nipples; testing; reliability.

Decline models: exponential, hyperbolic and harmonic declines, ultimate recovery.

Inflow performance: drawdown, productivity index, maximum well potential, gas/oil ratio and water/oil ratio effects.

Lift Performance: vertical lift performance.

Assessment for this unit is likely to take the form of a single case study in which candidates show that they can: assess the different types of wells that are found, outline the equipment required to complete wells, incorporate the safety aspects, evaluate the best option for particular wells and use a range of performance models and techniques to evaluate the potential economic performance of a well.