Well Control for Well Servicing Operations – Introductory Level

Related Learning Objectives

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Contents

1.0 Well Servicing Introductory Well Control Course Overview

The purpose of the Introductory course core curriculum is to identify a body of knowledge and a set of job skills needed by personnel during well servicing operations. See the below table for a listing of positions for whom this course is recommended.

This curriculum incorporates both surface and subsurface topics. All topics must be covered.

This course curriculum is designed for representatives who are primarily responsible for coiled tubing, snubbing, wireline, and workover operational support of well control. This curriculum identifies a body of knowledge and a set of job skills that can be used to provide well control training for Service Company and Oil and Gas Companies.

This curriculum incorporates Core Training Modules, Sub-Modules, Learning Topics, and Learning Objectives and Assessments.

This course is designed to be a situational training with no math required.

Recommended Attendees: IADC recommends that persons on location for or with job roles related to well servicing, attend this Introductory level course. Examples of these positions are listed in the table below.

Company Personnel Type	Positions
Service Company and Oil and Gas Company Personnel	Coiled Tubing Team Field Personnel
	Snubbing Team Field Personnel
	Wireline Team Field Personnel
	Workover Team Field Personnel
	Oil and Gas Company Representatives Field Personnel

Acceptable Delivery Methods:

Instructor-led training, self-study workbook, and e-Learning delivery (for example, computer-based training, web-based training, or other electronic delivery) are permitted for this course. A knowledge assessment is required.

IADC also requires a "blended" approach to (multiple strategies for) content delivery and a variety of techniques that appeal to different types of learners (e.g., visual, auditory, kinesthetic). These strategies will also help engage trainees in the learning process and will help improve learning and retention.

Minimum Course Length:

Fourteen (14) classroom hours or an equivalent timeframe for e-Learning delivery are required for delivery of this course. The self-study workbook and e-Learning are self-paced study. Course length excludes the knowledge assessment time (1.5 hours).

Course Curriculum Notes:

The curriculum that follows includes five components: Training Module, Sub-Modules, Learning Topics, AIM, and Learning Objectives and Assessment Guidelines.

AIM: The AIM letters indicate the level of knowledge and skills required at the job level:

A = Awareness of Learning Topic

I = Implements Learning Topic at this job level; needs an increased level of knowledge because they may have to take action of some task related to the topic.

M = Mastery of Learning Topics at this job level; needs a full knowledge because they have to take action, perhaps unsupervised, of some task related to the topic.

Learning Topics**:** This section provides guidance for instructors on what the trainee should learn.

Learning Objectives and Assessment Guidelines**:** This section defines what trainees should be able to do at the conclusion of the training and provides some examples of how to meet the objectives.

Assessment Notes:

Questions on the Knowledge Assessment will be graded as a cumulative score. To pass the course, the trainee must earn at least a 70% score.

2.0 Curriculum

2.1 Risk Awareness and Management

Module Name: 2.1 Risk Awareness and Management			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Situational Awareness	A	Well Service Environment a. Suspended Loads b. Potential Dropped Objects c. Energized Systems d. Rotating Equipment e. Hazardous Materials i. Wellbore Fluids/Gases ii. Wellsite Materials	Identify potential well service environment hazards in a Workover Operations.
	A		Identify potential well service environment hazards in a Wireline Operations.
	A		Identify potential well service environment hazards in a Snubbing Operations.
	A		Identify potential well service environment hazards in a Coiled Tubing Operations.
Stop Work Authority	I	Identifying Hazards and Appropriate Stop Work Response a. Workover b. Wireline c. Snubbing d. Coiled Tubing	Explain Stop Work Authority.
	I		Explain your responsibility of personal safety in Stop Work Authority.
	I		Explain your responsibility of notification to the immediate crew leader to stop specific hazardous activity and/or situation (e.g., escalation may be: operator/crew chief to supervisor to company representative).
Well Status and Types	I	Status of Well a. Live Well b. Dead Well c. Cased Hole d. Open Hole	Define 'live' well (see WellSharp Definitions page) and give examples (e.g., well on vacuum).
	I		Define 'dead' well (see WellSharp Definitions page) and give examples.
	I		Define cased hole (see WellSharp Definitions page).
	I		Define open hole (see WellSharp Definitions page).
	I	Type of Well a. Injector Well b. Oil Well c. Gas Well d. Special Condition Wells	Define an Injector Well (see WellSharp Definitions page).
	I		Explain potential well control hazard(s) of an Injector well (e.g., adjacent wells, charged formation, corrosion).
	I		Define an Oil Well (see WellSharp Definitions page).
	I		Explain potential well control hazard(s) of an Oil well (e.g., live hydrocarbons, inability to fill casing).

Module Name: 2.1 Risk Awareness and Management			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
	I		Define a Gas Well (see WellSharp Definitions page).
	I		Explain potential well control hazard(s) of a Gas well (e.g., hydrates, volatile hydrocarbons).
	I		Identify special well conditions (e.g., high pressure high temperature, corrosives, H_2S production).

2.2 Pressure and Influx Fundamentals

Module Name: 2.2 Pressure and Influx Fundamentals			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Pressure Fundamentals	M	Pressure	Explain pressure.
	M	Trapped Pressure	Explain the effects of trapped pressure.
Influx Fundamentals	M	What is an influx	Explain influx and consequences of inadequate barrier application (e.g., failed coiled tubing stripper, failed snubbing ram, failed wireline pack-off, and loss of workover fluid column).
	M		Explain why failure to keep hole full can cause an influx.

2.3 Barriers

Module Name: 2.3 Barriers			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Types of Barriers	I	Mechanical barriers	Define mechanical barrier (see WellSharp Definitions page).
	I		List examples of mechanical barriers.
	I	Fluid barriers	Define fluid barrier (see WellSharp Definitions page).
	I		Explain what is required for a fluid to be considered a barrier.
	I		List two types of fluid barriers.
Levels of Barriers	I	Primary and Secondary	Explain primary barriers (see WellSharp Definitions page).

Module Name: 2.3 Barriers			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
	I		Explain secondary barriers (see WellSharp Definitions page).
	I	Minimum number of barriers required for safe operations	Explain why a minimum number of barriers are required for safe operations. (Refer to industry recommendations for minimum number of barriers to be in place for specific company requirements.)
Barrier Management	M	Failed Barrier	Explain how a failed barrier can be detected (e.g., flow from the well during Workover Operations, leaking sealing elements in Coiled Tubing, Snubbing, or Wireline Operations).

2.4 Completion and Workover Fluids

Module Name: 2.4 Completion and Workover Fluids			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Completion and Workover Fluids	I	Purpose of fluid	Describe the purpose of fluids that make them suitable for workover, snubbing, coiled tubing, and specified wireline operations.
Fluid Types	A	Brines	Describe the applications where brines may be used.
	A		Identify acceptable types of water-based fluids that may be used in an intervention/completion operation.
	A	Gases	Identify acceptable types of gases that may be used in a workover/completion/stimulation fluid (e.g., CO_2, N_2).
Fluid Properties	A	Effects of Fluid Weight and Density	Describe the relationship between fluid weight and downhole pressure (e.g., hydrostatic).

2.5 General Overview of Surface and Subsurface Wellbore Equipment

Module Name: 2.5 General Overview of Surface and Subsurface Wellbore Equipment			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Surface and Subsurface Wellbore Equipment	I	General	Describe, in general terms, the functions of surface and subsurface wellbore equipment.

Module Name: 2.5 General Overview of Surface and Subsurface Wellbore Equipment			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
	I	ESD	Describe the purpose of the surface and subsurface Wellbore Emergency Shut Down (e.g., well shut down, platform shut down, equipment shut down).
Christmas Tree	I	Components	Identify the key Christmas Tree and Wellhead components.
	I	Purpose and Function of the Christmas Tree	Explain the function of the Christmas Tree and how they work with particular emphasis on: ▪ Master, swab and flow line valves ▪ Wireline cutting ability ▪ The Surface Safety Valve (SSV)
Wellhead	I	Purpose and Function of Wellhead	Identify the key Wellhead components.
	I		Explain the function of the Wellhead.
Casing and Tubing	I	Tubular Concepts	Explain tubular design, ratings, and testing.
Completion Equipment	A	General	Identify the completion accessories (e.g., Surface Controlled Subsurface Safety Valve, packers, plugs, sliding sleeve).

2.6 Well Servicing Operations

Module Name: 2.6 Well Servicing Operations			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Wireline Operations	A	Types of Wireline Operations a. Cased hole b. Open Hole c. Slick Line d. Braided Line	Describe Wireline Operations.
	I	Well Control Issues a. Cased Hole b. Open Hole c. Slick Line	List potential well control issues that could occur during cased hole operations (e.g., logging/perforating).
	I		List potential well control issues that could occur during open hole operations.

Module Name: 2.6 Well Servicing Operations			
Sub-Modules	**AIM**	**Learning Topics** **The instructor will impart knowledge on:**	**Learning Objectives and Assessment Guidelines** **The attendee will be able to:**
	I	d. Braided Line	List potential well control issues that could occur during slick line operations (e.g., live well, dead well, loss of barrier).
	I		List potential well control issues that could occur during braided line operations (e.g., live well, dead well, loss of barrier).
Snubbing Operations	A	Types of Snubbing Operations a. Stand-Alone b. Rig Assist	Describe Snubbing Operations.
	I	Well Control Issues a. Stand-Alone b. Rig Assist (Space Saver)	List potential well control issues that could occur during stand-alone operations (e.g., live well, dead well, loss of barrier).
	I		List potential well control issues that could occur during rig assist operations (e.g., live well, dead well, loss of barrier).
Coiled Tubing Operations	A	Types of Coiled Tubing Operations a. Clean-out b. Fishing c. Milling d. Perforating	Describe Coiled Tubing Operations.
	I	Well Control Issues a. Clean-out b. Fishing c. Milling d. Perforating	List potential well control issues that could occur during clean-out coiled tubing operations (e.g., coiled tubing failures).
	I		List potential well control issues that could occur during fishing operations (e.g., trapped pressure).
	I		List potential well control issues that could occur during milling operations (e.g., coiled tubing failure, trapped pressure).
	I		List potential well control issues that could occur during perforating operations (e.g., influx, collapse, buckling).
Workover Operations	A	Types of Workover Operations a. Clean-out b. Run or Pull Completion c. P&A (Plug & Abandon) d. Stimulation	Describe Workover Operations.

Module Name: 2.6 Well Servicing Operations			
Sub-Modules	**AIM**	**Learning Topics** **The instructor will impart knowledge on:**	**Learning Objectives and Assessment Guidelines** **The attendee will be able to:**
	I	Well Control Issues a. Clean-out b. Run or Pull Completion c. P&A (Plug & Abandon) d. Stimulation	List potential well control issues that could occur during clean-out workover operations (e.g., influx, trapped pressure).
	I		List potential well control issues that could occur during run or pulling completions operations (e.g., live hydrocarbons, non-shearables).
	I		List potential well control issues that could occur during P&A operations (e.g., influx, fluid loss).
	I		List potential well control issues that could occur during stimulation operations (e.g., corrosive fluids).

2.7 Pressure Control Equipment

Module Name: 2.7 Pressure Control Equipment			
Sub-Modules	**AIM**	**Learning Topics** **The instructor will impart knowledge on:**	**Learning Objectives and Assessment Guidelines** **The attendee will be able to:**
Wireline Primary Barriers	M	Stuffing Box/Pack Off/Grease Injection	Explain the purpose and activation of the stuffing box/pack off/grease injection as an external Wireline primary barrier.
Wireline Secondary Barriers	M	Wireline Valve	Explain how the Wireline Valve acts as a secondary Wireline barrier.
Wireline Safety Systems and Emergency Shutdown Devices (ESDs)	A	Safety Systems	Describe general functions of safety systems applicable to Wireline Operations.
	I	ESD (Equipment Based)	Describe the functions of shut down devices for the Wireline equipment.
	I		Explain the best practice placement of and responsibility for initiating ESD function.
Snubbing Primary Barrier	M	Stripper	Explain the purpose and activation of the stripper assembly as a primary Snubbing barrier.
	M	Back Pressure Valves	Explain the purpose of the back pressure valves as a primary Snubbing barrier.

Module Name: 2.7 Pressure Control Equipment			
Sub-Modules	**AIM**	**Learning Topics** **The instructor will impart knowledge on:**	**Learning Objectives and Assessment Guidelines** **The attendee will be able to:**
Snubbing Secondary Barriers	M	Contingent Rams	Explain the purpose and activation of contingent rams as a secondary Snubbing barrier (e.g., safety, blind, shear).
	M	Full Open Safety Valve (FOSV)	Explain the purpose and activation of Full Open Safety Valve (FOSV) as a secondary Snubbing barrier.
Snubbing Safety Systems and Emergency Shutdown Devices (ESDs)	A	Safety Systems	Describe general functions of safety systems applicable to Snubbing operations.
	I	ESD (Equipment Based)	Describe the functions of shut down devices for the Snubbing equipment.
	I		Explain the best practice placement of and responsibility for initiating ESD function.
Coiled Tubing Primary Barrier	M	Stripper	Explain the purpose and activation of the stripper assembly as a primary Coiled Tubing barrier.
	M	Back Pressure Valves (Flow Check Devices)	Explain the purpose of the back pressure valves (flow check devices) as a primary internal Coiled Tubing barrier.
Coiled Tubing Secondary Barrier	M	Contingent Rams	Explain the purpose and activation of contingent rams as a secondary Coiled Tubing barrier (e.g., safety, blind, shear).
Coiled Tubing Safety Systems and Emergency Shutdown Devices (ESDs)	A	Safety Systems	Describe general functions of safety systems applicable to Coiled Tubing operations.
	I	ESD (Equipment Based)	Describe the functions of shut down devices for Coiled Tubing equipment.
	I		Explain the best practice placement of and responsibility for initiating ESD function.
Workover Primary Barriers	M	Christmas Tree	Explain the purpose of the Christmas Tree as a primary Workover barrier prior to Workover Rig-Up.
	M	Fluid	Explain the purpose of fluid as a primary Workover barrier during Workover Operations.
	M	Stripper and Back Pressure Valves	Explain the purpose and activation of the combination of a stripper and back pressure valves as a primary Workover barrier during Workover Operations.

Module Name: 2.7 Pressure Control Equipment			
Sub-Modules	**AIM**	**Learning Topics** **The instructor will impart knowledge on:**	**Learning Objectives and Assessment Guidelines** **The attendee will be able to:**
Workover Secondary Barriers	M	BOP a. Annular b. Ram Types	Explain the purpose and activation of the BOP as a secondary Workover barrier.
	M	Workstring Components a. Plugs b. FOSV (Full Open Safety Valve) c. Back Pressure Valves	Explain the purpose and activation of the workstring components as a secondary Workover barrier.
Workover Emergency Shutdown Devices (ESDs)	A	ESD (Equipment Based)	Describe general functions of alarm systems applicable to Workover Operations.
	I		Describe the functions of shut down devices for Workover equipment.
	I		Explain the best practice placement of and responsibility for initiating ESD function.
Ancillary Equipment for Well Control	I	Gas Detectors	Describe the types of gas detectors (e.g., stand-alone, personal/portable).
	I	Accumulators a. Hydraulic System b. Remote Control System	Describe the purpose and activation of an accumulator system (e.g., all service operations).
	I		Explain the best practice placement of remote control systems and responsibility for initiating accumulator function.
	I	Hoses and Connections	Identify the possible consequences of incorrect make-up or mismatched connections.
	A	Pumps	Describe the purpose of the pumps (e.g., mud pumps, diaphragm pumps).
	I		Describe the purpose of pump safety system (e.g., pop-off valves, burst disc)
Shut-In	I	Shut-In a. Emergency Pressure Control	Define Well Shut-In.
	I		Explain the reasons for a shut-in.
	I		Explain the purpose and activation of emergency pressure control (e.g., shear and seal devices).

Module Name: 2.7 Pressure Control Equipment			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
	I	Roles and Responsibilities	Explain the importance of the crew knowing their specific well control responsibilities related to detection, well shut-in, and control.

2.8 Special Situations

Module Name: 2.8 Special Situations			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Hydrates	A	Effect of Hydrates	Define hydrates (see WellSharp Definitions page).
	A		Explain the effects of hydrates on well control.
Special Considerations	I	Effects on Well Control Methodology a. H_2S (Hydrogen Sulfide) b. CO_2 (Carbon Dioxide) c. Steam/Geothermal d. N_2 (Nitrogen)	Define H_2S (see WellSharp Definitions page).
	I		Explain the effects of H_2S on personnel, equipment selection, and procedures.
	I		Explain safety considerations with H_2S (e.g., wind direction, odor, LEL, exposure limits).
	I		Define CO_2 (see WellSharp Definitions page).
	I		Explain the effects of CO_2 on personnel, equipment selection, and procedures.
	I		Explain safety considerations with CO_2.
	I		Explain safety considerations with Steam/Geothermal.
	I		Define N_2.
	I		Explain the effects of N_2 on personnel, equipment selection, and procedures.
	I		Explain safety considerations with N_2.
Uncontrolled Release of Wellbore Fluids	I	Effects of Uncontrolled Release of Wellbore Fluids	Recognize hazards with gas or liquid released on location (e.g., run away engines, venting tanks, immediate fire hazards).

2.9 Emergency Drills

Module Name: 2.9 Emergency Drills			
Sub-Modules	**AIM**	**Learning Topics**	**Learning Objectives and Assessment Guidelines**
		The instructor will impart knowledge on:	**The attendee will be able to:**
Well Control Drills	M	Drills	Describe the purpose of drills (e.g., abandonment, ESD, shut-in, muster).
	M	Roles and Responsibilities	Explain the importance of the crew knowing their specific well control responsibilities related to well control drills.
Alarms	M	Types of Alarms	Identify the different types of alarms (e.g., abandonment, ESD, shut-in, muster).