

Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities

Specification

Competence-based qualifications

First registration April 2020

Issue 1

Edexcel, BTEC and LCCI qualifications

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ISBN 978 1 446 96664 8

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Welcome

With a track record built over 40 years of learner success, our BTEC International qualifications are recognised internationally by governments, industry and higher education.

What are BTEC International Specialist and Professional qualifications?

These BTEC qualifications are available at Levels 1–3 (Specialist) and at Levels 4–7 (Professional). The qualifications are designed to have one of two different purposes: some aim to give learners the knowledge and/or skills that they need to prepare for employment in a sector or job role; others are competence-based qualifications.

What are competence-based qualifications?

Competence-based qualifications are work-based qualifications that allow learners to develop and demonstrate their competence in the area of work or job role to which the qualification relates. Completing the qualification therefore provides evidence that learners are fully competent in the job role.

Learners will work towards their qualification in the workplace or (if permitted by the assessment requirements) in settings that replicate the working environment. Colleges, training centres and/or employers can offer these qualifications as long as they have access to appropriate physical and human resources and have the necessary quality assurance systems in place.

Sizes of qualification

Pearson estimates the number of guided learning hours (GLH) that will be needed for centre staff to deliver the qualification. This includes all training that involves centre staff in teaching and supervising learners, as well as all assessment activities.

BTEC Specialist and Professional qualifications are available in the following sizes:

Award – a qualification with a GLH value of 10–120 hours

Certificate – a qualification with a GLH value of 121–369 hours

Diploma – a qualification with a GLH value of 370 or above.

Collaborative development

These qualifications have been developed with input from industry experts. We are grateful to all the individuals and organisations who generously shared their time and expertise to help us develop these new qualifications.

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Introduction to BTEC International competence qualifications for the oil and gas sector

This specification contains all the information you need to deliver the Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities.

This qualification is part of a suite of oil and gas qualifications offered by Pearson.

What other qualifications are available?

The suite of oil and gas frontline production operations qualifications has been developed in collaboration with industry experts. The qualifications are designed to cover the minimum competence standards to meet the job requirements for key health, safety and environmental (HSE)-critical roles in the oil and gas industries.

In the oil and gas sector, the other qualifications are:

- Pearson BTEC International Level 2 Specialist Diploma for Process Technicians in Oil and Gas Facilities
- Pearson BTEC International Level 2 Specialist Diploma for Electrical Technicians in Oil and Gas Facilities
- Pearson BTEC International Level 2 Specialist Diploma for Instrument Technicians in Oil and Gas Facilities
- Pearson BTEC International Level 2 Specialist Diploma for Mechanical Technicians in Oil and Gas Facilities
- Pearson BTEC International Level 3 Specialist Diploma in Electrical Engineering Operations in Oil and Gas Facilities
- Pearson BTEC International Level 3 Specialist Diploma in Instrument Engineering Operations in Oil and Gas Facilities
- Pearson BTEC International Level 3 Specialist Diploma in Mechanical Engineering Operations in Oil and Gas Facilities
- Pearson BTEC International Level 4 Professional Diploma in Oil and Gas Facility Management
- Pearson BTEC International Level 4 Professional Diploma in Oil and Gas Installation Management.

These qualifications are not regulated in England.

What else does this specification contain?

This specification signposts the other essential documents and support that you need as a centre in order to deliver, assess and administer the Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities, including the staff development required. A summary of all essential documents is given in *Section 6 Administrative arrangements*.

The information in this specification is correct at the time of publication.

Overview of qualification sizes and purposes in the oil and gas suite

Level 2 qualifications

Title	Size and structure	Summary purpose
Pearson BTEC International Level 2 Specialist Diploma for Process Technicians in Oil and Gas Facilities	605 GLH. Six mandatory units.	This qualification allows learners to demonstrate their occupational competence as a process technician.
Pearson BTEC International Level 2 Specialist Diploma for Electrical Technicians in Oil and Gas Facilities	540 GLH. Six mandatory units.	This qualification allows learners to demonstrate their occupational competence as an electrical technician.
Pearson BTEC International Level 2 Specialist Diploma for Instrument Technicians in Oil and Gas Facilities	550 GLH. Six mandatory units.	This qualification allows learners to demonstrate their occupational competence as an instrument technician.
Pearson BTEC International Level 2 Specialist Diploma for Mechanical Technicians in Oil and Gas Facilities	610 GLH. Six mandatory units.	This qualification allows learners to demonstrate their occupational competence as a mechanical technician.

Level 3 qualifications

Title	Size and structure	Summary purpose
Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities	630 GLH. Three mandatory units plus optional units worth at least 280 GLH.	This qualification allows learners to demonstrate their occupational competence as a control room operator.
Pearson BTEC International Level 3 Specialist Diploma in Electrical Engineering Operations in Oil and Gas Facilities	500 GLH. Five mandatory units.	This qualification allows learners to demonstrate their occupational competence as an electrical technician engineer.
Pearson BTEC International Level 3 Specialist Diploma in Instrument Engineering Operations in Oil and Gas Facilities	460 GLH. Four mandatory units.	This qualification allows learners to demonstrate their occupational competence as an instrument technician engineer.
Pearson BTEC International Level 3 Specialist Diploma in Mechanical Engineering Operations in Oil and Gas Facilities	480 GLH. Four mandatory units.	This qualification allows learners to demonstrate their occupational as a mechanical technician engineer.

Level 4 qualifications

Title	Size and structure	Summary purpose
Pearson BTEC International Level 4 Professional Diploma in Oil and Gas Facility Management	At least 810 GLH. Four mandatory and two optional units.	This qualification allows learners to demonstrate their occupational competence when managing oil and gas production facilities. It also prepares them to deputise for the installation manager in emergencies.
Pearson BTEC International Level 4 Professional Diploma in Oil and Gas Installation Management	1020 GLH. Seven mandatory units.	This qualification allows learners to demonstrate their occupational competence as the manager of oil and gas installations. This includes managing production facilities onsite and any supporting facilities on- and off-site.

An overview of the structures of these qualifications can be found in *Appendix B: Structures of the qualification suite at a glance*.

1 **Qualification purpose and progression**

Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities

Who is this qualification for?

This qualification is for learners who work as control room operators. It gives them the knowledge and skills to control production process operations in an oil and gas facility.

Due to the hazardous nature of oil and gas operations, all learners are required to gain mandatory knowledge and skills in process operations, including safety, by implementing and supervising oil and gas frontline safety barriers, and by responding to and recovering in emergencies.

There is a choice of optional units. Learners working in surface operations will normally take Units 4, 5, 6 and 7, while those working in subsea operations (especially deep sea operations) would choose Units 8 and 9. Learners working in integrated facilities that cover both traditional and subsea operations may choose to complete all units.

What could this qualification lead to?

Learners who have completed the qualification will be ready to progress on to more senior roles, for example a senior control room operator or process supervisor.

Learners wishing to become a process supervisor can also progress on to qualifications at higher levels, such as the Pearson BTEC International Level 4 Professional Diploma in Oil and Gas Facility Management.

2 Qualification summary and key information

Qualification title	Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities
Operational start date	1 April 2020
Entry requirements	<p>Learners must be employed in a role that allows them to demonstrate the knowledge and skills as part of their normal work activities.</p> <p>Learners must have completed a diploma (Level 3 or equivalent) in a relevant engineering discipline.</p> <p>They must also EITHER have completed one of the following qualifications:</p> <p>Pearson BTEC International Level 2 Specialist Diploma for Process Technicians in Oil and Gas Facilities</p> <p>Pearson SRF BTEC Level 2 Intermediate Diploma for Operations Technicians in Oil and Gas Facilities (Process)</p> <p>OR</p> <p>have a minimum of five years' experience working as process field operators in the oil and gas sector.</p>
Guided Learning Hours (GLH)	A minimum of 630
Assessment	Portfolio of evidence (internal assessment)
Grading information	The qualification and units are graded pass/fail.

3 Structure

Qualification structure

Learners will need to meet the requirements outlined in the table below before the qualification can be awarded.

Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities		
Unit number	Unit title	GLH
Mandatory units – learners must achieve all three units		
1	Perform Functional Testing of Integrated Process Systems and Remote Control Operations	110
2	Perform Central Control Room Operations	120
3	Coordinate the Response to Emergencies and Critical Process Situations	120
Optional units – learners must achieve optional units worth at least 280 GLH		
4	Supervise Frontline Safety Barriers	60
5	Supervise Process Safety Within Own Area of Work	90
6	Supervise Materials Acquisition and Supply Chain Processes for Process-related Frontline Activities	60
7	Perform Constituents Testing of Process Fluids	70
8	Maintain Flow Assurance on Subsea Wells	150
9	Operate and Maintain Subsea Systems	150

4 Units

Understanding your units

The units in this specification set out our expectations of assessment in a way that helps you to prepare your learners for assessment. The units help you to undertake assessment and quality assurance effectively.

Each unit in the specification is set out in a similar way. This section explains how the units work. It is important that all teachers, assessors, internal verifiers and other staff responsible for the programme review this section.

Section	Explanation
Unit number	The number is in a sequence in the specification. Where a specification has more than one qualification, numbers may not be sequential for an individual qualification.
Unit title	This is the formal title that we always use, and it will appear on learners' certificates.
Level	All units and qualifications have a level assigned to them. The levels correspond with the levels used in the UK's Regulated Qualification Framework.
Unit type	This says if the unit is mandatory or optional for the qualification.
Guided Learning Hours (GLH)	Guided Learning Hours (GLH) is an estimate of the number of hours that will be needed for a typical learner to achieve the unit. GLH include all training involving centre staff in teaching and supervising learners, as well as all assessment activities.
Unit summary	This summarises the purpose of the unit.
Unit assessment requirements	This section outlines any requirements for the assessment of the unit.
Range statements	Range statements specify the scope and contexts to which the assessment criteria apply. All items in the range must be covered, except for items that follow an 'e.g.'
Learning outcomes	The learning outcomes set out what a learner must know, understand or be able to do as the result of a process of learning.
Assessment criteria	The assessment criteria specify the standard the learner is required to meet to achieve a learning outcome. Space is provided to record the date and type of evidence when the assessment criteria have been evidenced.
Declarations	This section is signed and dated by the learner and assessor after all the assessment criteria have been evidenced. If sampled, it must be signed and dated by the internal verifier.

Index of units

This section contains all the units developed for these qualifications. Please refer to *page 6* to check which units are available.

Unit 1:	Perform Functional Testing of Integrated Process Systems and Remote Control Operations	11
Unit 2:	Perform Central Control Room Operations	17
Unit 3:	Coordinate the Response to Emergencies and Critical Process Situations	23
Unit 4:	Supervise Frontline Safety Barriers	29
Unit 5:	Supervise Process Safety Within Own Area of Work	35
Unit 6:	Supervise Materials Acquisition and Supply Chain Processes for Process-related Frontline Activities	43
Unit 7:	Perform Constituents Testing of Process Fluids	49
Unit 8:	Maintain Flow Assurance on Subsea Wells	55
Unit 9:	Operate and Maintain Subsea Systems	61

Unit 1: Perform Functional Testing of Integrated Process Systems and Remote Control Operations

Level: 3

Unit type: **Mandatory**

Guided learning hours: **110**

Unit summary

This unit gives learners the knowledge and skills to perform functional tests on integrated process systems, including the remote control operations for which they are responsible, in accordance with company standards and operating procedures.

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Understand the functions and operating principles of processes and equipment in own facility

1.1 Key processes in own facility:

- separation
- dehydration
- compression
- well test
- distillation (where applicable)
- produced water and effluent water treatment
- emulsion treatment
- water flood (where applicable)
- export facilities
- utilities (drinking and service water, instrument air, fuel gas and power generation).

1.2 Major static equipment in own facility:

- boiler
- furnace
- vessels
- contactor towers (absorption tower)
- filtration
- storage tanks.

1.3 Major rotating equipment in own facility:

- engines
- pumps
- compressors
- turbines.

2 Operate panel hardware for the distributed control system (DCS), programmable logic controller (PLC) or instrument protective system (IPS)

2.1 Retrieve logs:

- events
- alarms
- sequence of events (SoE).

2.2 Interpret function block and ladder logic of DCS, PLC or IPS:

- retrieve functional block diagrams from system
- retrieve ladder logic diagram from system
- explain functions and causes-and-effects of logic diagrams.

2.3 Troubleshoot and rectify faulty DCS, PLC or IPS hardware:

- identify PLC faults
- identify faulty input operation (IO) signals
- perform upload and download programs for DCS, PLC or IPS
- organise resources to rectify faults.

3 Understand key process control loops and safeguarding systems in own facility

3.1 Principles of process control:

- proportional (P), proportional integrated (PI) and proportional integrated and derivative (PID) controls and their functions
- cascade control
- split range control
- selector control.

3.2 Key process control loops in own facility:

- two- and three-phase separation controls
- dehydration controls
- stabilisation controls
- compressor anti-surge controls
- turbine controls.

3.3 Wellhead control operations:

- operating principles
- control settings
- operational risks and health, safety and environmental (HSE) precautions.

3.4 Safeguarding systems in own facility:

- fire and gas detection (FNG)
- automatic shutdown (ASD)
- emergency shutdown (ESD)
- maintenance override switch (MOS) or operational override switch (OOS)
- high integrity pressure protection system (HIPPS)
- safety integrity level (SIL) studies and classification of safeguarding systems.

4 Be able to control the production process and prepare equipment for normal operation and maintenance

4.1 Steps in shutting down or starting up the facility:

- in accordance with company standard operating procedures (SOP)
- compliance with all HSE and legal requirements.

4.2 Start-up and shutdown plan for own facility:

- in accordance with company SOP
- compliance with all HSE and legal requirements
- plan endorsed by production supervisor
- shutdown of process for planned maintenance
- approval of shutdown by appropriate authority
- effective communications with all relevant parties
- all HSE issues identified and mitigation measures taken
- shutdown process in accordance with plan
- hand over equipment for maintenance in accordance with SOP.

4.3 Shut down production processes for planned maintenance:

- verify readiness for shutdown
- ensure effective communications with all relevant parties
- identify all HSE issues and mitigation measures taken
- carry out shutdown process in accordance with the plan
- hand over equipment to maintenance in accordance with SOP
- complete documentation and record.

4.4 Start-up of production processes after maintenance:

- verify readiness for start-up
- ensure effective communications with all relevant parties
- identify all HSE issues and mitigation measures taken
- carry out start-up process in accordance with the plan
- receive equipment after maintenance in accordance with SOP
- complete documentation and record.

4.5 Operate and monitor production processes and utility systems:

- monitor processes and utility systems to ensure steady operations
- identify process upsets and adjust controls to maintain operations within limits
- tune process controls to ensure optimal operations
- alert key personnel to any deviations from normal operations.

4.6 Process for black start-up of own facility:

- sequence for black start-up
- precautions and special considerations for black start-up.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand the functions and operating principles of processes and equipment in own facility	1.1	Describe the key processes in own facility			
		1.2	Describe the functions and operating principles of the major static equipment in own facility			
		1.3	Describe the functions and operating principles of the major rotating equipment in own facility			
2	Operate panel hardware for the distributed control system (DCS), programmable logic controller (PLC) or instrument protective system (IPS)	2.1	Retrieve logs from DCS, PLC or IPS			
		2.2	Interpret function block and logic diagram from DCS, PLC or IPS			
		2.3	Troubleshoot and rectify faulty DCS, PLC or IPS hardware			
3	Understand key process control loops and safeguarding systems in own facility	3.1	Explain the principles of process control			
		3.2	Explain the key process control loops in own facility			
		3.3	Explain wellhead control operations			
		3.4	Explain the safeguarding systems in own facility			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to control the production process and prepare equipment for normal operation and maintenance	4.1	Explain the steps in shutting down or starting up the facility			
		4.2	Prepare a start-up and shutdown plan for own facility			
		4.3	Perform a shutdown of the production process for planned maintenance			
		4.4	Perform a start-up of the production process after maintenance			
		4.5	Operate and monitor the production process and utility systems			
		4.6	Describe how to carry out a black start-up of own facility			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 2: Perform Central Control Room Operations

Level: 3

Unit type: **Mandatory**

Guided learning hours: **120**

Unit summary

This unit gives learners the knowledge and skills to coordinate the overall operations of an integrated process system, including remote control operations. Learners need to have an overview of the entire facility, manage the process and direct the control of the facility through field operators and technicians. This includes alarm management, process optimisation controls, the release/receipt process and maintenance of equipment when required.

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Understand alarm management

1.1 Minimum requirements for alarm management:

- up-to-date and verified management of change (MOC) controlled alarm catalogue
- track alarm key performance indicators (KPI) for the standing alarm rate and total alarm rate
- monitor and systematically reduce nuisance alarm.

1.2 Differences between alarm priorities:

- critical alarms – act now
- standard alarms – act to resolve, get help as needed
- target/alert alarms – optimise, act to resolve, get help as needed.

2 Understand cause and effect of safety critical loops

2.1 Actions when a critical alarm is sounded:

- emergency shutdown
- blowdown
- fire and gas detection system.

2.2 Steps involved in bad actor alarm analysis:

- retrieve event list and alarm catalogue
- identify high alarm contributors
- cascade findings
- prioritise actions against bad actors
- proactive monitoring – root cause analysis (RCA) of bad actor alarms and corrective maintenance.

2.3 Consequences of exceeding critical limits:

- cumulative degradation of integrity or reliability of equipment
- loss of primary containment that could potentially lead to a fire, explosion or release of toxic or hazardous material
- exceeding an environmental operating permit limit or any risk assessment matrix (RAM) (severity 2 or greater), environmental or community impact
- a non-orderly shutdown of the facility, or a portion of the facility, due to the activation of the next layer of protection
- a non-orderly shutdown of the facility, or a portion of the facility, due to equipment failure or other reasons
- any other health, safety or process safety RAM (severity 2 or greater) consequence
- a significant negative impact on business performance
- an inability to meet turnaround run-length expectations.

3 Be able to access critical information and report anomalies

3.1 Key information about alarms:

- alarm catalogue from DCS
- alarm trends, including sequential event recorder (SER).

3.2 Critical parameters and information required:

- deviations from monthly targets, including flaring limits and effluent discharge quality
- based on alarm catalogue and priorities relating to:
 - critical alarms
 - standard alarms
 - target/alert alarms.

3.3 DCS faceplate and template:

- use operator mode only
- use functions of a faceplate and its subsequent screens
- develop process trending screens.

4 Be able to manage and coordinate control room operations

4.1 Daily operations reports, including daily event lists:

- operations logs
- alarms
- bypasses
- Permit to Work.

4.2 Process shift and crew change handovers:

- brief shift crew on key activities and sign shift handover reports
- brief roster crew on key activities and sign roster change handover reports.

4.3 Daily facility processes and utility activities:

- planned activities – preventative maintenance (PM), corrective maintenance (CM)
- unscheduled activities
- PTW management
- alarm management
- coordination of overrides and bypasses.

4.4 Safety-critical information handover:

- operations logs
- alarms
- bypasses
- Permit to Work.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand alarm management	1.1	Explain the minimum requirements for alarm management			
		1.2	Explain the differences between alarm priorities			
2	Understand cause and effect of safety critical loops	2.1	Explain the actions required when a critical alarm is sounded			
		2.2	Describe the steps involved in bad actor alarm analysis			
		2.3	Explain possible consequences of exceeding critical limits in the facility			
3	Be able to access critical information and report anomalies	3.1	Identify and extract key information about alarms from the DCS			
		3.2	Demonstrate which critical parameters and information are required during reporting			
		3.3	Navigate between DCS faceplate and templates			
4	Be able to manage and coordinate control room operations	4.1	Prepare daily operations reports, including daily event lists			
		4.2	Manage process shift and crew change handovers			
		4.3	Coordinate daily facility processes and utility activities from the central control room			
		4.4	Hand over all safety-critical information during shifts and roster			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 3: Coordinate the Response to Emergencies and Critical Process Situations

Level: 3

Unit type: **Mandatory**

Guided learning hours: **120**

Unit summary

This unit gives learners the knowledge and skills to coordinate the overall operations of an integrated process system, including remote control operations. Learners need to have an overview of the entire facility, manage the process, including alarms, and direct the control of the facility through field operators and technicians.

Unit assessment requirements

Simulation is permitted for all assessment criteria, but it must be carried out in a realistic working environment, in line with the requirements of Section 2 of the *Assessment rules* (see *Appendix A*).

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Be able to assess critical situations within the work area and react appropriately

- 1.1 Identify developing and existing critical situations and act on warning signs:
- recognise abnormal changes in process variables
 - monitor actual variables against critical alarm settings – ASD, FNG and ESD
 - control variables to manage alarms.
- 1.2 Interpret relevant alarms and take actions appropriate to the situation:
- retrieve event list and alarm catalogue
 - identify high alarm contributors
 - prioritise actions depending on whether it comes from a bad actor alarm.

1.3 Monitor the situation and take action to minimise risks to personnel, process, facility and equipment:

- retrieve key information from DCS or ASD
- adjust processes via the DCS to control situations
- communicate with field operators to mitigate escalating events
- raise the alarm as necessary with crews and supervisors.

1.4 Appropriate procedures relevant to the situation:

- company SOP
- site emergency response procedures
- site HSE case guidelines.

1.5 Communicate the critical situation to appropriate personnel:

- field operators
- crews
- supervisors.

1.6 Limits of authority:

- authority to activate shutdown such as ESD and blowdown
- authority to raise alarms such as general platform alarm (GPA) and prepare to abandon platform alarm (PAPA).

2 Be able to coordinate the response to emergencies

2.1 Identify and immediately take actions required to make the situation safe:

- interpret readings based on process variables approaching critical limits
- act within authority on emergencies.

2.2 Relevant alarms:

- normal alarms and annunciators
- general platform alarm (GPA)
- prepare to abandon alarm (PAPA).

2.3 Communicate all relevant information and instructions:

- personnel – field operators, crews and supervisors
- types of communication – phones, public address system and radios
- oral instructions.

2.4 Clarify and act on information received:

- verify information from DCS with field
- verify information from DCS and ASD and vice versa
- clarify information with relevant authorities if outside own authority.

2.5 Recording of critical information:

- event log
- DCS records
- written notes and report.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to assess critical situations within the work area and react appropriately	1.1	Identify developing and existing critical situations and act on warning signs			
		1.2	Interpret relevant alarms and take actions that are appropriate to the situation			
		1.3	Monitor the situation and take effective action to minimise risks to personnel, processes, facilities and equipment			
		1.4	Use appropriate procedures that are relevant to the situation			
		1.5	Communicate the critical situation correctly to the appropriate personnel			
		1.6	Act in accordance with the limits of own authority			
2	Be able to coordinate the response to emergencies	2.1	Accurately identify and immediately take the actions required to make the situation safe			
		2.2	Activate all relevant alarms			
		2.3	Effectively communicate all relevant information and instructions			
		2.4	Clarify and act on information received			
		2.5	Record critical information in accordance with company procedures			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 4: Supervise Frontline Safety Barriers

Level: 3

Unit type: **Optional**

Guided learning hours: **60**

Unit summary

This unit gives learners the knowledge and skills needed to supervise the implementation of frontline barriers, including the handling and storage of chemicals, and entry into a confined space and static hazards affecting process operation activities.

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Be able to supervise chemical storage and disposal

1.1 Mitigation measures for hazards arising from handling chemicals used in own facility:

- hazards:
 - inhalation of chemical fumes
 - contact with skin or eyes
 - ingestion
 - chemical reactivity, e.g. flammability and corrosiveness
- mitigation measures:
 - use of material safety data sheets (MSDS) and/or safety data sheets (SDS)
 - use of safe handling of chemicals (SHOC) procedures when handling, storing or implementing emergency measures
 - reading and interpreting symbols, signage and chemical coding.

1.2 Minimum recovery requirements prior to chemical storage or disposal:

- use of personal protective equipment (PPE)
- drip pan
- eye wash
- shower station
- in accordance with MSDS and/or SDS document.

1.3 Chemical storage and disposal:

- compliance with the Permit to Work and safe system of work
- lead toolbox meeting and communicate effectively to the team about the job, risks and mitigation requirements
- supervise and monitor work activities
- check work and close Permit to Work
- complete documentation and reports.

2 Be able to supervise work activities in confined spaces

2.1 Risks involved in confined space entry:

- definition of confined space
- potential hazardous substances or conditions within the space or nearby
- heat and darkness.

2.2 Mitigation measures to be taken prior and during confined space entry:

- Permit to Work
- safe system of work
- confined space entry certificate
- measures against lack of oxygen, poisonous gas, fumes or vapour
- precautions against gas, liquids and/or solids that can suddenly fill the space
- fire and explosion due to residues left in confined space.

2.3 Prepare for work activities involving confined space entry:

- approved Permit to Work
- ensure proper isolation of hazardous sources
- warning signs
- proper preparation before entry, including cleaning, ventilation and gas testing
- proper use of special tools and lighting
- certified personnel
- preparation of emergency arrangements, including provision of rescue harness and readiness of first aid procedures.

2.4 Supervise and implement work activities involving confined space entry:

- lead toolbox meeting
- proper supervision of work
- clear communication
- closed Permit to Work.

3 Be able to control static hazards in the facility involving own area of work

3.1 Risks from static electricity in own area of work:

- discharge from static electricity
- ignition of flammable or combustible substances
- explosions when loading and offloading of oil and/or gas.

3.2 Mitigation measures required for potential static risks:

- proper maintenance of static control equipment
- precautions to mitigate static risks – proper earth/ground connection, screening of signal cables
- proper use of explosion-proof materials and maintenance.

3.3 Work activities involving exposure to static hazards:

- bunkering
- loading.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to supervise chemical storage and disposal	1.1	Explain risks and mitigation measures used when handling chemicals used in own facility			
		1.2	Ensure minimum recovery requirements are implemented prior to chemical storage or disposal			
		1.3	Supervise staff to ensure proper chemical storage and disposal			
2	Be able to supervise work activities in confined spaces	2.1	Explain the risks involved in entering confined spaces			
		2.2	Describe the necessary mitigation measures to be taken prior to and during confined space entry			
		2.3	Prepare for work activities involving confined space entry			
		2.4	Supervise and implement work activities involving entry into confined space			
3	Be able to control static hazards in the facility involving own area of work	3.1	Manage the risks associated with static electricity in own areas of work			
		3.2	Explain the measures required to mitigate risks from static electricity			
		3.3	Perform work activities involving exposure to hazards caused by static electricity			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 5: Supervise Process Safety Within Own Area of Work

Level: 3

Unit type: **Optional**

Guided learning hours: **90**

Unit summary

This unit gives learners the knowledge and skills to supervise the implementation of process safety, including the handling of temporary facility changes, working in a hazardous atmosphere, application of overrides and bypasses, gas-freeing operations and coordination of the Permit to Work system.

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Be able to supervise temporary facility changes

1.1 Facility changes related to process safety:

- in accordance with company health, safety and environment management system (HSEMS) and company management of change system
- justify changes based on process safety
- assess the criticality of facility changes based on risk assessment matrix.

1.2 Hazards and risks prior to the changes using company risk matrix:

- apply hazard and effects management process (HEMP) and job hazards analysis
- refer to site HSE case
- participate in HAZID.

1.3 Supervise the execution of facility change on-site:

- obtain approved facility change
- ensure Permit to Work is completed
- act in accordance with company procedures for facility change.

1.4 Update any documentation:

- piping and instrument diagrams (P&ID), hazardous area/safety equipment layout, HSE case, using red line mark-ups
- communication to appropriate follow-up action parties.

2 Be able to supervise work in areas with a hazardous atmosphere

2.1 Personal exposure limits for toxic gas found in own oil and gas field:

- duration of exposures to toxic gases
- safe concentration of poisonous/toxic gas.

2.2 Mitigations for work done in a hazardous atmosphere:

- safe system of work, including continuous monitoring of gas testing, etc.
- use of approved equipment, e.g. use of intrinsically safe (IS) and explosion proof (Ex) rated equipment only

2.3 Ways to reduce exposure of personnel to a hazardous atmosphere:

- conduct ALARP assessment in accordance with company SOP and health, safety and environment management systems (HSEMS)
- use of a hazard hierarchy to demonstrate risk has been reduced.

2.4 Communication with personnel on the existence of hazardous atmosphere:

- inform staff about risk boundaries using a hazardous area classification drawing and P&ID
- alert staff to hazardous gases in process piping associated with maintenance work.

2.5 Supervise work in hazardous areas:

- ensure Permit to Work is completed
- continuous monitoring of hazardous area, including continuous monitoring of gas testing
- act in accordance with company procedures for facility change.

3 Be able to supervise work activities involving maintenance and operation override switches (MOS/OOS)

- 3.1 Company standards on safety system isolation certificate (SSSI) and register:
- short-term override, e.g. MOS
 - long-term override, e.g. MOC
 - isolation extension, e.g. locked open and/or locked closed valves
 - temporary equipment, e.g. use of welding sets, portable generators, air compressors
 - temporary repairs
 - temporary hoses
 - handover requirements, including passing valves.
- 3.2 Appropriate SSIC prior to isolation:
- perform risks and mitigations assessment
 - conduct ALARP using layered protection barriers and safeguards
 - ensure proper documentation and registers
 - assess fire and gas coverage, e.g. 85% or 90% coverage with 2 or N detectors.
- 3.3 Review and advise on mitigation measures:
- identification of controls for each risk identified in job hazard analysis
 - the use of passing valves, temporary equipment and repairs.
- 3.4 Supervise the execution of work involving overrides:
- obtain approval for overrides, both MOS or OOS
 - ensure proper application of Permit to Work, including tagout and lockout if applied
 - act in accordance with company procedures for facility change.
- 3.5 Reinstate system to normal:
- reinstatement after isolation.

4 Be able to supervise work activities involving hydrocarbon-freeing operations

4.1 Isolation for gas depressurisation:

- following company guidelines for positive isolation
- carrying out safety system overrides
- carrying out sectional depressurisation during:
 - pressurised vessel or tank maintenance
 - retrieval and launching of operation pig
 - valve, piping nozzles and instrument maintenance
 - hot work without habitat, e.g. structural replacement or monti bristle or sand blasting
 - pipeline depressurisation
 - turbine enclosure (for turbine wash, etc.).

4.2 Coordinate simultaneous activities to ensure no conflicting hot work:

- communication with parties involved
- multiple hot work activities
- avoidance of conflicting activities.

4.3 Communication and supervision of personnel to prevent simultaneous hot work activity:

- avoidance of simultaneous activities, including gas-freeing and hot work activity
- exposure of hot work and nature of other work
- risk and mitigation
- company guidelines for SIMOPS.

4.4 Ensure compliance with approved Permit to Work:

- maintain overview of Permit to Work activities in own facility
- advise supervisor of any concern or breach of safe system at work.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to supervise temporary facility changes	1.1	Propose facility changes related to process safety			
		1.2	Identify hazards and risks prior to the changes with the use of the company risk matrix			
		1.3	Supervise the execution of facility changes on site			
		1.4	Update documents before making them available on site			
2	Be able to supervise work in areas with a hazardous atmosphere	2.1	Describe personal exposure limits for toxic gases			
		2.2	Identify and put in place mitigations for work done in a hazardous atmosphere			
		2.3	Assess ways of reducing exposure of personnel to a hazardous atmosphere			
		2.4	Communicate with personnel on-site with regard to the hazardous atmosphere that exists on site			
		2.5	Supervise the execution of work in areas with a hazardous atmosphere			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Be able to supervise work activities involving maintenance and operations override switches (MOS/OOS)	3.1	Explain company standards on safety system isolation certificates (SSIC and other isolation certificates)			
		3.2	Ensure that the SSICs are appropriate for the planned work			
		3.3	Review and advise on mitigation measures			
		3.4	Supervise work involving maintenance and operations overrides			
		3.5	Reinstate the system to normal			
4	Be able to supervise work activities involving hydrocarbon-freeing operations	4.1	Carry out isolation for gas depressurisation and positive isolation			
		4.2	Coordinate simultaneous activities to ensure there is no conflicting hot work on-site			
		4.3	Communicate with all personnel to prevent any simultaneous hot work activity on site			
		4.4	Supervise work to ensure compliance with the approved permit to work			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 6: Supervise Materials Acquisition and Supply Chain Processes for Process-related Frontline Activities

Level: 3

Unit type: Optional

Guided learning hours: 60

Unit summary

This unit gives learners the knowledge and skills required coordinate and supervise materials acquisition to comply with the minimum stocking levels required to support the operations in their facility. This includes being able to rationalise requirements based on projects and budget, raise quotations, gain approval and follow up requisitions until receipt and storage take place.

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Be able to plan material requirements to support frontline activities

1.1 Coordination with site teams to establish detailed requirements based on projected activities, e.g.:

- planned maintenance
- unplanned/corrective maintenance
- facility change requests
- major maintenance/turnaround activities
- simultaneous activities.

1.2 Integrated materials requirements:

- integrate materials requirements from site teams
- justify and rationalise requests.

1.3 Approval from site management for acquisition:

- present integrated materials requirements
- gain formal approval to proceed.

1.4 Compliance with minimum stock on-site:

- maintain minimum stock on-site based on agreed guidelines
- review minimum stock requirements with site teams to ensure compliance with company materials stock management guidelines and standards.

2 Be able to raise materials requisitions from site

2.1 Prioritise materials requisition based on budget and urgency:

- operational requirements
- budget availability
- integrate materials requisition with projects to avoid double ordering of spares.

2.2 Obtaining quotations from suppliers or vendors:

- minimum of three quotations
- selection of suppliers and/or vendors from company-approved supplier/vendor list
- clarification of requirements and delivery capabilities of supplier or vendor.

2.3 Evaluation of proposals from suppliers and vendors and select best option:

- set selection criteria
- evaluate proposals from suppliers and vendors
- select successful bidder
- propose selection to site management for approval.

2.4 Raise material requisition to ensure timely delivery of materials:

- raise materials requisition after approval from site management
- follow up with central materials department on delivery and specifications.

3 Be able to track the status of material requisitions

3.1 Follow-up procedure with supplier or vendor for timely delivery of materials:

- track status of materials delivery
- escalate to higher authority if there are issues with delivery and specifications.

3.2 Deal with disputes with supplier or vendor:

- intervention when there are changes to specifications or delivery from supplier or vendor
- resolve disputes.

3.3 Receive materials in accordance with company procedures for materials receipt:

- verify products on receipt
- acknowledge receipt
- close the materials requisition process.

4 Be able to supervise the storage and preservation of materials

4.1 Supervise storage of materials on-site:

- coordination with materials coordinator to ensure proper storage
- update site database for stock.

4.2 Store materials, including ensuring proper preservation as recommended by manufacturers:

- preserve materials in accordance with company SOP

4.3 Document and plan storage of materials to ensure easy retrieval of materials:

- updating site storage record.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to plan material requirements to support frontline activities	1.1	Coordinate with site teams to establish detailed requirements based on projected activities			
		1.2	Develop integrated materials requirements			
		1.3	Obtain approval from site management for acquisition			
		1.4	Ensure compliance with minimum required levels of stock on site			
2	Be able to raise material requisitions from site	2.1	Prioritise material requisitions based on budget and urgency			
		2.2	Obtain quotations from suppliers or vendors in accordance with company procedures			
		2.3	Evaluate proposals from suppliers and vendors and select the best option			
		2.4	Raise material requisitions to ensure timely delivery of materials			
3	Be able to track the status of material requisitions	3.1	Follow up with the supplier or vendor for timely delivery of materials			
		3.2	Intervene and resolve disputes with the supplier or vendor			
		3.3	Receive materials in accordance with company procedures for materials receipt			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to supervise the storage and preservation of materials	4.1	Supervise the storage of materials on site			
		4.2	Store materials, including ensuring proper preservation, as recommended by manufacturers			
		4.3	Document and plan storage of materials to ensure their easy retrieval			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 7: Perform Constituents Testing of Process Fluids

Level: 3

Unit type: **Optional**

Guided learning hours: **70**

Unit summary

This unit gives learners the knowledge and skills to perform tests on process systems, including constituent testing in gas, water content testing in process fluids and glycol condition testing. During the sampling process, learners will carry out isolation/depressurisation and valve alignment in accordance with operating procedures. They will then collect, preserve, store and send samples to relevant parties for further analysis. In all test cases, learners will be taught the operating procedures for updating relevant logs and sheets

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Understand the testing of different constituents in oil and gas fluids

1.1 Constituents in oil and gas fluids:

- hydrocarbons
- water
- glycol
- hydrogen sulphide
- carbon dioxide
- toxic reagents, as appropriate to own facility.

1.2 Basic chemical properties of constituents, including:

- viscosity
- density
- pH
- total suspended solids (TSS)
- oil in water.

1.3 Safe handling of samples, chemicals and apparatus:

- use of proper PPE
- in accordance with company SOP for safe handling of samples
- site analyser and apparatus operating instructions.

1.4 Operating principles of the analysers used on-site:

- in accordance with site analysers' operating instructions and technical information
- in accordance with company SOP.

1.5 Sampling and testing procedures related to own facility:

- in accordance with company SOP
- in accordance with manufacturers' instructions.

2 Be able to perform constituent testing of process fluids applicable to own facility

2.1 Isolation, depressurisation and valve alignment, and site sampling:

- in accordance with isolation and depressurisation procedures
- bleed pressure and drain all pressured lines, equipment and process, as required in Permit to Work
- comply with company SOP
- use authorised fittings by manufacturers.

2.2 Constituent testing on site:

- constituent tests to include the following:
 - H₂S, CO₂
 - moisture in gas
 - sediment testing
 - water in crude/oil in water
 - glycol testing
- use of methods to include centrifuges, infrared absorption, pH by aqueous solution and electrometric method (glycol)
- in accordance with manufacturers' procedures, company SOP and HSEMS.

2.3 Reinstatement system for normal operations after testing:

- in accordance with company SOP.

2.4 Record and report the outcomes of sampling:

- in accordance with company SOP.

3 Be able to prepare samples for further laboratory testing

3.1 Preparation of samples for further analysis:

- in accordance with company SOP
- use of approved sampling equipment, e.g. glass sampling bottles, pressurised sampling cylinders
- in accordance with aviation or marine safe handling of chemicals.

3.2 Communication with relevant parties:

- specialist laboratory
- logistics
- pick-up services.

3.3 Follow up findings and recommendations:

- follow up with specialist laboratory for test results
- give recommendations based on findings.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand the testing of different constituents in oil and gas fluids	1.1	Explain the different types of constituent in oil and gas fluids			
		1.2	Explain the basic chemical properties of these fluids			
		1.3	Explain the principles of safe handling of samples, chemicals and apparatus			
		1.4	Explain the operating principles of the analysers used on-site			
		1.5	Explain the sampling and testing procedures related to own facility			
2	Be able to perform constituent testing of fluids applicable to own facility	2.1	Isolate, depressurise and complete valve alignment to allow site sampling			
		2.2	Perform constituent testing on-site			
		2.3	Reinstate systems for normal operations after testing in accordance with company SOP			
		2.4	Record and report outcome of sampling			
3	Be able to prepare samples for further laboratory testing	3.1	Prepare and consign samples for further analysis			
		3.2	Communicate with relevant parties			
		3.3	Follow up findings and recommendations with appropriate personnel			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 8: Maintain Flow Assurance on Subsea Wells

Level: 3

Unit type: **Optional**

Guided learning hours: **150**

Unit summary

This unit gives learners the knowledge and skills needed to ensure that subsea well start-up is carried out in accordance with standard operating procedures. Learners will maintain effective communication and perform valve alignments on wellhead, manifold and subsea choke adjustments. They will monitor the well and process conditions against the daily production plan.

Learners will also gain the knowledge and skills to perform subsea well ramp-down and shut-in. They will perform valve alignments on wellhead and manifold and boarding choke/PCV adjustments to shut-in the well. They must ensure that all procedures are carried out with minimal interruption to the main process system of the facility

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Understand the functions and principles of subsea systems

1.1 The functions of the following subsea systems:

- subsea wellhead
- manifolds
- chemical injection system
- umbilical lines
- hydraulic system, including hydraulic power unit (HPU) and accumulators.

1.2 Operating principles of the following subsea systems:

- subsea wellhead
- manifolds
- chemical injection system
- umbilical lines
- hydraulic system, including HPU and accumulators.

1.3 Explain how to monitor subsea operations:

- start-up
- ramp-down and shutting-in production, how this may affect other wells in the flowline and actions required
- monitoring of pressures, temperatures and drawdown in subsea operations
- monitoring of drawdown limit and how it can adversely affect well bore and production equipment
- monitoring of subsea hydraulic systems – isolation of high- and low-pressure pumps and replacement of hydraulic filters.

1.4 Major hazards associated with subsea operations and how these can be mitigated:

- the effect of high temperatures on pipelines
- pressures and temperatures
- leaks
- use of methanol
- handling of hydraulic fluids for HPU.

2 Be able to start up and maintain the operations of a subsea well

2.1 Initial check on key subsea equipment prior to start-up, including:

- christmas tree
- production master valve (PMV)
- HPU
- master control station (MCS) and DCS.

2.2 Subsea well start-up:

- in accordance with HSSE and company SOP
- safe system of work, including Permit to Work
- subsea well ramp-up.

2.3 Valve alignments on wellhead, manifold and subsea choke adjustment:

- in accordance with HSSE and company SOP
- safe system at work, including Permit to Work.

2.4 Monitor well and process conditions against the daily production plan from the DCS:

- pressure
- gas flow rate
- temperature of subsea pipeline
- communicating with field operators.

2.5 Report issues and problems to supervisor, including recommendations:

- identify variance and resolve
- raise issues with supervisor if outside own authority.

3 Be able to perform normal subsea well shutdown

3.1 Subsea well ramp-down:

- in accordance with company HSEMS, including Permit to Work
- following company ramp-down procedures.

3.2 Perform a well shutdown in accordance with company standard operating procedures:

- in accordance with well shut-in checklist, including aligning valves on wellhead, manifold, boarding choke and PCV adjustments to shut down the well
- closing of subsea choke
- PMV, flow wing valve (FWV) and surface-controlled sub-surface safety valve (SSSV) adjustment in accordance with approved site-specific procedures
- observance of all HSE issues
- monitor critical well shut-in readings from DCS trends.

3.3 Chemical injection (CI) rate adjustments, if necessary:

- in accordance with company SOP
- monitor well production
- stop CI after well shutdown.

3.4 Report issues, problems and recommendations to supervisor:

- document and report outcome of well shut-in in accordance with SOP
- highlight any issues for follow-up
- communicate recommendations.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand the functions and principles of subsea systems	1.1	Describe the functions of the major subsea systems			
		1.2	Describe the operating principles of the major subsea systems in own facility			
		1.3	Explain how to monitor subsea operations			
		1.4	Explain the major hazards associated with subsea operations and mitigation required			
2	Be able to start up and maintain the operations of a subsea well	2.1	Carry out initial checks on key equipment associated with subsea well start-up			
		2.2	Perform subsea well start-up in accordance with company standard operating procedures			
		2.3	Perform valve alignments on wellhead, manifold and subsea choke adjustment to keep a well in accordance with operating procedures			
		2.4	Monitor the well and process conditions against the daily production plan			
		2.5	Report issues and problems to supervisor, including recommendations			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Be able to perform a normal subsea well shutdown	3.1	Perform a subsea well ramp-down			
		3.2	Perform a well shutdown in accordance with company standard operating procedures			
		3.3	Perform chemical injection rate adjustments if necessary			
		3.4	Report outcomes, issues and recommendations to supervisor			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

Unit 9: Operate and Maintain Subsea Systems

Level: 3

Unit type: **Optional**

Guided learning hours: **150**

Unit summary

This unit gives learners the knowledge and skills needed to operate and maintain subsea well systems. Learners will monitor annulus A and B pressures to determine if bleed is required and develop their understanding of the requirements of valve leak testing. They will carry out chemical injection operations by setting and monitoring injection rates and adjusting accordingly. Learners will operate and maintain the hydraulic power unit (HPU) system and replace HPU filters as indicated by pressure differential or laboratory analysis. In all instances, learners will discuss and report any problems to relevant parties and recommend further actions.

Unit assessment requirements

This unit must be assessed using evidence from real work activities. For further details, please refer to *Appendix A: Assessment rules*.

Simulation is **not** permitted for this unit.

Range statements

The range statements must be read in conjunction with the assessment criteria to which they relate. All items in the range must be covered, except for items that follow an 'e.g.'

1 Be able to perform subsea well testing

1.1 Subsea well testing procedures:

- in accordance with company SOP.

1.2 Well switching and appropriate separator:

- align wellhead header from production train(s) to test separator header
- in accordance with company SOP.

1.3 Collect water samples to determine the water cut:

- in accordance with HSEMS and company SOP.

1.4 Collect gas and liquid meter readings:

- in accordance with HSEMS and company SOP.

1.5 Testing operations:

- in accordance with company SOP
- relevant data, including gas flowrate, wellhead flow tubing pressure, wellhead temperature, annulus A and B pressures.

1.6 Documentation of findings and recommendations

- document findings
- communicate to relevant department, e.g. well engineering, for further actions.

2 Be able to perform subsea well annulus monitoring and bleed down

2.1 Assess annulus A and B pressures and annulus bleed requirements:

- in accordance with company approved guidelines
- comply with maximum and minimum pressures of annulus based on guidelines.

2.2 Planning and scheduling of annulus bleed, including approval:

- document trends of annulus A and B pressures from DCS
- plan to include findings and recommendations for annulus bleed
- obtain approval for annulus bleed in accordance with company MOA.

2.3 Valve alignment:

- in accordance with company SOP.

2.4 Bleed-down operations:

- obtain annulus trends
- bleed-down operations in accordance with company SOP and HSE procedures.

2.5 Annulus pressure trending before and after bleed-down operations:

- extract annulus pressure trends from DCS
- compare before and after bleed-down operations.

2.6 Document findings and recommendations with site management on issues and further actions:

- document findings
- recommend further actions based on findings.

3 Be able to perform a subsea wellhead valve leak test

3.1 Requirements for how to carry out subsea wellhead leak test:

- in accordance with company SOP
- industrial lessons learned
- manufacturer's recommendations and guidelines.

3.2 Requirements and criteria for how to carry out a successful subsea wellhead valve leak test:

- requirements – how frequently subsea wellhead leak tests are needed and pressures that need to be applied
- criteria – differential pressures build-up and holding times.

3.3 Valve leak testing plan and schedule:

- to cover well details
- resources requirement
- timing to ensure minimum disruption to production requirements
- any special supports tools
- HSE considerations
- approval in accordance with delegated manual of authority.

3.4 Well shut-in, valve alignments and valve testing, and pressure equalisation:

- in accordance with company SOP
- follow the correct sequence of valves shutting and opening, including for:
 - production control valve (PCV)
 - production master valve (PMV)
 - production wing valve (PWV).

3.5 Trending of pressures and temperatures:

- monitor pressures of well
- monitor temperatures of well.

3.6 Documentation of and report findings:

- verify results and compare with previous results
- recommend further actions based on outcome of leak test
- communicate findings, as appropriate.

4 Be able to operate subsea chemical injection system

4.1 Chemical injection operations:

- optimise the use of chemicals
- set and monitor chemical injections as approved by production technologist
- in accordance with company SOP for use of chemicals.

5 Be able to operate and maintain a hydraulic system

- 5.1 Operation and maintenance of hydraulic power unit (HPU) system:
- in accordance with company SOP
 - use of approved hydraulic oil.
- 5.2 Replacement of HPU filters when indicated by pressure differentials or laboratory analysis:
- in accordance with company SOP for differential pressure (DP) readings
 - use of approved HPU filters.
- 5.3 Hydraulic fluid samples and appropriate laboratory analysis:
- use of approved sampling equipment
 - use of approved laboratory.
- 5.4 Site hydraulic fluid analysis and PAMAS fluid analyser:
- in accordance with company SOP
 - in accordance with manufacturer's recommendations.

Learning outcomes and assessment criteria

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform subsea well testing	1.1	Explain subsea well testing procedures			
		1.2	Switch well to appropriate separator			
		1.3	Collect water samples to determine the water cut			
		1.4	Collect gas and liquid meter readings			
		1.5	Carry out testing operations			
		1.6	Document and report findings			
2	Be able to perform subsea well annulus monitoring and bleed down	2.1	Assess annulus A and B pressures to determine if an annulus bleed is required			
		2.2	Plan and schedule an annulus bleed, including approval			
		2.3	Perform valve alignment in accordance with company standard operating procedures			
		2.4	Carry out bleed-down operations			
		2.5	Carry out annulus pressure trending before and after bleed-down operations			
		2.6	Document findings, issues and recommendations with site management and agree further actions			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Be able to perform a subsea wellhead valve leak test	3.1	Explain the requirements for how to carry out a subsea wellhead valve leak test			
		3.2	Describe the requirements and criteria for a successful subsea wellhead valve leak test			
		3.3	Plan and schedule valve leak testing, including approval			
		3.4	Carry out well shut-in, valve alignments and valve testing and pressure equalisation			
		3.5	Carry out trending of pressures and temperatures			
		3.6	Document and report findings			
4	Be able to operate a subsea chemical injection system	4.1	Carry out chemical injection operations			
5	Be able to operate and maintain a hydraulic system	5.1	Operate and maintain a hydraulic power unit (HPU) system			
		5.2	Perform replacement of HPU filters when indicated by pressure differentials or laboratory analysis			
		5.3	Take hydraulic fluid samples to appropriate laboratory for analysis			
		5.4	Carry out site hydraulic fluid analysis using fluid analyser as required			

Declarations

I confirm that the evidence for this unit is authentic and a true representation of my own work.

Learner name: _____

Learner signature: _____ Date: _____

I confirm that the evidence for this unit is authentically that of the learner whose name and signature appears above. The assessment has been carried out in accordance with any specified assessment requirements for the unit and qualification.

Assessor name: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____

(if sampled)

5 Assessment

To achieve a pass for qualifications in this suite, the learner must achieve all the units required in the qualification structure.

Internal assessment

The units are assessed through an internally- and externally quality-assured Portfolio of Evidence, consisting of evidence gathered during the course.

Each unit has learning outcomes and assessment criteria. To pass each unit, learners must:

- achieve **all** the learning outcomes
- satisfy **all** the assessment criteria by providing sufficient and valid evidence for each criterion, including meeting any range statements
- prove that the evidence is their own.

The learner must have an assessment record that identifies the assessment criteria that have been met. The assessment record should be cross-referenced to the evidence provided. The assessment record should include details of the type of evidence and the date of assessment. Suitable centre documentation should be used to form an assessment record.

Valid	is relevant to the standards for which competence is claimed
Authentic	is produced by the learner
Current	is sufficiently recent to create confidence that the same skill, understanding or knowledge persists at the time of the claim
Reliable	indicates that the learner can consistently perform at this level
Sufficient	fully meets the requirements of the assessment criteria, including any range statements

Learners can provide evidence of occupational competence from:

- **current practice** – where evidence is generated from a current job role
- a **programme of development** – where evidence comes from assessment opportunities built into a learning programme. The evidence provided must meet the assessment requirements for the qualification and reflect current practice in the sector
- the **Recognition of Prior Learning (RPL)** – where a learner can demonstrate that they can meet a unit's assessment criteria through knowledge, understanding or skills they already possess. The assessor must be confident that the same level of skill, understanding and knowledge exists at the time of the claim as existed at the time the evidence was produced. RPL is acceptable for accrediting part of a unit, one or more units, or a whole qualification

Further guidance is available in our *Recognition of Prior Learning Policy and Process* document, available on our website.

- a combination of the above.

Assessment rules

The assessment rules for the qualifications in this sector are included in *Appendix A*. They set out the principles for assessing the units to ensure that the qualifications remain valid and reliable.

Types of evidence

To achieve a unit, the learner must gather evidence that shows that they have met the required standard specified in the assessment criteria, Pearson's quality assurance arrangements (please see *Section 7 Quality assurance*) and the requirements of the assessment rules given in *Appendix A*.

In line with the assessment rules, evidence for internally-assessed units can take a variety of forms as indicated below:

- direct observation of the learner's performance by their assessor (O)
- outcomes from oral or written questioning (Q&A)
- products of the learner's work (P)
- personal statements and/or reflective accounts (RA)
- outcomes from simulation (S)
- professional discussion (PD)
- witness testimony (WT)
- expert witness testimony (EWT)
- evidence of Recognition of Prior Learning (RPL).

Learners can use the abbreviations in their portfolios for cross-referencing purposes.

Learners can also use one piece of evidence to prove their knowledge, skills and understanding across different assessment criteria and/or across different units. One piece of evidence may be used to demonstrate achievement of several assessment criteria in the same or different units.

Any specific evidence requirements for a unit are given in the *Unit assessment requirements* section of the unit.

Further guidance on centre quality assurance and internal verification processes can be found in *Section 7 Quality Assurance*.

Assessment of knowledge and understanding

Knowledge and understanding are key components of competent performance, but it is unlikely that performance evidence alone will provide sufficient evidence for knowledge-based learning outcomes and assessment criteria. Where the learner's knowledge and understanding is not apparent from performance evidence, it must be assessed through other valid methods, listed above.

6 Administrative arrangements

Introduction

This section focuses on the administrative requirements for delivering a BTEC qualification. It is of particular value to Quality Nominees, Lead IVs and Programme Leaders.

Learner registration and entry

Shortly after learners start the programme of learning, you need to make sure that they are registered for the qualification. You need to refer to the *International Information Manual* for information on making registrations for the qualification.

Learners can be formally assessed only for a qualification on which they are registered. If learners' intended qualifications change, for example if a learner decides to choose a different pathway specialism, then the centre must transfer the learner appropriately.

Access to assessment

Assessments need to be administered carefully to ensure that all learners are treated fairly, and that results and certification are issued on time to allow learners to progress to their chosen progression opportunities.

Pearson's *Equality Policy* requires that all learners should have equal opportunity to access our qualifications and assessments, and that our qualifications are awarded in a way that is fair to every learner. We are committed to making sure that:

- learners with a protected characteristic are not, when they are undertaking one of our qualifications, disadvantaged in comparison to learners who do not share that characteristic
- all learners achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Further information on access arrangements can be found in the Joint Council for Qualifications (JCQ) document *Access Arrangements, Reasonable Adjustments and Special Consideration for General and Vocational Qualifications*.

Administrative arrangements for assessment

Records

You are required to retain records of assessment for each learner. Records should include decisions reached and any adjustments or appeals. Further information can be found in the *International Information Manual*. We may ask to audit your records, so they must be retained as specified.

Reasonable adjustments to assessment

To ensure that learners have fair access to demonstrate the requirements of the assessments, a reasonable adjustment is one that is made before a learner is assessed. You are able to make adjustments to internal assessments to take account of the needs of individual learners. In most cases, this can be achieved through allowing the use of assistive technology or adjusting the format of evidence. Any reasonable adjustment must reflect the normal learning or working practice of a learner in a centre or working within the occupational area. We can advise you if you are uncertain as to whether an adjustment is fair and reasonable. You need to plan for time to make adjustments if necessary.

Further details on how to make adjustments for learners with protected characteristics are given on our website, in the document *Supplementary guidance for reasonable adjustment and special consideration in vocational internally-assessed units*.

Appeals against assessment

Your centre must have a policy for dealing with appeals from learners. These appeals may relate to assessment decisions being incorrect or assessment not being conducted fairly. The first step in such a policy could be a consideration of the evidence by a Lead IV or other member of the programme team. The assessment plan should allow time for potential appeals after assessment decisions have been given to learners. If there is an appeal by a learner, you must document the appeal and its resolution. Learners have a final right of appeal to Pearson but only if the procedures that you have put in place have not been followed. Further details are given in the document *Enquiries and appeals about Pearson vocational qualifications and end point assessment policy*.

Dealing with malpractice in assessment

Malpractice means acts that undermine the integrity and validity of assessment, the certification of qualifications and/or may damage the authority of those responsible for delivering the assessment and certification.

Pearson does not tolerate actual or attempted actions of malpractice by learners, centre staff or centres in connection with Pearson qualifications. Pearson may impose penalties and/or sanctions on learners, centre staff or centres where malpractice or attempted malpractice has been proven.

Malpractice may occur or be suspected in relation to any unit or type of assessment within a qualification. For further details on malpractice and advice on preventing malpractice by learners, please see Pearson's *Centre Guidance: Dealing with Malpractice*, available on our website.

The procedures we ask you to adopt vary between units that are internally assessed and those that are externally assessed.

Centres are required to take steps to prevent malpractice and to investigate instances of suspected malpractice. Learners must be given information that explains what malpractice is for internal assessment and how suspected incidents will be dealt with by the centre. The *Centre Guidance: Dealing with Malpractice* document gives full information on the actions we expect you to take.

Pearson may conduct investigations if we believe a centre is failing to conduct internal assessment according to our policies. The above document gives further information and examples, and details the penalties and sanctions that may be imposed.

In the interests of learners and centre staff, centres need to respond effectively and openly to all requests relating to an investigation into an incident of suspected malpractice.

Learner malpractice

The head of centre is required to report incidents of suspected learner malpractice that occur during Pearson qualifications. We ask centres to complete JCQ Form M1 (www.jcq.org.uk/malpractice) and email it with any accompanying documents (signed statements from the learner, invigilator, copies of evidence, etc.) to the Investigations Processing team at candidatemalpractice@pearson.com. The responsibility for determining appropriate sanctions or penalties to be imposed on learners lies with Pearson.

Learners must be informed at the earliest opportunity of the specific allegation and the centre's malpractice policy, including the right of appeal. Learners found guilty of malpractice may be disqualified from the qualification for which they have been entered with Pearson.

Failure to report malpractice constitutes staff or centre malpractice.

Teacher/centre malpractice

The head of centre is required to inform Pearson's Investigations team of any incident of suspected malpractice (which includes maladministration) by centre staff, before any investigation is undertaken. The head of centre is requested to inform the Investigations team by submitting a JCQ M2 Form (downloadable from www.jcq.org.uk/malpractice) with supporting documentation to pqsmalpractice@pearson.com. Where Pearson receives

allegations of malpractice from other sources (for example Pearson staff, anonymous informants), the Investigations team will conduct the investigation directly or may ask the head of centre to assist.

Pearson reserves the right in cases of suspected malpractice to withhold the issuing of results/certificates while an investigation is in progress. Depending on the outcome of the investigation, results and/or certificates may not be released or they may be withheld.

We reserve the right to withhold certification when undertaking investigations, audits and quality assurance processes. You will be notified within a reasonable period of time if this occurs.

Sanctions and appeals

Where malpractice is proven, we may impose sanctions or penalties, such as:

- mark reduction for affected external assessments
- disqualification from the qualification
- debarment from registration for Pearson qualifications for a period of time.

If we are concerned about your centre's quality procedures we may impose sanctions such as:

- working with centres to create an improvement action plan
- requiring staff members to receive further training
- placing temporary blocks on the centre's certificates
- placing temporary blocks on registration of learners
- debarring staff members or the centre from delivering Pearson qualifications
- suspending or withdrawing centre approval status.

The centre will be notified if any of these apply.

Pearson has established procedures for centres that are considering appeals against penalties and sanctions arising from malpractice. Appeals against a decision made by Pearson will normally be accepted only from the head of centre (on behalf of learners and/or members or staff) and from individual members (in respect of a decision taken against them personally). Further information on appeals can be found in the JCQ Appeals booklet (<https://www.jcq.org.uk/exams-office/appeals>).

Certification and results

Once a learner has completed all the required components for a qualification, the centre can claim certification for the learner, provided that quality assurance has been successfully completed. For the relevant procedures, please refer to our *International Information Manual*. You can use the information provided on qualification grading to check overall qualification grades.

Additional documents to support centre administration

As an approved centre, you must ensure that all staff delivering, assessing and administering the qualifications have access to the following documentation. These documents are reviewed annually and are reissued if updates are required.

- *Pearson International Quality Assurance Handbook*: this sets out how we will carry out quality assurance of standards and how you need to work with us to achieve successful outcomes.
- *International Information Manual*: this gives procedures for registering learners for qualifications, transferring registrations and claiming certificates.
- *Regulatory policies*: our regulatory policies are integral to our approach and explain how we meet internal and regulatory requirements. We review the regulated policies annually to ensure that they remain fit for purpose. Policies related to this qualification include:
 - adjustments for candidates with disabilities and learning difficulties, access arrangements and reasonable adjustments for general and vocational qualifications
 - age of learners
 - centre guidance for dealing with malpractice
 - recognition of prior learning and process.

This list is not exhaustive and a full list of our regulatory policies can be found on our website.

7 Quality assurance

Centre and qualification approval

As part of the approval process, your centre must make sure that the resource requirements listed below are in place before offering the qualification.

- Centres must have access to appropriate physical resources (for example equipment, IT, learning materials, teaching rooms) to support the delivery and assessment of the qualification. This may include a workplace in line with industry standards and/or a Realistic Working Environment (RWE) where this is permitted in the units. This must comply with the requirements specified in the assessment rules in *Appendix A*.
- Staff involved in the assessment process must have relevant expertise and/or occupational experience specified in the assessment rules.
- There must be systems in place to ensure continuing professional development for staff delivering the qualification.
- Centres must have in place appropriate health and safety policies relating to the use of equipment by learners.
- Centres must deliver the qualification in accordance with current equality and diversity legislation and/or regulations.

Continuing quality assurance and standards verification

On an annual basis, we produce the *Pearson International Quality Assurance Handbook*. It contains detailed guidance on the quality processes required to underpin robust assessment and internal verification.

The key principles of quality assurance are that:

- a centre delivering BTEC programmes must be an approved centre, and must have approval for the programmes or groups of programmes that it is delivering
- the centre agrees, as part of gaining approval, to abide by specific terms and conditions around the effective delivery and quality assurance of assessment; the centre must abide by these conditions throughout the period of delivery
- an approved centre must follow agreed protocols for standardisation of assessors and verifiers, for the planning, monitoring and recording of assessment processes, and for dealing with special circumstances, appeals and malpractice.

The approach of quality-assured assessment is through a partnership between an approved centre and Pearson. We will make sure that each centre follows best practice and employs appropriate technology to support quality-assurance processes, where practicable. We work to support centres and seek to make sure that our quality-assurance processes do not place undue bureaucratic processes on centres. We monitor and support centres in the effective operation of assessment and quality assurance.

The methods we use to do this include:

- making sure that all centres complete appropriate declarations at the time of approval
- undertaking approval visits to centres
- making sure that centres have effective teams of assessors and verifiers who are trained to undertake assessment
- assessment sampling and verification, through requested samples of assessments, completed assessed learner work and associated documentation
- an overarching review and assessment of a centre's strategy for delivering and quality assuring its BTEC programmes, for example making sure that synoptic units are placed appropriately in the order of delivery of the programme.

Centres that do not fully address and maintain rigorous approaches to delivering, assessing and quality assurance cannot seek certification for individual programmes or for all BTEC programmes. An approved centre must make certification claims only when authorised by us and strictly in accordance with requirements for reporting.

Centres that do not comply with remedial action plans may have their approval to deliver qualifications removed.

Appendix A: Assessment rules

The purpose of these assessment rules is to ensure that this suite of qualifications is assessed in a valid and reliable manner.

It covers:

1. Approaches to assessment
2. Simulation
3. Requirements for assessors and internal verifiers
4. Requirements for expert witnesses.

1 Approaches to assessment

- 1.1 Within the learning outcomes for the units, there may be a mix of assessment criteria that relate to **performance** and those that relate to **knowledge and understanding**. Assessment criteria relating to knowledge/understanding typically use words such as *identify, describe* and *explain*.
- 1.2 Most of the evidence for assessment criteria that relate to *performance* must derive from real work activities carried out in the workplace. In some circumstances, evidence may come from simulation in a realistic working environment (see section 2 below). For these assessment criteria, the preferred types of evidence are:
 - observation by the assessor of learner performance in the workplace
 - expert witness testimony relating to learner performance in the workplace. This is particularly useful for evidence that occurs when the assessor is not present. To be considered an expert witness, they must meet the definition outlined in section 4.
 - products of work done in the workplace, e.g. written records.
- 1.3 Assessment criteria that relate to knowledge and understanding can be assessed inside or outside the workplace, but the learner must relate their knowledge and understanding to the work environment. For these assessment criteria, evidence is likely to come mainly from:
 - learner reflective accounts
 - oral or written questioning, with questions and answers recorded by the assessor or candidate
 - professional discussion.

2 Simulation

- 2.1 Where simulation is permitted, this is identified within the relevant unit.
- 2.2 Simulation is allowed only in situations where learners are required to respond to a situation that rarely occurs, for example emergencies or situations that would require a complete shutdown of production.
- 2.3 Where simulation is allowed, it must take place in a realistic working environment (RWE). In other words, the conditions should match those that would be normally found in the workplace, including:
 - facilities, equipment and materials
 - relationships with colleagues
 - pressures
 - relevant legislation, regulations and codes of practice.
- 2.4 Individuals involved in the simulation should be assigned roles, and, where appropriate, visual and sound effects should be used, e.g. to simulate explosions. To show their ability to shut down a facility, it is recommended that computer-based simulations can be used.
- 2.5 All simulations must be planned, delivered and documented by the centre in a way that ensures the simulation accurately reflects what the unit seeks to assess.

3 Requirements for assessors and internal verifiers

- 3.1 Assessors and internal verifiers (IVs) must be occupationally competent. This means that each assessor/IV must be competent in the functions covered by the units they are assessing/verifying. This competence must be current and verifiable, and must be sufficient to be effective and reliable when judging the learner's competence. This can be confirmed in various ways, for example through:
 - CV and references
 - possession of relevant qualification(s).
- 3.2 Assessors and IVs must provide evidence of maintaining their occupational competence, for example by maintaining a CPD log.
- 3.3 Assessors and IVs must:
 - understand the structure of the qualification
 - recognise acceptable sources of evidence for the qualification
 - implement the required assessment recording procedures
 - understand and comply with the quality assurance and administrative requirements for the qualification.

3.5 Assessors must have sufficient expertise in the internal verification of competence-based assessment. To evidence this, they must have, or be working towards, one of the following:

- Level 3 Award in Assessing Competence in the Work Environment
- Level 3 Certificate in Assessing Vocational Achievement
- relevant units from predecessor qualifications: D32 and D33; or A1, A2
- qualifications or training that can be demonstrated to be equivalent to one or more of the above.

3.6 Internal verifiers must have sufficient expertise in the internal verification of competence-based assessment. To evidence this, they must have, or be working towards, one of the following:

- Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practice
- relevant units from predecessor qualifications: D34; or V1
- qualifications or training that can be demonstrated to be equivalent to one or more of the above.

4 Expert witnesses

4.1 Pearson supports the use of expert witness testimony as a natural and effective way of contributing to evidence of learners' competence. Nonetheless, the quality of this type of evidence will be affected by the witness's knowledge of the qualification and their own occupational competence. As a minimum, the expert witness must be:

- familiar with the part(s) of the qualification for which they are providing testimony
- occupationally competent – this means that they must be competent in the functions covered by the units they are witnessing
- fully briefed and clear about the purpose and use of the testimony.

Appendix B: Structures of the oil and gas qualification suite at a glance

The tables below show the units and the qualifications to which they contribute in this suite of oil and gas qualifications.

M Mandatory units **O** Optional units

Pearson BTEC International Level 2 Specialist Diplomas for Process, Electrical, Instrument and Mechanical Technicians in Oil and Gas Facilities	Unit size (GLH)	Pathway			
		Process	Electrical	Instrument	Mechanical
1 Control Frontline Barriers in Oil and Gas Operations	120	M	M	M	M
2 Respond and Recover in Emergencies and Incidents	60	M	M	M	M
3 Implement Process Safety	130	M	M	M	M
4 Operate and Monitor Oil Production Processes and Associated Systems	135	M			
5 Operate and Monitor Gas Processes and Dehydration Systems	110	M			
6 Operate and Monitor the Gas Condensate Process and System	50	M			
7 Perform Routine Operations and Maintenance of Electrical Drives and the Motor-control Centre	80		M		
8 Perform Routine Operations and Maintenance of Power Generation and Control Equipment	80		M		
9 Perform Routine Operations and Maintenance of Power Supplies and Lighting Systems	70		M		
10 Perform Routine Operations and Maintenance of Process Measuring and Analyser Devices	70			M	
11 Perform Routine Operations and Maintenance of Current-to-Pneumatic Converters	60			M	

Pearson BTEC International Level 2 Specialist Diplomas for Process, Electrical, Instrument and Mechanical Technicians in Oil and Gas Facilities	Unit size (GLH)	Pathway			
		Process	Electrical	Instrument	Mechanical
12 Perform Routine Operations and Maintenance of Process Controllers and Control Valves	110			M	
13 Perform Routine Operations and Maintenance of Static Equipment	120				M
14 Perform Routine Operations and Maintenance of Reciprocating Engines and Pumps	90				M
15 Perform Routine Operations and Maintenance of Compressors and Turbines	90				M

Pearson BTEC International Level 3 Specialist Diploma in Control Room Operations in Oil and Gas Facilities	Unit size (GLH)	Mandatory or optional
1 Perform Functional Testing of Integrated Process Systems and Remote Control Operations	110	M
2 Perform Central Control Room Operations	120	M
3 Coordinate the Response to Emergencies and Critical Process Situations	120	M
4 Supervise Frontline Safety Barriers	60	O
5 Supervise Process Safety Within Own Area of Work	90	O
6 Supervise Materials Acquisition and Supply Chain Processes for Process-related Frontline Activities	60	O
7 Perform Constituents Testing of Process Fluids	70	O
8 Maintain Flow Assurance on Subsea Wells	150	O
9 Operate and Maintain Subsea Systems	150	O

Pearson BTEC International Level 3 Specialist Diploma in Electrical Engineering Operations in Oil and Gas Facilities		Unit size (GLH)	Mandatory or optional
1	Inspect and Test Installations, Cables and Conductors	100	M
2	Inspect and Test Power Distribution and Protection Systems	100	M
3	Perform Corrective Maintenance of Electrical Equipment and Distribution Systems	100	M
4	Perform Corrective Maintenance of Auxiliary Power and Utilities Systems	100	M
5	Perform Corrective Maintenance of Power Generation and Protection Systems	100	M

Pearson BTEC International Level 3 Specialist Diploma in Instrument Engineering Operations in Oil and Gas Facilities		Unit size (GLH)	Mandatory or optional
1	Perform Corrective Maintenance of Control Systems and Safeguarding Systems	100	M
2	Perform Corrective Maintenance of Distributed Control Systems	120	M
3	Perform Corrective Maintenance of Instrumented Protective Devices and Systems	120	M
4	Perform Corrective Maintenance of Fire and Gas Detection Devices and Systems	120	M

Pearson BTEC International Level 3 Specialist Diploma in Mechanical Engineering Operations in Oil and Gas Facilities		Unit size (GLH)	Mandatory or optional
1	Perform Corrective Maintenance of Reciprocating Engines	120	M
2	Perform Corrective Maintenance of Pumps	120	M
3	Perform Corrective Maintenance of Gas Turbines	120	M
4	Perform Corrective Maintenance of Compressors	120	M

Pearson BTEC International Level 4 Professional Diploma in Oil and Gas Facility Management		Unit size (GLH)	Mandatory or optional
1	Manage Emergency Responses	150	M
2	Manage Health, Safety, Environment and Security	150	M
3	Manage Information and Decision Making	140	M
4	Manage Operations and Asset Integrity	140	M
5	Manage Maintenance Activities	140	O
6	Manage Turnaround and Project Implementation	160	O
7	Manage Process Plant and Well Integrity	120	O
8	Manage Upstream Production and Operations Optimisation	140	O
9	Manage Marine Operations	130	O
10	Manage Marine Export Operations	140	O
11	Manage Onshore Terminal Plant, Storage and Export Facilities	110	O
12	Manage Onshore Terminal Process Optimisation and Export Operations	140	O

Pearson BTEC International Level 4 Professional Diploma in Oil and Gas Installation Management		Unit size (GLH)	Mandatory or optional
1	Manage Emergency Responses	150	M
2	Manage Health, Safety, Environment and Security	150	M
3	Manage Information and Decision Making	140	M
4	Manage Production and Maintenance Operations	150	M
5	Manage Simultaneous Operations	150	M
6	Manage Finance and Human Resources	130	M
7	Manage Operations and Production Plans	150	M

March 2020

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