Higher National Unit specification

General information for centres

Unit title: Hydrocarbon Extraction and Process

Unit code: F43V 34

Unit purpose: This Unit will provide candidates with knowledge of reservoir formation, extraction process, separation principles and process and fluid treatment prior to transportation.

On completion of the Unit, the candidate should be able to:

1 Explain the formation of different types of reservoir, and associated hydrocarbon extraction process.
2 Explain the equipment and process for separation.
3 Explain the equipment and process for treatment of separated components.

Credit points and level: 1 HN 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 Access 1 to Doctorates.*

Recommended prior knowledge and skills: While access to this Unit will be at the discretion of the centre, it would be beneficial for candidates to have some prior knowledge of chemistry at SCQF level 5 or 6, or equivalent.

Core Skills: There are opportunities to develop the component Written Communication of 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. This Unit is included in the framework of the Chemical Process Technology HNC and HND.

Assessment: This Unit could be assessed by use of extended response questions. A report could be used to holistically assess all three Outcomes.

Higher National Unit specification: statement of standards

Unit title: Hydrocarbon Extraction and Process

Unit code: F43V 34

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 formation of different types of reservoir, and associated hydrocarbon extraction process

Knowledge and/or Skills

- Types of reservoir
- Formation of reservoirs
- Hydrocarbon extraction process
- Reservoir maintenance
- Drilling equipment

Evidence Requirements

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

- explain the formation of different types of reservoirs. Explanations must cover salt domes, stratigraphic traps and structural traps and the general principle that governs how all three types of reservoir form.
- explain the hydrocarbon extraction process, including the different ways of maintaining the reservoir to enable maximum output. Explanations must cover gas injection, water injection and gas lift.
- the usage of different drilling equipment used on a drilling rig. Explanations must cover drill derrick, drill string, drill bits, rotary table, draw works, power swivel, blow out preventer and mud, mud pumps and returns.

Assessment Guidelines

This Outcome could be assessed by extended response questions. Alternatively, a report could be used to holistically assess all three Outcomes.

Higher National Unit specification: statement of standards (cont)

Unit title: Hydrocarbon Extraction and Process

Outcome 2

Explain the equipment and process for separation

Knowledge and/or Skills

- Horizontal separator, construction and usage
- Vertical separator, construction and usage
- Separator internals

Evidence Requirements

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

- explain the construction and usage of both a horizontal separator and a vertical separator. The explanation must include that horizontal separators are used for longer separation times.
- explain the separator internals for both a horizontal and a vertical separator and the function of the identified internals. The explanations must cover inlet baffles, weirs, flow straighteners, desanding lines, anti-vortex devices, demisters and coalescers.

Assessment Guidelines

This Outcome could be assessed by extended response questions. Alternatively, a report could be used to holistically assess all three Outcomes.

Higher National Unit specification: statement of standards (cont)

Unit title: Hydrocarbon Extraction and Process

Outcome 3

Explain the equipment and process for treatment of separated components

Knowledge and/or Skills

- Oil transfer equipment (pumps)
- Gas drying
- Gas compression equipment
- Gas compression process
- Produced water

Evidence Requirements

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

- explain the usage of different types of oil transfer equipment (pumps) and their construction. The explanation must cover the two main equipment types; centrifugal pumps and reciprocating pumps, and for which situation each types appropriate.
- explain the usage of equipment and process of gas drying for the treatment of separated components. This must cover the glycol drying process and glycol regeneration process. Equipment covered must include the 'package' and its contents (package contains heaters and glycol contactor tower).
- explain the operation of equipment and process for gas compression for the treatment of separated components The explanations must cover centrifugal compressor with reference to a diffuser, and reciprocating compressor with reference to pistons.
- explain the equipment and process for dealing with produced water for the treatment of separated components. The explanation must include gas flotation and hydrocyclones.

Assessment Guidelines

This Outcome could be assessed by extended response questions. Alternatively, a report could be used to holistically assess all three Outcomes.

Administrative Information

Unit code: F43V 34

Unit title: Hydrocarbon Extraction and Process

Superclass category: YB

Original date of publication: August 2008

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 Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Hydrocarbon Extraction and Process

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

Whilst this Unit may be delivered on a standalone basis, it has been developed as part of the framework of the Chemical Process Technology HNC/HND. It is recommended that it is taught and assessed within the context of these particular Group Awards.

Guidance on the delivery and assessment of this Unit

This Unit is likely to be delivered as part of a Group Award designed to provide candidates with technical knowledge and skills for employment in the chemicals, pharmaceutical and beverage manufacturing industries. If delivered as part of Chemical Process Technology HNC, it is recommended that the Unit is delivered in the latter part of the HNC, building on knowledge gained in the mandatory Units.

Individual Outcomes could be assessed by use of extended response questions. Alternatively, a report could be used to holistically assess all three Outcomes. All Evidence Requirements must be met within the report.

In Outcome 1, candidates need to provide a single explanation for how reservoirs form, as this will be the same principle for each type, with only slight differences owing to particular geographical factors.

Opportunities for developing Core Skills

The delivery and assessment of this Unit may contribute towards development of the component Written Communication of the Core Skill of *Communication* at SCQF level 6, particularly by use of a report as the instrument of assessment. The general skills of the component are 'read, understand and evaluate written communication' for its reading element and 'produce well-structured written communication' for its written element.

Any preparation towards producing a report such as supplementary reading and/or internet research will facilitate development of the component's reading element, as candidates will need to examine a variety of information, for example on the formation of reservoirs in the first Outcome.

The writing element of the component may be developed when producing the report, in which candidates should be encouraged to present all essential ideas/information and supporting detail in a logical and effective order; use an appropriate structure, link information to assist the clarity and impact of the writing; and use spelling, punctuation and sentence structures which are consistently accurate.

Higher National Unit specification: support notes (cont)

Unit title: Hydrocarbon Extraction and Process

Open learning

This Unit would be suitable for delivery by distance learning provided that electronic or telephone consultation is available when required.

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* **(www.sqa.org.uk)**.

General information for candidates

Unit title: Hydrocarbon Extraction and Process

This Unit will provide you with knowledge of reservoir formation, extraction processes, separation principles and fluid treatment, prior to transportation. The content will be useful to you if you are employed or expecting to commence employment as a process operator in the offshore industry.

This Unit is intended primarily for those working towards the Chemical Process Technology HNC/HND, though it may be undertaken on a standalone basis.

On completion of the Unit you should be able to:

1 Explain the formation of different types of reservoir, and associated hydrocarbon extraction process.
2 Explain the equipment and process for separation.
3 Explain the equipment and process for treatment of separated components.

Assessment is likely to be by the use of extended response questions or by production of a report.

There are opportunities to develop the Core Skills component, Written Communication in this Unit.