

## IADC SNUBBING COURSE OUTLINE

<b><u>IADC WELLSHARP WELLSERVICE SNUBBING</u></b>		
<b><u>COURSE OUTLINE</u></b>		
<b><u>DAY1</u></b>		
<b><i>TIME</i></b>	<b><i>Subject</i></b>	<b><i>Lesson plan</i></b>
8:00 - 9:00	<b>Risk Awareness and Management</b> :Potential Impacts of a Well Control Event Live/Dead Well , Risk Management Systematic risk ,Pre-job Communication , Handover for Tour and Hitch Change ,Safety Margin Selection , Bridging Documents , Emergency Equipment , Requirements procedures ( MAASP)	Lesson plan -1
9:00 - 10:30	Installation of rings, flanges and connections , Load Bearing Considerations(requires lifting certifications , environmental factors ) , <b>Pressure Fundamentals</b> (Types of pressure a. Hydrostatic pressure , b. Applied Pressures 1. Surface pressure a. SITP b. Annulus Pressure	Lesson plan -2
10:30 - 10:45	BREAK	
10:45 - 11:00	2. Pump Pressure 3. ECDs (Equivalent Circulating Densities) 4. Trapped Pressure 5. Swab/surge c. Formation pressure d. Differential pressure e. Fracture pressure	Lesson plan -3
11:00-12:00	f. Bottom hole pressure 1. Balanced 2. Underbalanced 3. Overbalanced, (MASP) , Kill Mud Weight , <u>ECD and calculation</u> , <b>U-tubing</b> , <u>Buoyancy and calculation</u> , <u>Volume , strokes and rates /Displacement calculations</u> , <b><u>Snub force calc.</u></b>	Lesson plan -4
12:00-12:30	Launch Time	
12:30-02:00	Principles( Tubing Collapse and Casing Burst , <u>von Mises equivalent (VME) form.</u> ) , Given well data, complete a well data question form (wellbore profile , deviation) pre-recorded information (Well configuration " Top and bottom of perforations , Packer/tool locations ) , <u>Maximum allowable working pressure(well head , casing )</u> , <u>casing burst ,tubing collapse</u> ,	Lesson plan -5
02:00-02:45	<b>Snubbing/Buckling</b> (calculate friction forces ) The well (Wellhead / Well Control Stack / Christmas tree valves – function test), <b>Reduction of Tensile under Collapse Loading</b> <b>Barriers : Philosophy</b> and Operation of Barrier Systems(Barriers and barrier envelope ,Purpose of barriers)	Lesson plan -6
02:45: 03:00	BREAK	

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03:00-03:45	<p><b>Types of Barriers</b> ( fluid , mechanical )</p> <p><b>Levels of Barriers</b> (Hierarchy , primary ,secondary and tertiary )</p> <p>Barrier Management (test criteria , monitoring and detecting failure) <b>Validating fluid barriers</b> ( monitoring , fluid weight , crystallization , if barrier fail ), Hoses , fittings and Connections</p>	Lesson plan -7
03:45: 05:00	<p><b>Influx Fundamentals :</b></p> <p><b>Influx :</b> Detention , Causes , Influx detection ( signs and indicators ) , Importance of Influx Management in Open Hole Operations (Managing Risk , Consequences of not Managing influx "pollution"</p> <p>Pressure and Volume Relationship (<b>Boyles Law</b>) " Gas Volume/Pressure .</p>	Lesson plan -8
05:05	END OF TRAINING DAY	
<b><u>DAY 2</u></b>		
08:00-09:45	<p><b>Completion and Workover Fluids</b> (purpose, corrosion)</p> <p>Brine requirements . Fluid properties ( Density , viscosity ,PH, saturation ,Crystallization , Fluid Flow Behavior (viscosity , rate , friction pressure loss , geometry ) Fluid Types ( Gas , oil , water)</p> <p><u>Measuring Techniques (density and viscosity)</u></p>	Lesson plan -9
09:45-10:00	BREAK	
10:00-11:00	<p><b>Surface and Subsurface Wellbore Equipment</b></p> <p>Christmas Tree</p> <p>BOP component stack ( function component</p> <p>HCR &amp; manual valve</p>	Lesson plan -10
11:00-12:00	<p>Annular</p> <p>Blind/shear</p> <p>Shear or cutter ram</p> <p>Configuration ,</p> <p><b>Stripping rams (HWO) , tapered string )</b></p> <p><b><u>Auxiliary Well Control ( Down hole check valve , full opening safety valve)</u></b></p>	Lesson plan -11
12:00-12:30	LAUNCH TIME	
12:30-02:45	<p><u>Accumulator(function ,min. system pressure , Drawdown test . Closing time , regulators , panel)</u></p> <p><u>Chokes and Choke Manifolds</u></p> <p><u>Fluid Measuring (strokes, rates)</u></p> <p>Workstring and Production Tubing integrity(burst , collapse ,torsion , <b>IBOP</b>)</p>	Lesson plan -12
02:45 : 03:00	BREAK	

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03:00-05:00	<b>Completion Equipment:</b> Tubing HGR Surface & sub-surface Controlled Sub-Surface Safety Valve (SCSSV) Packers SSD Gas lift mandrill	Lesson plan -13
05:00	END OF TRAINING DAY	
<b><u>DAY 3</u></b>		
08:00-09:30	<b>Procedures:</b> <u>Set/Check Alarm Limits(PIT LEVEL &amp;FLOW RETURN)</u> <u>Shut-in ( procedures , Non-sharable )</u> <u>Monitoring and Recording During Shut-in (visual check , accumulator) ,</u> <u>Verification of Shut-in (annular , BOP , manifold)</u>	Lesson plan -14
09:30-09:45	BREAK	
09:45-10:45	Importance of strip/trip tank and line up ( <u>valve line up while stripping , bleed off calculation- volumetric method</u> ) <b>Snubbing Equipment :</b> <b>Types of snubbing unit: a. Stand-alone b. Rig Assist (Space Saver)</b> Snubbing Barriers ( internal , external )	Lesson plan -15
10:45-12:00	<b>Stripper , Dynamic Stripping BOPs (Main Stripping Stack</b> Annular Stripping ram Safety ram Equalizing Loop and Bleed-off Line )	Lesson plan -16
12:00-12:30	LAUNCH TIME	
12:30-02:00	<b>Well Kill in Preparation of Well Interventions :</b> Live vs. Dead Well intervention (without killing the well , Bull heading , circulation <b>Special Situations:</b> Blockages and Trapped Pressure in Tubing / Wellbore , Hydrates , H2S consideration (detention , necessary equipment ) ,	Lesson plan -17
02:00-02:15	BREAK	
02:15-03:45	Describe and discuss conditions where pressure calculations exceed MASP <u>Operations with Specific Well Control Concerns(acid, frac , Perf. ) ,</u>  <b>R/U :Special BOP Equipment ( guide ram , guide tube )</b>	Lesson plan -18

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03:45-05:00	<b>Cont. Planned Responses to Anticipated Well Control Scenarios:</b> Buckling Piston effect Slip bowl failure	Lesson plan -19
05:05	END OF TRAINING DAY	
	<b><u>DAY 4</u></b>	
08:00-09:30	<b>Cont. Planned Responses to Anticipated Well Control Scenarios:</b> Power unit or hydraulic circuit failure Stripping annular element failure leak below BOP	Lesson plan -20
09:30-09:45	BREAK	
09:45 :11:00	Pressure at surface inside the work string , leak in stripper BOP ram ) <b>Buckling of tubular</b> ( detention , prevention ) <b>Parting of string</b> ( prevention , immediate action )	Lesson plan -21
11:00-12:00	<b>Organizing a Well Control Operation</b> : personnel -Roles and Responsibilities , Plan Responses to Anticipated Well Control Scenarios	Lesson plan -22
12:00-12:30	LAUNCH TIME	
12:30-03:00	<b>Testing</b> : Pressure and Function Tests ( purpose , Maximum safe working pressures of well control equipment , low & high pressure test ) , BOP Testing ( specific equipment , pressure test value ) Testing of Completion Equipment ( Packers , deep set plug , documentation	Lesson plan -23
03:15-03:30	BREAK	
03:30-05:00	<b>Government, Industry and Company Rules, Order and Policies</b> : API and ISO recommended practices, standards and bulletins pertaining to well control , Company/operator specific requirements <b>Ancillary Considerations:</b> Gas detector , fluid gas separator , <u>Choke Drills</u> , Wellhead Control Panel	Lesson plan -24
05:00	END OF LAST TRAINING DAY	