International Well Control Forum

Well Intervention Pressure Control Subsea Syllabus

November 2017
Version 1.0

Contents

Guidance Notes

1. Introduction

IWCF have created this Well Intervention Pressure Control (WIPC) Subsea optional module to enhance the existing WIPC syllabus.
Although this module is primarily aimed at Level 4 candidates, it is also available for Level 3 candidates who have experience of subsea well intervention operations.

The Subsea module will:

1) Meet the International Association of Oil and Gas Producers (IOGP) recommendations for enhancements to well control training, examination and certification as highlighted in Report 476, issued August 2016.

2) Allow IWCF to continuously deliver the highest standards of well control training and assessment.

1.1. Who should take the WIPC Subsea course?

We recommend personnel in the following positions should take the Subsea module:

Level 3 : Experienced Single Intervention Discipline Subsea Operator
Level 4 : Single Intervention Discipline Subsea Supervisor/Engineer
Level 4 : Subsea Well Services Supervisor/Well Site Leader
Level 4 : Subsea Completion Supervisor/Service Leader.

1.2. How long is the course?

Please refer to the document 'IWCF Well Intervention Subsea Guidance' for all course durations and accreditation requirements.

1.3. How many candidates can a Centre have on a course?

IWCF recommends a maximum of fifteen candidates per course (depending on room size/facilities) for maximum interaction.

2. The syllabi explained

2.1. Testing understanding

IWCF expects candidates' knowledge and understanding of well (pressure) control to be developed so that they can competently perform their assigned well control duties. It is insufficient for any candidate on any level of the course to be coached to pass the assessment.

"The quality of teaching must evolve to ensure learning objectives are met. Training must be taught in line with the stipulated syllabus and it will not be sufficient to base training on "test-similar" or "test-identical" exam questions to help personnel pass the written exam" (IOGP Report 476).

2.2. Learning objectives

The learning objectives in the syllabus are based on the content (subject matter) the instructor must teach to meet the requirements of this module. The use of the wording "learning objective" is in line with the IOGP Report 476 and is a broad overview statement of what the student will be taught during the course.

Example:
'During the course, the student will gain an understanding of: subsea pressure control equipment'.

2.3. Learning outcomes

Learning outcomes have been developed for each of the learning objectives contained in the syllabus. The outcome indicates how each learning objective will be fulfilled with a detailed description of the skills a candidate must have at the end of the course. These learning outcomes are the basis for assessment questions.

Example:
'By the end of the course, the student will be able to: Describe the function of subsea pressure control equipment'.

3. Coding

Subsea Completion and Intervention	**WI-SS-SSO-01**
General Overview	WI-SS-SSO-01.01
Subsea Trees	WI-SS-SSO-01.02
Subsea Wellheads and Tubing Hangers	WI-SS-SSO-01.03
Surface Controlled Sub-Surface Safety Valves	WI-SS-SSO-01.04
Subsea Well Barrier Philosophy	WI-SS-SSO-01.05
Subsea Equipment Suitability	WI-SS-SSO-01.06
Subsea Wellhead Pressure	WI-SS-SSO-01.07
Subsea Well Pressure Calculations	WI-SS-SSO-01.08
Subsea Hydrates	WI-SS-SSO-01.09
Subsea Well Integrity Tests	WI-SS-SSO-01.10
Subsea Intervention Control Systems	WI-SS-SSO-01.11
Subsea Well Kill Methods	WI-SS-SSO-01.12
Subsea Intervention Lubricator (SIL) – Wireline Operations	**WI-SS-SSO-02**
Subsea Pressure Control Equipment (SIL)	WI-SS-SSO-02.01
SIL Operations	WI-SS-SSO-02.02
Subsea Tree Interface (SIL/WCP)	WI-SS-SSO-02.03
Barrier principles (SIL)	WI-SS-SSO-02.04
Barrier Testing (SIL)	WI-SS-SSO-02.05
Problem Situations (SIL)	WI-SS-SSO-02.06
Shut-in (SIL)	WI-SS-SSO-02.07
Subsea Open Water CWOR Operations	**WI-SS-SSO-03**
Subsea Pressure Control Equipment (CWOR)	WI-SS-SSO-03.01
CWOR Operations	WI-SS-SSO-03.02
Subsea Tree Interface (CWOR/LRP)	WI-SS-SSO-03.03
Barrier principles (CWOR)	WI-SS-SSO-03.04
Barrier Testing (CWOR)	WI-SS-SSO-03.05
Problem Situations (CWOR)	WI-SS-SSO-03.06
Shut-in (CWOR)	WI-SS-SSO-03.07

Subsea Landing String / Subsea Test Tree (SSTT) Operations	**WI-SS-SSO-04**
Subsea Pressure Control Equipment (SSTT)	WI-SS-SSO-04.01
SSTT Operations	WI-SS-SSO-04.02
Subsea Tree Interface (SSTT / Subsea BOP)	WI-SS-SSO-04.03
Barrier Principles (SSTT)	WI-SS-SSO-04.04
Barrier Testing (SSTT)	WI-SS-SSO-04.05
Problem Situations (SSTT)	WI-SS-SSO-04.06
Shut in (SSTT)	WI-SS-SSO-04.07

4. Glossary of Terms

ASV	Annular Safety Valve
BOP	Blow Out Preventer
CT	Coiled Tubing
CWOR	Completion Workover Riser
DP	Dynamic Positioning
EDP	Emergency Disconnect Package
HXT	Horizontal Xmas Tree
ID	Internal Diameter
ITC	Internal Tree Cap
IWOCS	Installation Workover Control System
LRP	Lower Riser Package
LV	Lubricator Valve
MUX	Multiplex
OIM	Offshore Installation Manager
PCE	Pressure Control Equipment

PSJ	Ported Slick Joint
ROV	Remotely Operated Vehicle
SFH	Surface Flow Head
SIL	Subsea Intervention Lubricator
SIMOPS	Simultaneous Operations
SCSSV	Surface Controlled Subsurface Safety Valve
SSTT	Sub Sea Test Tree
STT	Surface Test Tree
THCP	Tubing Hanger Crown Plug
THP	Tubing Hanger Plug
THRT	Tubing Hanger Running Tool
THS	Tubing Head Spool
TRT	Tree Running Tool
VXT	Vertical Xmas Tree
WCP	Well Control Package

5. Importance Levels

All learning outcomes have an 'importance' level which is displayed in the far-right column of the syllabus. The importance is based on the criticality factor; the potential risk of a candidate not holding the knowledge. The levels shown below are based on the potential risk of the candidate **not** having the knowledge:

Importance	Level of risk	Explanation
10	Critical	Could lead to catastrophic damage to life, limb, environment, industry.
5	Major	Major risk factor.
4	Serious	Key knowledge – could lead to risk to life, limb and the environment.
3	Moderate	Necessary knowledge.
2	Minor	Underpinning knowledge.
1	Foundation	Foundation knowledge.

6. Assessment Method

The Subsea Module is will be assessed by:

- Written assessment.

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
SUBSEA COMPLETION AND INTERVENTION			
General Overview			
WI-SS-SSO-01.01.01	Pressure control in subsea completion and intervention operations.	Explain the unique challenges of managing pressure control during subsea completion and intervention operations: - Sea water depth - Hydrostatic effects due to sea water depth - Floating vessel movement resulting from metocean environment - Well control equipment on the seabed and PCE on surface - ROV and Diver intervention.	3
WI-SS-SSO-01.01.02	Subsea Intervention Lubricator (SIL) systems.	Describe how SIL systems are used and how they are positioned in intervention mode.	3
WI-SS-SSO-01.01.03	Open Water Completion Workover Riser (CWOR) systems.	Describe how open water CWOR systems are used and how they are positioned in completion, installation and intervention modes, including the following system components: - Surface flowhead - Surface PCE.	3

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-01.01.04	Completion landing strings/Subsea Test Trees (SSTTs).	Describe how completion landing strings/SSTTs are used, and how they are positioned in completion, installation and intervention modes, including the following system components: - Surface flowhead - Surface PCE - Riser sealing mandrel assemblies (for deep water and gas).	3
WI-SS-SSO-01.01.05	The well (pressure) control responsibilities of personnel involved in the subsea intervention.	Describe the lines of communication and the roles of responsible personnel (including OIM/Captain and Subsea Engineer) involved in subsea well intervention pressure control. Explain why toolbox talks and pre-job on site planning must include all responsible personnel.	5
WI-SS-SSO-01.01.06	Handover from and back to the host installation.	Describe the handover from and back to the host installation including: - System isolations and depressurisation - Handover of well control functions - Lines of communication with the host installation.	10

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-01.01.07	Vessel or rig positioning.	Explain rig anchor systems and rig or vessel DP systems including: - Watch circles - Weather forecast (wind, wave and current) drift or drive off - Emergency response. Explain the marine operational risks, and identify how to mitigate those risks including: - Safe handling zones - Dropped objects risk and prevention - SIMOPS.	4
WI-SS-SSO-01.01.08	Heave compensation systems.	Describe the function and failure modes of active and passive heave compensation systems for: - Equipment land-out - Riser tensioning - Wireline and CT well entry.	4
Subsea Trees			
WI-SS-SSO-01.02.01	Subsea tree pressure control functions and barrier elements.	Describe the primary function of HXT systems and VXT systems including the following barrier elements: - Master, swab and flow line valves - THPs and profiles - Tubing hanger seals - Connectors and seals.	10

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Subsea Wellheads and Tubing Hangers			
WI-SS-SSO-01.03.01	The types of subsea wellheads.	Describe the types of subsea wellheads: - HXT systems - VXT including THS systems.	5
WI-SS-SSO-01.03.02	Subsea tubing hangers.	Describe the primary function of subsea HXT and VXT tubing hangers including: - To seal off the annulus - To support the tubing weight - To provide a landing profile for THPs or THCPs.	5
Surface Controlled Sub-Surface Safety Valves			
WI-SS-SSO-01.04.01	Surface Controlled Sub-Surface Safety Valves (SCSSVs) and Annulus Safety Valves (ASVs) in a subsea environment.	For a subsea completion, describe: - SCSSV/ASV control line routing and common leak paths - How deep water can limit the choice of SCSSV - The risk of hydrates due to the location of the SCSSV (low temperatures and high pressures).	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Subsea Well Barrier Philosophy			
WI-SS-SSO-01.05.01	Barrier philosophy for subsea wells.	Describe the barrier elements (mechanical and fluid) required on a subsea well, including completion, installation and intervention modes. Consider intervention systems connected to: - Wellhead - HXT - VXT.	10
WI-SS-SSO-01.05.02	How to test subsea mechanical barriers.	From a given situation, assess both positive and negative inflow test methods for subsea mechanical barriers using: - Surface and subsea pumps - Hoses - Umbilical - Chemical injection units. From a given situation, explain how to test subsea mechanical barriers, including: - By applying pressures - By monitoring pressures.	5
WI-SS-SSO-01.05.03	Fluid barriers in a subsea well.	Describe fluid hydrostatic pressure and the relationship with formation pressure in a subsea well, considering: - Overbalance - Water depth - Hydrostatic - Riser margin - Air gap.	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-01.05.04	Multiple barrier protection in a subsea well.	From a given subsea situation, identify the required well barriers (including hydrostatic fluid monitoring).	5
Subsea Equipment Suitability			
WI-SS-SSO-01.06.01	How to determine if the equipment on a subsea well is suitable for the well intervention operation.	From given subsea well data and a specific operation, determine if the subsea equipment is suitable, considering: - Mechanical connections - Pressure ratings (internal and external) - Fluid exposure - Temperature - Environment (water depth and current).	5
Subsea Wellhead Pressure			
WI-SS-SSO-01.07.01	How to determine shut-in subsea well head pressure.	Demonstrate how to determine shut-in subsea well head pressure using: - Previous well data - Live instruments (such as tree and downhole gauges) - Using data from below the wellhead or at surface (with confirmed well fluid properties).	4

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Subsea Well Pressure Calculations			
WI-SS-SSO-01.08.01	Calculating downhole pressures in a subsea well.	From a given a set of data, calculate the differential pressures at any point between the tubing and annulus (above and below any barrier) considering: - Sea water depth and fluid column - Air gap - Control line and hydrostatic due to water depth.	4
Subsea Hydrates			
WI-SS-SSO-01.09.01	Hydrate formation in a subsea environment.	Explain why hydrate formation may be more likely in a subsea environment due to: - Lower temperature - Higher hydrostatic pressure due to water and well depth - External hydrates around connectors. Explain how to prevent and mitigate hydrates by using chemical injection at different fluid entry points: - SSTT - Riser and/or choke and kill lines - Hoses - Subsea tree - Downhole - LV and STT/SFH.	4

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Subsea Well Integrity Tests			
WI-SS-SSO-01.10.01	How to do subsea well integrity tests.	Describe the correct rig-up and how to do subsea well integrity tests (positive and negative inflow) on intervention systems connected to: - Wellhead - HXT - VXT. Explain the limits of 'A' annulus access only for: - Casing integrity tests - Plug tests - Sliding Sleeve tests.	5
WI-SS-SSO-01.10.02	How to analyse subsea integrity test results.	From given test data, describe the effects of the following factors on subsea integrity test results: - Tested volume - Temperature - Fluid expansion - Remoteness of subsea systems.	4
Subsea Intervention Control Systems			
WI-SS-SSO-01.11.01	Subsea intervention control system types.	Describe the types of subsea intervention control systems and how they are used: - Direct hydraulics - Electro-hydraulic/MUX.	3

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-01.11.02	Subsea operations using ROVs and Divers.	Describe how ROVs and Divers are used to operate manual valves and functions (including secondary override).	3
Subsea Well Kill Methods			
WI-SS-SSO-01.12.01	How to select the most appropriate kill method for a subsea well.	From a given set of subsea well bore conditions, explain the most appropriate kill method to choose, and describe limitations such as: - Options available for handling hydrocarbons - Available kill fluid volume.	5
WI-SS-SSO-01.12.02	Slow circulation rates for subsea wells.	Explain how subsea well bore configuration and pump parameters affect the choice of slow circulation rates (considering choke/kill line friction loss).	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
SUBSEA INTERVENTION LUBRICATOR (SIL) – WIRELINE OPERATIONS			
Subsea Pressure Control Equipment (SIL)			
WI-SS-SSO-02.01.01	The PCE required for subsea wireline/cable operations.	For a given subsea wireline/cable operation, describe the function of the subsea PCE.	4
WI-SS-SSO-02.01.02	How to install and test subsea PCE elements required for the subsea wireline/cable operation.	Describe how to install and test the subsea PCE elements required for the subsea wireline/cable operation.	4
WI-SS-SSO-02.01.03	The barrier element configuration on a SIL well control package.	From a given diagram or description of a SIL well control package: - Describe the function - Explain the reasons for the ram/valve configuration (to maintain well barrier envelopes at different phases of the operation).	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-02.01.04	Operating a subsea grease injection/pressure control head.	From a given diagram or description of a subsea grease injection/pressure control head, identify the components and explain their function.	4
WI-SS-SSO-02.01.05	Operating a lower subsea lubricator section.	From a given diagram or description of a lower subsea lubricator section, identify the components and explain their function including: - Pressure monitoring - Bleed off systems. Describe how to determine if the equipment is fit for use.	4
SIL Operations			
WI-SS-SSO-02.02.01	The limits of a SIL system for subsea intervention operations.	From a given subsea rig-up with a SIL system, assess if an operation can be carried out: - Slickline/e-line operations - Setting and recovery operations - Fishing operations (wireline tools). Explain why the SIL system ID must be considered when assessing if an operation can be carried out.	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Subsea Tree Interface (SIL/WCP)			
WI-SS-SSO-02.03.01	The components required for rig-up on a subsea tree during SIL operations.	From a given a rig-up on a subsea tree during SIL operations, identify the components required and explain how to prepare the equipment, including connections, adaptors and sealing surfaces. Consider intervention systems connected to: - HXT - VXT.	4
Barrier Principles (SIL)			
WI-SS-SSO-02.04.01	The mechanical barrier elements used in SIL equipment for subsea wireline operations.	Describe the mechanical barrier elements used in SIL equipment for subsea wireline operations. Consider intervention systems connected to: - HXT - VXT.	5
WI-SS-SSO-02.04.02	Primary barrier elements, secondary barrier elements and shearing devices for SIL operations.	From a given SIL rig-up and well system diagram/description, identify the primary barrier elements, secondary barrier elements and shearing devices. Explain shearing device operating limits including: - Shear valve capability - Operating pressure - Accumulator supply (including hydrostatic depth effects).	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Barrier Testing (SIL)			
WI-SS-SSO-02.05.01	How to pressure test a SIL equipment stack.	From a given situation, describe how to pressure test the SIL equipment stack for intervention systems connected to: - HXT - VXT.	5
WI-SS-SSO-02.05.02	How to pressure test a SIL equipment rig-up.	From a given diagram or description of SIL equipment, explain how to pressure test a well control barrier element, for example: a valve or BOP ram in the direction of well bore pressure.	5
Problem Situations (SIL)			
WI-SS-SSO-02.06.01	What to do if there is a leak in the stuffing box during a subsea slickline SIL operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the stuffing box during a subsea slickline SIL operation. Consider intervention systems connected to: - HXT - VXT.	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-02.06.02	What to do if there is leak in the PCE during a subsea slickline SIL operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the PCE during a subsea slickline SIL operation. Consider intervention systems connected to: - HXT - VXT.	5
WI-SS-SSO-02.06.03	What to do if there is a leak in the grease injection head during a subsea braided line SIL operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the grease injection head during a subsea braided line SIL operation. Consider intervention systems connected to: - HXT - VXT.	5
WI-SS-SSO-02.06.04	What to do if the cable breaks during a subsea braided line SIL operation.	Explain how to make the situation safe while maintaining control of the subsea well if the cable breaks during a subsea braided line SIL operation. Consider intervention systems connected to: - HXT - VXT.	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-02.06.05	What to do if the hydraulic control unit fails on the SIL IWOCS.	Explain how to make the situation safe while maintaining control of the subsea well if the hydraulic control unit fails on the SIL IWOCS. Consider intervention systems connected to: - HXT - VXT.	5
Shut-in (SIL)			
WI-SS-SSO-02.07.01	How to safely shut in a subsea well during a SIL operation.	From a given situation, explain how to shut in the subsea well safely during a SIL operation with or without wire in the hole, considering: - Valve and connector sequence - Lines of communication - Emergency compared to planned shut in. Consider intervention systems connected to: - HXT - VXT.	10

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
SUBSEA OPEN WATER CWOR OPERATIONS			
Subsea Pressure Control Equipment (CWOR)			
WI-SS-SSO-03.01.01	The well control equipment required for subsea CWOR operations.	For a given CWOR operation, describe the function of the subsea well control equipment: - Tree connector/TRT - LRP - EDP - Riser joints - Stress joint - Annulus circulation line - Lubricator Valve - STT /SFH.	4
WI-SS-SSO-03.01.02	How to install and test subsea CWOR well control equipment required for the operation.	From a given stack configuration, explain how to install and test the subsea CWOR well control equipment: - Tree connector/TRT - LRP - EDP - Riser joints - Stress joint - Annulus circulation line - Lubricator Valve - STT/SFH.	4
WI-SS-SSO-03.01.03	The barrier element configuration on a CWOR well control package/LRP (including surface PCE).	From a given diagram or description of a CWOR well control package/LRP (including surface PCE): - Describe the function - Explain the reasons for the system configuration (to maintain well barrier envelopes throughout the operation).	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
CWOR Operations			
WI-SS-SSO-03.02.01	The limits of a CWOR system for subsea intervention operations.	From a given rig-up with a CWOR system, assess if an operation can be carried out: - Slickline/e-line operations - CT operations - Setting and recovery operations - Fishing operations. Explain why the CWOR system ID must be considered when assessing if an operation can be carried out.	5
WI-SS-SSO-03.02.02	How to install and operate different types of subsea CWOR barrier sealing elements.	From a given diagram or description, identify the different types of CWOR barrier sealing elements. Describe how to install and operate CWOR barrier sealing elements considering the following situations: - Pressure assistance on closing - Different operating pressures - Hydraulic connections.	4
Subsea Tree Interface (CWOR/LRP)			
WI-SS-SSO-03.03.01	The components required for a compatible rig-up on a subsea tree during CWOR operations.	From a given CWOR diagram or description, identify the components (including adaptors and connectors) required for a compatible rig-up considering correct pressure ratings and dimensions. Explain how to prepare the equipment including sealing surfaces. Consider intervention systems connected to: - Wellhead - HXT - VXT.	4

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Barrier Principles (CWOR)			
WI-SS-SSO-03.04.01	The mechanical barrier elements used in CWOR equipment for subsea operations.	Describe the mechanical barrier elements used in CWOR equipment for subsea operations. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5
WI-SS-SSO-03.04.02	Primary barrier elements, secondary barrier elements, and shearing devices for CWOR operations.	From a given CWOR rig-up and well system diagram/description, identify the primary barrier elements, secondary barrier elements and shearing devices. Explain shearing device operating limits including: - Shear valve capability - Operating pressure - Accumulator supply (including hydrostatic depth effects).	5
Barrier Testing (CWOR)			
WI-SS-SSO-03.05.01	How to pressure test a CWOR equipment stack.	From a given situation, describe how to pressure test the CWOR equipment stack for intervention systems connected to: - Wellhead - HXT - VXT.	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-03.05.02	How to pressure test a CWOR equipment rig-up.	From a given diagram or description of CWOR equipment rig-up, explain how to pressure test a well control barrier element, for example: a valve or BOP ram in the direction of well bore pressure.	5
Problem Situations (CWOR)			
WI-SS-SSO-03.06.01	What to do if there is a leak in the riser during a subsea slickline CWOR operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the riser during a subsea slickline CWOR operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5
WI-SS-SSO-03.06.02	What to do if there is a leak in the LRP during a subsea slickline CWOR operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the LRP during a subsea slickline CWOR operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-03.06.03	What to do if there is there is a leak in the CT during a subsea CWOR operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the CT during a subsea CWOR operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5
WI-SS-SSO-03.06.04	What to do if the CT breaks during a subsea CWOR operation.	Explain how to make the situation safe while maintaining control of a subsea well if the CT breaks during a subsea CWOR operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5
WI-SS-SSO-03.06.05	What to do if there if the control package/LRP or IWOCS fails during a CWOR operation.	Explain how to make the situation safe while maintaining control of the subsea well if the control package/LRP or IWOCS fails during a CWOR operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
Shut-in (CWOR)			
WI-SS-SSO-03.07.01	How to safely shut in a subsea well during a CWOR operation.	From a given situation, explain how to shut in the subsea well safely during a CWOR operation, with or without wire or CT in the hole, considering: - Valve and connector sequence - Lines of communication - Emergency compared to planned shut in. Consider intervention systems connected to: - Wellhead - HXT - VXT.	10

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
SUBSEA LANDING STRING/SUBSEA TEST TREE (SSTT) OPERATIONS			
Subsea Pressure Control Equipment (SSTT)			
WI-SS-SSO-04.01.01	The well control equipment required for SSTT operations.	For a given SSTT operation, describe the function of the subsea well control equipment: - THRT - THRT adapter - PSJ - SSTT - Shear sub - Landing string/riser joints - Lubricator Valve - STT/SFH - Spanner Joints (simple SSTT string).	4
WI-SS-SSO-04.01.02	How to install and test well control equipment required for SSTT operations.	From a given stack configuration, explain how to install and test the well control equipment required for SSTT operations: - THRT - THRT adapter - PSJ - SSTT - Shear sub - Landing string/riser joints - Lubricator Valve - STT/SFH - Spanner Joints (simple SSTT string).	4

Category	Learning objective During this course, the student will gain an understanding of:	Learning outcome By the end of this course, the student will be able to:	Importance
WI-SS-SSO-04.01.03	The barrier element configuration of a subsea landing string system including SSTT and surface PCE.	From a given diagram or description of a subsea landing string system: - Describe the function - Explain the reasons for the system configuration (to maintain well barriers envelopes at different phases of the operation).	5
WI-SS-SSO-04.01.04	Space out of the SSTT within the rig BOP.	Explain the positioning of the SSTT within the rig BOP. From a given situation, assess which BOP ram equipment must be changed to match the SSTTs.	4
WI-SS-SSO-04.01.05	The limits of SSTT shear ram equipment.	Describe the limits of SSTT shear ram equipment including: - Non-shearable tubulars/downhole tools/crown plugs - Physical shear testing - Effects of control accumulator pressures - Water depth.	5

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WI-SS-SSO-04.01.06	The secondary operational features of the SSTT system.	Describe the function of rupture discs and shuttle valve arrangements: - To close the SSTT valve using external annulus pressure - THRT or SSTT unlatch. Describe the advantages and disadvantages of these arrangements: - Can unlatch if the umbilical fails - Risk of rupture/unplanned unlatching - Difficult to achieve annular BOP annulus pressure required (if there is a large annular slick joint OD).	3
WI-SS-SSO-04.01.07	The rig BOP ram equipment geometry and interface to the SSTT.	Explain how to configure the SSTT system for BOP vertical space-out: - Pipe rams around ported slick joint - Shear rams across the shear sub - Annular around retainer valve or annular slick joint.	3
WI-SS-SSO-04.01.08	Check valves in SSTTs.	Describe how to use, position and test check valves within the chemical injection line of the SSTT. Explain the advantages and disadvantages of using check valves: - Chemical injection fluids may have a lighter weight (no back pressure on reel) - Avoids the risk of fluid contamination in the chemical injection line - Check valves are a well barrier element and may leak.	3

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WI-SS-SSO-04.01.09	When a rig BOP annular should be closed on a SSTT system.	Describe when and why a rig BOP annular should be closed when used with a SSTT system including: - During a planned disconnect (circulating hydrocarbons from the SSTT system bore) - If a BOP ram fails - When operating secondary unlatch methods.	3
WI-SS-SSO-04.01.10	Choke and kill lines within the rig BOP when using the SSTT system.	Describe how to use and position the choke and kill lines within the rig BOP when using the SSTT system.	3
SSTT Operations			
WI-SS-SSO-04.02.01	The well intervention operations that can be carried out with a SSTT system.	From a given subsea rig-up with a SSTT system, assess which operations can be carried out, considering: - SSTT system ID limits - Through tubing operations (slickline, e-line and CT) - Through tubing fishing operations - Pull and run Completion/Tubing Hanger/ITC on SSTT system - SSTT system run through Marine Riser/Subsea BOP.	5

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WI-SS-SSO-04.02.02	The operations that can be carried out during well kill with an unlatched SSTT in the rig BOP.	From a given equipment rig-up, explain which operations can carried out during well kill with an unlatched SSTT in the rig BOP.	4
WI-SS-SSO-04.02.03	How to install and operate different types of SSTT barrier sealing elements.	From a given diagram or description, identify different types of SSTT barrier sealing elements. Describe how to install and operate SSTT barrier sealing elements, considering the following situations: - Well pressure assistance on closing - Different operating pressures - Hydraulic connections - Unidirectional/bi-directional sealing - Pump through capability.	4

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Subsea Tree Interface (SSTT / Subsea BOP)			
WI-SS-SSO-04.03.01	How to prepare the equipment for rig-up on a Subsea Tree/Wellhead during SSTT operations.	For a given rig-up, explain how to prepare the equipment during SSTT operations, including sealing surfaces, connections and BOP connector gaskets, considering the following methods: - ROV inspection - Jet wash and/or brushing - Marine riser and BOP cavity flushing to remove debris. Consider intervention systems connected to: - Wellhead - HXT - VXT.	4
WI-SS-SSO-04.03.02	The components required for a compatible rig-up on a subsea tree/wellhead during SSTT operations.	From a given SSTT diagram or description, identify the components (including adaptors and connectors) required for a compatible rig-up considering: - BOP connector for interface to Subsea Tree/Wellhead - SSTT system THRT - Correct pressure ratings and dimensions. Consider intervention systems connected to: - Wellhead - HXT - VXT.	4

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Barrier Principles (SSTT)			
WI-SS-SSO-04.04.01	The mechanical barrier elements used in SSTT system operations.	Describe the mechanical barrier elements used in SSTT system operations. Consider invention systems connected to: - Wellhead - HXT - VXT.	5
WI-SS-SSO-04.04.02	Primary barrier elements, secondary barrier elements, and shearing devices in SSTT operations.	From a given a SSTT rig-up and well system diagram/description, identify the primary barrier elements, secondary barrier elements and shearing devices. Explain shearing device operating limits including: - Shear valve capability - Operating pressure - Accumulator supply (including hydrostatic depth effects).	5
Barrier Testing (SSTT)			
WI-SS-SSO-04.05.01	How to pressure test a SSTT system/subsea BOP equipment stack.	From a given situation, describe how to pressure test a SSTT system/subsea BOP equipment stack. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5

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WI-SS-SSO-04.05.02	How to pressure test a SSTT equipment rig-up.	From a given diagram or description of a SSTT rig-up, explain how to pressure test a well control barrier element, for example: a valve or BOP ram in the direction of well bore pressure.	5
Problem Situations (SSTT)			
WI-SS-SSO-04.06.01	What to do if there is a leak in the riser during a subsea slickline SSTT operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the riser during a subsea slickline SSTT operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5
WI-SS-SSO-04.06.02	What to do if there is a leak in SSTT system during a subsea slickline operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the SSTT system during a subsea slickline operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5

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WI-SS-SSO-04.06.03	What to do if there is a leak in the CT during a SSTT operation.	Explain how to make the situation safe while maintaining control of the subsea well if there is a leak in the CT during a SSTT operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5
WI-SS-SSO-04.06.04	What to do if the CT breaks during a SSTT operation.	Explain how to make the situation safe while maintaining control of the subsea well if the CT breaks during a SSTT operation. Consider intervention systems connected to both: - Wellhead - HXT - VXT.	5
WI-SS-SSO-04.06.05	What to do if the IWOCS fails during a SSTT operation.	Explain how to make the situation safe while maintaining control of the subsea well if the IWOCS fails during a SSTT operation. Consider intervention systems connected to: - Wellhead - HXT - VXT.	5

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Shut in (SSTT)			
WI-SS-SSO-04.07.01	How to safely shut in a subsea well during a SSTT operation.	From a given situation, explain how to shut in the subsea well safely during a SSTT operation, with or without wire or CT in the hole considering: - Valve and connector sequence - Lines of communication - Emergency compared to planned shut in. Consider intervention systems connected to: - Wellhead - HXT - VXT.	10