

IADC WELLSERVICE Oil and Gas Operator (OGO)		
<u>COURSE OUTLINE</u>		
<u>DAY1</u>		
TIME	Subject	Lesson plan
17:00 - 18:30	Risk Awareness and Management Potential Impacts of a Well Control Event Well integrity management program (ISO 16530-1) Safety Margin Selection (Criteria , acceptable margin , risk of less/exceed margin) Well control Bridging documents Pressure Control Equipment/Barrier Envelope : (Maximum Allowable Working Pressure (MAWP) , Load Bearing Considerations(requires lifting certifications , environmental factors) Organizing a Well Control Operation: Roles and Responsibilities Pre-recorded information Emergency response and plan	Lesson plan -1
18:30 - 19:00	, Well Control Principles & Calculations (Types of pressure a. Hydrostatic pressure, b. Applied Pressures 1. Surface pressure a. SITP b. Annulus Pressure 2. Pump Pressure 3. ECDs (Equivalent Circulating Densities) 4. Trapped Pressure	Lesson plan -2
19:00 - 19:15	BREAK	
19:15 - 20:00	5. Swab/surge c. Formation pressure d. Differential pressure e. Fracture pressure f. Bottom hole pressure 1. Balanced 2. Underbalanced 3. Overbalanced, (MASP) , Kill Mud Weight , Calculate gradient for different density of liquid and gases	Lesson plan -3
20:00-21:00	Calculate net force effects due to trapped pressure. ECD and calculation , U-tubing <u>Buoyancy and calculation , compressibility</u> Principles(Tubing Collapse and Casing Burst , <u>von Mises equivalent (VME) form.</u>) Snubbing/Buckling : (consequences of exceeding the tubing integrity due to frictional forces Conditions causing collapse or parting of pipe	Lesson plan -4
21:00-21:30	Break	

<p>21:30-22:00</p>	<p>pre-recorded information (Well configuration " Top and bottom of perforations , Packer/tool locations) , <u>Maximum allowable working pressure(well head , casing)</u> ,the well (Wellhead / Well Control Stack / Christmas tree valves – function test)</p> <p>Barriers Barriers Philosophy and operation: Barriers and barrier envelope ,Purpose of barriers , Barrier Hierarchy) Levels of Barriers (Hierarchy , primary ,secondary and tertiary , minimum number of barriers are required for safe operations Types of Barriers (fluid , mechanical)</p>	<p>Lesson plan -5</p>
<p>22:00-22:15</p>	<p>Barrier Management (test criteria , monitoring and detecting failure , negative/positive test , documentation , test period) Validating fluid barriers (monitoring , fluid weight , Identify conditions that would lead to settling of solids , if barrier fail</p> <p>Coiled tubing Pressure Control Equipment Barriers : Barrier Envelope (lubricator/riser , fluid inlet " flow tree with isolation valve " , kill line , Primary Barrier A-stripper (<u>purpose</u> , <u>types</u> , limitation B-Check valves Fluid inlet/outlet (flow tee with isolation valve Secondary Barrier (quad BOP) Tertiary Barrier (quad BOP , shear seal , X-tree)</p>	<p>Lesson plan -6</p>
<p>22:15-22:30</p>	<p>Wireline Pressure Control Equipment: Control Heads (line wiper , Stuffing Box/Pack off a. Manual b. Hydraulic Grease Injection Head " function , operation limit" , Chemical Injection Sub Lubricator (Primary PCE) :(Lubricator , Quick test sub) Wireline Valves (Conductor/Braided line rams) a. Line rams b. Shear seal rams Wireline Valves (Slick line) a. Line rams b. Shear seal rams (function ,configuration and limitation) , Pump-in Sub Purpose and placement of a wireline shear seal.</p>	<p>Lesson plan -7</p>

22:30 - 23:00	<p>Snubbing Barriers (internal , external Stripper , Dynamic Stripping BOPs (Main Stripping Stack Annular Stripping ram Safety ram Equalizing Loop and Bleed-off Line) Influx Fundamentals Influx : Detention , Causes , Influx detection (signs and indicators Importance of Influx Management in Open Hole Operations (Managing Risk , Consequences of not Managing influx "pollution" Pressure and Volume Relationship (Boyles Law) " Gas Volume/Pressure .</p>	Lesson plan -8
23:05	END OF TRAINING DAY	
<u>DAY 2</u>		
17:00-19:00	<p>Completion and Workover Fluids Completion and Workover Fluids (purpose, corrosion) Brine requirements . Fluid properties (Density and temperature effect , viscosity ,PH, saturation ,Crystallization Fluid Flow Behavior (friction pressure loss , geometry) Surface and Subsurface Wellbore Equipment Christmas Tree BOP component stack (function, component , flow path HCR &manual valve , Annular Blind/shear shear or cutter ram OEM Replacement Parts</p>	Lesson plan -9
19:00-19:15	BREAK	
19:15-20:00	<p>Accumulator(function ,min. system pressure ,pre-charge pressure <u>Drawdown test . closing time , regulators , functions of main and remote well control panels , power pack</u> Workstring and Production Tubing (Integrity , causes that can effect tubing ratings and result in failures , hazards, Polished Bore Receptacle (PBR) , how tubing movement during testing and stimulation could result in tubing failures)</p>	Lesson plan -10

<p>20:00-20:30</p>	<p>Completion Equipment: (Surface & sub-surface Controlled Sub-Surface Safety Valve (SCSSV) , Landing nipple , Packers , SSD , Gas lift mandrill Plugs (types , rating ,differential , equalizing sub) Procedures: Verification of Shut-in (Procedures for shut-in and securing the well a. Coiled Tubing b. Wireline c. Snubbing d. Workover), <u>Non-shearable</u> ,</p>	<p>Lesson plan -11</p>
<p>20:30-21:00</p>	<p><u>Monitoring and Recording During Shut-in (visual check , accumulator) , Stripping operations (importance of strip in/out , calculation , stripping procedures)</u> Preparing for Well Entry :Use of valve removal plug (VR plug) , X-tree removal , 2-way BPV) Wire line open hole log Gauge run Secure well after shear wireline Cased hole logging problem Slick line problem</p>	<p>Lesson plan -12</p>
<p>21:00 – 21:30</p>	<p style="text-align: center;">Break</p>	
<p>21:30 : 22:00</p>	<p>Contingency Procedures (API Coiled Tubing): Stripper leak , leak at different places in CT stack , parted CT , buckled CT , Surface equipment failure) Handling Kill Problems: if csg pressure exceed MAASP , Communication between casing strings Operational Considerations: Operational Limitations (pressure, forces) , Coiled Tubing Limitations (material strength , bend-cycle fatigue Well Kill in Preparation of Well Interventions : Live vs. Dead Well intervention (without killing the well)</p>	<p>Lesson plan -13</p>

22:00-22:30	<p><u>Bull heading:</u> principles advantages/disadvantages limitation calculation and kill sheet friction pressure minimum theoretical volume verify if well has been killed</p> <p><u>Volumetric Method</u> principles limitations Summarize actions to take once the influx reaches the surface</p>	Lesson plan -14
22:30-23:00	<p><u>Lube and Bleed</u> principles advantages/disadvantages Calculate pressure per unit of volume in lube and bleed . limitation Pump schedule for lube and bleed operations. verify if well has been killed</p> <p><u>Forward Circulation (Driller's) Method</u> principles advantages/disadvantages Calculate limitation Explain how kill procedures can impact BHP (i.e., changing SPM)</p>	Lesson plan -15
23:00	END OF TRAINING DAY	
<u>DAY 3</u>		
17:00-18:00	<p><u>Reverse Circulation</u> principles advantages/disadvantages Calculate Explain the main differences between a normal forward circulation kill technique and a reverse circulating</p>	Lesson plan -16
18:00-19:00	<p><u>Pump Startup and Shutdown Procedure</u> Startup/Shutdown procedures Action to take if SCR has not been recorded ICP , Lag time , Determine the action(s) required to verify a well is dead <u>before opening up the BOP</u></p>	Lesson plan -17

19:00 – 19:15	Break	
19:15-20:00	<p>Demonstrate a detailed forward circulating (driller's) method</p> <p>Demonstrate a startup and shutdown procedure</p> <p>Demonstrate how to maintain constant BHP when an influx is being circulated</p>	Lesson plan -18
20:00-21:00	<p>Special Situations: Blockages and Trapped Pressure in Tubing / Wellbore , Hydrates , H2S consideration (detention , necessary equipment , safety consideration)</p>	Lesson plan -19
21:00 - 21:30	BREAK	
21:30-22:00	<p>Demonstrate a detailed forward circulating (driller's) method</p> <p>Demonstrate a startup and shutdown procedure</p> <p>Demonstrate how to maintain constant BHP when an influx is being circulated</p>	Lesson plan -20
22:00-23:00	<p>2nd group</p> <p>Demonstrate a detailed forward circulating (driller's) method</p> <p>Demonstrate a startup and shutdown procedure</p> <p>Demonstrate how to maintain constant BHP when an influx is being circulated</p>	Lesson plan -21
23:00	END OF TRAINING DAY	
<u>DAY 4</u>		
17:00-18:00	<p>Demonstrate a detailed forward circulating (driller's) method</p> <p>Demonstrate a startup and shutdown procedure</p> <p>Demonstrate how to maintain constant BHP when an influx is being circulated</p>	Lesson plan -21

18:00-19:00	<p>Managing Change During a Well Kill How to react to problems that can happen during the well Kill importance of handover procedures during a well kill Problems with the kill Identify when the plan is not successful and decide on the corrective action Identify the importance of reassessment of the current plan and techniques used (i.e., MOC). Complication with Hydraulic Fracturing</p>	Lesson plan -22
19:00-19:30	Break	
19:30 : 20:30	<p>Well intervention complication on Drilling rigs (wire line or CT rigged up on a drilling rig's well control system , Wireline Shear Seals(purpose ,last resort) Fishing wireline (tools and pressure control considerations) Planned Responses to Anticipated Well Control Scenarios: Buckling Piston effect Slip bowl failure Power unit or hydraulic circuit failure Stripping annular element failure leak below BOP Parting of string</p>	Lesson plan -23
20:30-21:00	<p>Testing : Pressure packers and plugs , Testing of Connections a. Rig BOP b. Wireline Valve Well Control Drills Pit Drills Trip drills Choke drills Various drills</p>	Lesson plan -24
21:00-21:30	BREAK	
21:30-23:00	<p>Government, Industry and Company Rules, Order and Policies : API and ISO recommended practices, standards and bulletins pertaining to well control , Company/operator specific requirements Ancillary Considerations: Gas detector , fluid gas separator , Wellhead Control Panel</p>	Lesson plan -25
23:00	END OF LAST TRAINING DAY	