International Well Control Forum

Well Intervention Pressure Control
Level 2 Syllabus

July 2015
Version 7.0

Contents

Guidance Notes

1. OVERVIEW

1.1. Introduction

This course syllabus aims to meet the recommendations for enhancements to well control training, examination and certification produced by the International Association of Oil and Gas Producers (OGP) in report number 476 issued in October 2012.

1.2. Who takes the Well Intervention Pressure Control course?

We recommend personnel in the following positions should attend the appropriate level of training and assessment:

Level 2	:	Assistant Operator (Wireline, Coiled Tubing, Snubbing).
Level 3	:	Equipment Operator (Wireline, Coiled Tubing, Snubbing).
Level 3-4	:	Single Discipline Supervisor/Engineer (on successful completion of Level 3 should progress to level 4).
Level 4	:	Well Services Supervisor.
Level 4	:	Completion Supervisor/Service Leader.

Appendix 2 in the OGP Report 476 has more specific job categories.

1.3. How long is the course?

The Level 2 training course must be a minimum of 20 hours.

The Level 3 and Level 4 training courses must be a minimum of 28 hours - based on all options taken - not including examination time.

1.4. 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.

1.5. When can a candidate move on from Level 2 to Level 3 and then to Level 4?

Level 2 Well Intervention courses should be run as a separate course.

Level 3 Well Intervention courses may be partly combined with the Level 4 Supervisor Pressure Control Training for common modules of this course.

If Level 4 Supervisor and Level 3 Operator training courses are partially combined, whilst advanced well pressure control operations are being taught to the Level 4 Supervisory personnel, Level 3 Operator participants should spend this time on training to improve detection and immediate-response skills". (Page 11, OGP Report 476).

IWCF recommends a minimum three month period to build further industry experience and competence before the candidate moves onto the next level. It is unacceptable for a Level 3 candidate to be enrolled on a Level 4 course at the same time.

Please refer to the IWCF website for guidance on progression: http://www.iwcf.org/news-events/news/52-guidance-for-progression-through-levels-2-4

2. The Level 2, 3 and 4 syllabi explained

2.1. Testing understanding

IWCF expects candidates' knowledge and understanding of basic well intervention pressure control to be developed so that they can "competently perform their assigned well control duties" (OGP Report 476). It is insufficient for candidates on any level of course to be simply coached to pass an exam.

"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". (OGP Report 476).

2.2. Structure of the written test syllabus

2.2.1. Learning objectives (formerly "standards")

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

Example:

During the course students will gain an understanding of …….how to drive a car.

2.2.2. Learning outcomes (formerly "performance criteria")

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 student must have at the end of the course. These learning outcomes are the basis for assessment questions.

Example:

By the end of the course students will be able to ……drive a car including:

- Reversing round a corner
- Parking.

2.2.3. Syllabus division

The written test syllabus is divided into two sections:

Compulsory Modules:

- Completion Operations
- Completion Equipment.

Optional Modules:

- Coiled Tubing Operations
- Snubbing Operations
- Wireline Operations.

Please note: at least one optional module must be taken.

2.2.4. Coding

	Well Intervention Pressure Control
Completion Operations	
Overview	WA
Introduction to well control	WB
Introduction to barriers	WC
Risk management	WD
Circulating system	WG
Testing	WP
Influx characteristics and behaviour	WI
Shut-in procedures	WJ
Well control methods	WK
Contingency planning	WN
Completion Equipment	
Blow Out Preventers	WEQA
Completion equipment	WEQG
Annulus pressure monitoring	WEQJ

	Well Intervention Pressure Control
Coiled Tubing Operations	
Coiled Tubing Equipment	WCA
Rigging up	WCD
Testing	WCE
Barrier principles	WCF
Shut-in procedures	WCH
Snubbing Operations	
Pressure Control Equipment	WSA
Rigging—up procedure	WSD
Testing	WSE
Barrier principles	WSF
Shut-in procedures	WSH
Critical Operating procedures	WSI
Wireline Operations	
Pressure Control Equipment	WWA
Rigging-Up	WWD
Testing	WWE
Barrier principles	WWF
Contingency Procedures	WWL
Critical Operating Procedures	WWK

2.2.5. Levels

All learning outcomes have been given an “importance”, in other words, a number of points. This is shown in the right hand column on the syllabus. The importance is based on their level of “criticality” in the syllabus.

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.

2.2.6. Assessment method

The Level 2 course is based on:

- Written assessment.

New syllabus 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
COMPLETION OPERATIONS			
OVERVIEW			
Well control incidents			
WA01.01	The negative impact and effects of a well control incident.	Describe the impact of a well control incident on: - personal wellbeing - personal injury - employment - the environment - reputation - society. Give examples of some of the effects of a well control incident such as: - capital loss - over-regulation - the suspension of drilling - limiting areas of operations, for example, in the Arctic.	5
WA01.02	Well integrity requirements throughout the well life cycle from construction to abandonment and the importance of well integrity in preventing well control incidents.	Define the term “well integrity management” (keeping hydrocarbons in the pipe) and explain why this is important.	5
Well control training and assessment			
WA02.01	The need for well control training and assessment.	Explain "why are we here?" including: - the trust of stakeholders - avoiding over-regulation - the recruitment of new personnel - responsibility to colleagues - competence.	5

New syllabus 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
Pre-operation planning			
WA03.02	The need for a plan outlining the well control responsibilities of personnel involved in the task.	Explain why pre-job site planning and the Stop Work Authority are so important.	5
WA03.03	The importance of pre-job meetings and Toolbox Talks.	Give examples of the benefits of holding meetings before any well operation.	5
Handover			
WA04.01	The reasons for confirming well integrity before handover/takeover of the well.	Explain why well integrity or pressure isolation is confirmed before rigging-up equipment on the well.	5
INTRODUCTION TO WELL CONTROL			
Hydrostatic pressure			
WB01.01	The term “hydrostatic pressure”.	Define the term “hydrostatic pressure”.	3
WB01.02	Factors that affect hydrostatic pressure.	List the factors that affect hydrostatic pressure.	5
Formation pressure			
WB02.01	The term “formation pressure”	Define the term “formation pressure”.	3
Fracture pressure			
WB03.01	The term “fracture pressure”.	Define the term “fracture pressure” and give examples of its impact on well integrity such as formation breakdown.	2
Primary well control			
WB04.01	Primary well control.	Explain primary well control.	5

New syllabus 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
Secondary well control			
WB05.01	Secondary well control.	Explain secondary well control.	5
Pressure control equipment			
WB06.01	The uses of the Blow Out Preventer (BOP) and pressure control equipment.	Give examples of the uses of the BOP and pressure control equipment.	5
INTRODUCTION TO BARRIERS			
WC01.01	Well barrier philosophy in intervention operation.	Describe best practice of having two barriers between the source of pressure in the well and atmosphere before breaking containment.	5
Barrier Management			
WC02.01	The term “barrier”.	Define the term “barrier”.	3
WC02.02	The well barrier envelopes in well operations.	Describe the principle of barrier envelopes.	3
WC02.04	The need to verify barrier elements.	Explain why barriers must be tested. List the reference sources for barrier test criteria including: - the well programme - operations manuals - company/industry standards - specifications from equipment manufacturers - integrity testing - low and high pressure tests.	3
WC02.06	The correct action to take when a well barrier/element test fails.	Explain the importance of taking the correct action when a well barrier/element test fails.	2

New syllabus 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
WC02.07	The principles of different barrier types: - mechanical barriers - fluid barriers.	Describe the principles of different barrier types and explain the differences between - mechanical barriers - fluid barriers and explain how they work, including fluid hydrostatic pressure and the relationship with formation pressure (overbalance).	2
WC02.08	The principle of grouping barrier elements into primary and secondary barriers and shearing devices.	Identify primary and secondary barriers and shearing devices from a given surface well system diagram.	2
WC02.09	Barrier terminology - “primary” and “secondary” barriers.	Define the terms “primary” and “secondary” barriers.	2
RISK MANAGEMENT			
WD01.01	The main principles of systematic risk management.	Describe the principles of risk management – identify impact and probability, mitigate and control.	3
WD01.02	The need for a Management of Change (MOC) process.	Explain the importance of recognising and managing change; explain why an MOC process is needed.	3
WD02.01	The importance of well control and emergency drills.	Explain the purpose and list the correct steps and common procedures for well control and emergency drills, including how long they should take.	3
CIRCULATING SYSTEM			
Definition and Principles			
WG01.01	The purpose of a kill system.	Describe the main items required for a kill system such as equipment and fluids.	2

New syllabus 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
TESTING			
Inflow Testing			
WP01.01	An inflow test.	Describe an inflow test.	5
WP01.02	The importance of an inflow test.	Explain why an inflow test is done.	5
WP01.07	The specific roles and responsibilities of everyone during inflow tests.	Explain “who does what” during inflow tests.	5
WELL INTEGRITY TESTING			
WH01.01	Why integrity testing is used.	Explain why integrity testing is used.	5
INFLUX CHARACTERISTICS AND BEHAVIOUR			
Principles			
WI01.01	The hazards of surface leaks.	Give examples of the associated hazards of surface leaks: - gas (hydrocarbon, H_2S, CO_2) - stimulation fluids - oil - water.	5
WI01.05	The different types of surface leaks.	Recognise the different types of surface leaks: - valves - ruptures - hoses/pipes - hydraulic control.	5

New syllabus 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 PROCEDURES			
General Principles			
WJ01.01	The importance of having a shut-in procedure.	Describe the roles and responsibilities in a shut-in procedure.	3
Procedure			
WJ02.05	The possible consequences of opening and closing valves under differential pressure.	Explain the precautions to take when opening a valve under differential pressure using a given example. Explain the importance of following instructions in an emergency situation. Identify the correct steps to shut in the well at the Christmas Tree, for example the number of turns to close it and which valves in sequence using a given example including: - no tools in the hole - tools in the hole - tubing in the hole.	5
Interpretation			
WJ04.01	Why pressures must be recorded once the well is shut in.	Explain why pressures are recorded after the well has been shut in.	2
Observations			
WJ05.01	The limitations of a pressure gauge and how to correctly read the gauge.	Explain the limitations of pressure gauges and the importance of accurate calibration.	2

New syllabus 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
WELL CONTROL METHODS			
Kill Method Principles			
WK02.01	The principles of the different well control methods.	Describe the basic principle of killing a well using each of the three methods: - bullheading - reverse circulating - lubricate and bleed.	2
CONTINGENCY PLANNING			
Pressure Gauge Failure			
WN02.01	How to detect when pressure gauges are not working correctly and the correct action to take.	Identify different types of pressure gauge problems from given examples, for example, physical damage, vibration damage and loss of fluids within the gauge, and explain the correct action to take.	2
Hydrate Formation			
WN05.01	Hydrates.	Describe how hydrates form and how to prevent them.	2

New syllabus 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
COMPLETION EQUIPMENT			
BLOWOUT PREVENTERS (BOP)			
Connections			
WEQA05.01	The importance of choosing the correct flange gasket and make-up procedures.	Identify different types of flanges from given examples and describe flange compatibility.	2
COMPLETION EQUIPMENT			
WEQG01.01	The purpose and function of the Christmas Tree and wellheads in relation to pressure control.	Describe the primary function of the Christmas Tree and wellheads with particular emphasis on: - what they are - what they do - how they work/form barriers.	3
WEQG01.02	The function of tubing hangers.	Describe the primary function of tubing hangers with particular emphasis on: - sealing off the annulus - supporting the tubing weight and tubing loading.	3
WEQG01.03	The function of sub-surface safety valves.	Describe the primary function of sub-surface safety valves.	3
WEQG01.04	The function, limitations and position of landing nipples.	Describe the primary function of completion landing nipples.	2
WEQG01.05	Tubing movement during production, testing and stimulation.	Describe how steel tubulars expand and contract during production/injection.	2
WEQG01.07	The function and application of side pocket mandrels.	Describe the primary function and application of side pocket mandrels, for example gas lift, circulation and chemical injection.	2

New syllabus 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
WEQG01.08	Circulating devices.	Describe what a circulation device is and explain why circulation can be required.	2
WEQG01.10	The basic function of a production packer and the different types that are commonly used.	Describe the need for and basic function of a production packer and the different types.	2
Rig Up/Rig Down			
WEQG03.01	How to check equipment.	Explain the importance of checking for and reporting damage to equipment.	3
WEQG03.02	The correct make-up procedures and checking of hydraulic hoses and fittings.	Explain the correct steps to take to make up different types of hydraulic hoses and fittings and explain how to check them for deterioration.	5
WEQG03.03	The procedure when non-shearable equipment is across the BOP.	Explain how the capability of a shearing device can be impaired or impacted when running different types of tool string through it.	2
ANNULUS PRESSURE MONITORING			
WEQJ01.01	The reasons for monitoring annulus pressure.	Explain why annulus pressure is monitored.	3

New syllabus 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
COILED TUBING OPERATIONS			
COILED TUBING EQUIPMENT			
Pressure Control Equipment			
WCA01.02	The requirements for, and the use of, check valves in coiled tubing Bottom Hole Assembly (BHA).	Explain why check valves are used in coiled tubing Bottom Hole Assembly (BHA).	2
WCA01.04	The operating principles of coiled tubing strippers.	Describe the operating principles of coiled tubing strippers.	2
WCA01.05	The minimum barrier requirements and shear capability.	Describe the stack-up needed for the two barrier principle.	2
Blow Out Preventers			
WCA02.01	The operating principles of coiled tubing BOPs.	Describe the operating principles of: - quad-type BOPs - combi-type BOPs - shear/seal BOPs - triple combi BOPs.	3
Ram Type Preventers			
WCA04.05	The limitations of shear ram equipment.	Explain when the equipment will shear and when it will not.	3
RIGGING UP			
WCD01.04	How to recognise defects of the sealing elements that could affect the continued use of the part(s).	Identify different types of failure through wear and explosive decompression.	3
WCD01.05	The function, positioning and use of valves in relation to pressure control.	Identify the different types of valves (including check valves) from a given schematic drawing and describe the differences between them.	2

New syllabus 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
WCD01.06	The principles of adjustable and fixed chokes, when they should be used and their function.	Explain how adjustable and fixed chokes work using a given schematic drawing and explain what they are used for.	2
WCD01.07	The need to maintain two barriers when changing stripper rubbers during intervention.	Explain why two barriers must be maintained when changing stripper rubber during intervention in line with industry best practice.	5
TESTING			
WCE01.02	The correct test procedures to pressure-test a BOP consistent with the direction of the flow.	Identify which equipment, for example, rams, should be tested from a given diagram.	3
WCE01.03	How pressure control equipment can be pressure tested with coil tubing in place.	Identify which equipment (rams) can be tested from a given diagram of an equipment arrangement.	2
BARRIER PRINCIPLES			
WCF01.01	The mechanical barriers used in coiled tubing operations.	Describe the different types of mechanical barriers.	3
WCF01.03	Primary and secondary barriers and shearing devices.	Identify the primary and secondary barriers and shearing devices from a given surface rig-up and well system diagram.	3
SHUT-IN PROCEDURES			
WCH01.01	The importance of shutting in the well quickly with or without tools in the hole.	Explain the importance of following instructions in an emergency situation.	3
WCH01.02	The consequences of significant pressure differentials.	Recognise the difference between wellhead pressure and coiled tubing internal pressure and explain the possible consequences of a pressure differential, for example, collapsed pipe.	2

New syllabus 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
SNUBBING OPERATIONS			
PRESSURE CONTROL EQUIPMENT			
Snubbing Blowout Preventers			
WSA02.01	The operating principles of snubbing BOPs.	Give examples of the main differences between snubbing pipe ram and blind/shear BOPs.	3
WSA02.02	The reasons for changing worn elastomers and temporary suspension of work.	Explain the importance of maintaining the integrity of elastomers.	3
Ram Type Preventers			
WSA04.02	BOP ram equipment, its pressure rating, correct installation procedure and use.	Describe the basic operating principles of BOPs including identifying pressure rating, correct installation and procedures.	3
WSA04.04	Defects during a BOP element change that could affect the continued use of the part(s).	Identify critical seals and parts that may fail through wear from a given example and explain why they need replacing.	3
WSA04.05	How to recognise damage to the equipment and the correct action to take.	Recognise if equipment is damaged and the importance of reporting issues to senior site personnel.	2
WSA04.06	The limitations of shear ram equipment.	Explain how the capability of a shearing device can be impaired or impacted when running different types of tool string through it.	2
Seals and Sealing Elements			
WSA05.01	The operating principles of stripper rams, annular BOPs and other ram BOP sealing elements.	Describe the basic operating principles of stripper rams, annular BOPs and other ram BOP elements.	3

New syllabus 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
WSA05.03	Defects during a packing element change that could affect the continued use of the part(s).	Identify critical seals that may have failed through wear from a given schematic drawing.	3
WSA05.04	The criteria for maintaining two barriers when changing stripper inserts during intervention.	Explain why two barriers must be maintained when changing stripper rubber during intervention in line with industry best practice.	2
Valves			
WSA06.01	The function, positioning and use of valves in relation to pressure control.	Describe the operation, use and maintenance of primary pressure control valves and chokes.	2
RIGGING-UP PROCEDURE			
WSD01.01	The items of a rig-up which need to be properly checked and prepared before installation.	Identify, from a given specification for a rig-up, the equipment needed for basic checks such as seal and seal area damage checks.	3
WSD01.02	The adapters, connectors and flanged connectors needed to ensure compatibility between the equipment in use.	Identify, from a given specification for a rig-up, the equipment needed to complete a competent hook-up. Explain the techniques required to make a safe and reliable connection.	2
TESTING			
WSE01.01	The need for pressure testing.	Explain why equipment is pressure tested and the requirements for low and high pressure testing.	5
WSE01.02	The correct test procedures.	Identify the equipment, for example, rams that should be tested from a given diagram of equipment rig-up. Explain the correct action to take to pressure test a valve or BOP function consistent with the direction of the well bore flow.	3

New syllabus 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
WSE01.03	How to pressure test pressure control equipment with tubulars in place.	Identify the equipment that should be tested, for example rams, from a diagram of a specific equipment arrangement.	2
BARRIER PRINCIPLES			
WSF01.01	The mechanical barriers used in snubbing operations.	Identify the different types of mechanical barriers from a given example.	3
WSF01.03	The principle of grouping barriers into primary and secondary barriers and shearing devices.	Identify the primary and secondary barriers and shearing devices from a given surface rig-up and well system diagram.	3
SHUT-IN PROCEDURES			
WSH01.01	The importance of shutting in the well quickly and safely according to the selected procedure, with or without tubing in the hole.	Explain why it is so important to follow instructions in an emergency situation.	3
CRITICAL OPERATING PROCEDURES			
WSI01.01	The basic forces on tubulars created by well pressure.	Describe the basics of: - balance-point - pipe light and pipe heavy - transition from light to heavy.	2

New syllabus 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
WIRELINE OPERATIONS			
PRESSURE CONTROL EQUIPMENT			
Surface Equipment			
WWA01.01	The specialised equipment related to pressure control during wireline operations.	Describe the function of surface pressure control equipment specific to wireline operations including: - slick line - braided line - electric line.	3
WWA01.03	The positioning of wireline BOPs in the pressure control rig-up.	Describe the correct positioning of wireline BOPs in the pressure control rig-up including equipment access for loading tool strings and various tool string configurations.	3
WWA01.04	Ram configurations.	Explain why BOP ram configurations need to change between slick line and braided line operations.	2
WWA01.05	When to operate a wireline BOP.	Give examples of when to operate a wireline BOP.	3
WWA01.06	The function of a grease control head.	Describe the grease control head as a piece of primary pressure control equipment.	2
WWA01.07	The function of a stuffing box.	Describe the slick line stuffing box as a piece of primary pressure control equipment.	2
WWA01.08	The function of internal BOPs and ball check valve.	Explain when and why an internal BOP or a ball check valve is installed in a pressure control system.	3
Slick line/braided line shear seal BOP			
WWA02.01	The principles and operation of a slick line BOP.	Describe the major components of a slick line BOP explain the function of a weep hole.	2

New syllabus 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
WWA02.02	The principles of pressure/inflow testing the slick line BOP.	Describe the correct method for testing the slick line BOP complying with two barriers in place.	3
WWA02.03	The principles of operation of a braided line/e-line BOP.	Describe the braided line/e-line BOP major components and explain the function of a weep hole.	2
WWA02.04	The principles of pressure/inflow testing the braided line/e-line BOP.	Describe the correct method for testing the braided line/e-line BOP complying with two barriers in place.	3
RIGGING-UP			
WWD01.03	Critical isolation requirements.	Explain the potential for alternate pressure systems connected to the well, for example, a flowline of a production system that can be a secondary source of pressure (a hazard) for the well operation.	5
TESTING			
WWE01.01	The safe practice requirements for bleeding-down pressure control equipment on land or offshore into the atmosphere or using temporary or fixed flare stacks.	Describe safe practice for bleeding-down pressure control equipment into the atmosphere or using temporary or fixed flare stacks. Describe the dangers of venting hydrocarbon or inert gas into the atmosphere.	3
BARRIER PRINCIPLES			
WWF01.01	The mechanical barriers used in wireline operations.	Identify the different types of mechanical barriers from a given example.	3
WWF01.03	The principle of grouping barriers into primary and secondary barriers and shearing devices.	Identify the primary and secondary barriers and shearing devices from a given surface rig-up and well system diagram.	3

New syllabus 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
CONTINGENCY PROCEDURES			
WWL01.01	The correct steps when testing the BOP with test rods.	Explain why test rods are used instead of cables. Explain the importance of test rods that are engineered and not 'home made'.	3
CRITICAL OPERATING PROCEDURES			
WWK01.01	The importance of drift runs before doing other downhole operations.	Explain the importance of drift runs.	2