

Lesson plan 4 Snubbing Level 3,4						
Time	Lecture	Subject	Delivery Method for level 3	Delivery Method for level 4	Teaching Aids	Assessing & Understanding
08:00 - 08:30		Homework revision	Check the answers for yesterday homework with students and discuss the correct answers	Check the answers for yesterday homework with students and discuss the correct answers	Verbal White board	Discussion
08:30 - 09:00	4.1	<b>Application SN</b> When snubbing is used	Explain the uses and limitations of snubbing	Explain the uses and limitations of snubbing	Power point Manual	Open Question Q & A
	4.2	<b>Equipment SN</b> The snubbing equipment in different operating environments	Explain why it is important to use the correct snubbing equipment for different parameters: - Pressure ratings - Flow - Fluid composition - Temperature - Connection compatibility Explain why compatibility with external equipment systems is important: - Drilling rig - Production facility - Remote	From a given situation assess if the snubbing equipment is suitable for different parameters: - Pressure ratings - Flow - Fluid composition - Temperature - Connection compatibility.  Explain why compatibility with external equipment systems is important: - Drilling rig - Production facility - Remote	Power point Video Manual	Open Question Q & A
9:00 - 10:00	4.3	<b>PRESSURE CONTROL Surface PCE Stack SN</b> PCE required for snubbing operations	Explain the function and positioning of the surface PCE components required for snubbing operations	From a given situation, assess the surface PCE components required and explain their function for snubbing operations	Power point White board	Discussion

	4.4	<p><b>Primary Barrier Elements SN</b> Primary barrier elements used during snubbing operations</p>	<p>Describe the function and positioning of primary barrier elements used during snubbing operations:</p> <ul style="list-style-type: none"> <li>- Stripper bowl or annular preventer</li> <li>- Stripper BOP</li> </ul> <p>Outline the operating limits of snubbing primary barrier elements:</p> <ul style="list-style-type: none"> <li>- Potential for buckling</li> <li>- Height limitations</li> <li>- Access for maintenance</li> </ul>	<p>Describe the function and positioning of primary barrier elements used during snubbing operations:</p> <ul style="list-style-type: none"> <li>- Stripper bowl or annular preventer</li> <li>- Stripper BOP</li> </ul> <p>Outline the operating limits of snubbing primary barrier elements:</p> <ul style="list-style-type: none"> <li>- Potential for buckling</li> <li>- Height limitations</li> <li>- Access for maintenance</li> </ul>	Verbal Power point	Discussion
10:00 - 10:30	4.5	<p><b>Primary Barrier Elements SN</b> Snubbing primary barrier sealing elements and how to operate them correctly</p>	<p>Explain how the snubbing primary barrier sealing elements will operate:</p> <ul style="list-style-type: none"> <li>- With well pressure assistance on closing</li> <li>- With operating pressures</li> <li>- With operating temperature</li> <li>- Type of fluid (oil, gas or water)</li> <li>- Condition of tubulars and connections</li> <li>- Pipe Rotation With running speeds</li> </ul>	<p>Explain how the snubbing primary barrier sealing elements will operate:</p> <ul style="list-style-type: none"> <li>- With well pressure assistance on closing</li> <li>- With operating pressures</li> <li>- With operating temperature</li> <li>- Type of fluid (oil, gas or water)</li> <li>- Condition of tubulars and connections</li> <li>- Pipe Rotation With running speeds</li> </ul>	Power point Manual	Open Question Q & A
	4.6	<p><b>Primary Barrier Elements SN</b> Primary barrier element integrity during snubbing operations</p>	<p>Explain the factors that can affect primary barrier elements integrity during snubbing operations:</p>	<p>From a given situation, explain how to prevent primary barrier element failure during</p>	White board Power point	Group discussion

			<ul style="list-style-type: none"> <li>- Hydraulic pressure</li> <li>- Roughness of the workstring</li> <li>- Fluid composition</li> <li>- Maintenance</li> <li>- Running speeds</li> </ul>	snubbing operations considering the following factors: <ul style="list-style-type: none"> <li>- Hydraulic pressure</li> <li>- Roughness of the workstring</li> <li>- Fluid composition</li> <li>- Maintenance</li> <li>- Running speeds</li> </ul>		
	4.7	<b>Secondary Barrier Elements – BOPs (Ram Type Preventers) SN</b>  Secondary barrier elements (snubbing BOPs) used during snubbing operations	Describe the function and positioning of secondary barrier elements (snubbing BOPs) used during snubbing operations, and their operating limits, including potential for failure: <ul style="list-style-type: none"> <li>- Annular BOPs</li> <li>- Pipe ram/safety BOPs</li> </ul>	From a given diagram, assess if the snubbing BOP space-out and configuration is suitable for the operation	Power point Manual	Open Question Q & A
10:30 - 11:00	4.8	<b>Secondary Barrier Elements – BOPs (Ram Type Preventers) SN</b>  BOP ram configurations for different snubbing operations	For a given situation, identify the required changes to the snubbing BOP ram configuration for: <ul style="list-style-type: none"> <li>- Changes to tubular diameter and type</li> <li>- Different fluid composition</li> <li>- Changes to pressure and temperature</li> </ul>	For a given situation, assess the required changes to the snubbing BOP ram configuration for: <ul style="list-style-type: none"> <li>- Changes to tubular diameter and type</li> <li>- Different fluid composition</li> <li>- Changes to pressure and temperature</li> </ul>	Power point	Discussion
11:00 - 11:30		<b>Lunch Break</b>				
11:30 - 11:45	4.9	<b>Secondary Barrier Elements – BOPs (Ram Type Preventers) SN</b> How to operate secondary barrier elements (snubbing	Explain how to operate the secondary barrier elements (snubbing/annular/pi	From a given situation, explain the correct actions to take if the secondary barrier	White board Manual	Open Question Q & A

		BOPs) including annular BOPs and pipe ram/safety BOPs	pe ram/safety BOPs) during snubbing operations including: - Closing and operating sequences - Operating pressures - Lining up and hydraulic connections	elements (snubbing/annular/pi pe ram/safety BOPs) fail to seal or function		
	4.10	<b>Shearing Devices SN</b> Snubbing shearing devices	Explain the function, positioning and operating limits of snubbing: - Shear ram - Shear/seal ram/valve.  Explain when to use a snubbing: - Shear ram - Shear/seal ram/valve	Explain the function, positioning and operating limits of snubbing: - Shear ram - Shear/seal ram/valve.  From a given situation, explain why and when to use a snubbing: - Shear ram - Shear/seal ram/valve	White board Verbal Video	Discussion
11:45 - 12:15	4.11	<b>Other Well Control Devices SN</b> Downhole check valves (back pressure valves) used during snubbing operations	Explain the positioning of downhole check valves (back pressure valves) in a snubbing BHA and how to test them  Outline the advantages and disadvantages of using downhole check valves (back pressure valves) in a snubbing BHA	From a given situation assess the positioning of downhole check valves (back pressure valves) in a snubbing BHA and how to test them  Outline the advantages and disadvantages of using downhole check valves (back pressure valves) in a snubbing BHA	Power point manual	Open Question Q & A

	4.12	<p><b>Other Well Control Devices SN</b> The need for and the use of alternative and additional internal well control devices in snubbing operations</p>	<p>Explain the use and positioning of various alternative and additional internal well control devices including: - Stab-in safety valves - Internal BOPs - Pump down plugs Pump out devices</p>	<p>From a given situation compare the use of various internal well control devices including: - Stab-in safety valves - Internal BOPs - Pump down plugs - Pump out devices.</p> <p>Explain where to position the devices in the string and justify reasoning</p>	White board Manual	Discussion
12:15 - 13:45	4.13	<p><b>PRESSURE CONTROL (BARRIER ELEMENTS AND ENVELOPES) PRINCIPLES SN</b> Grouping barrier elements into barrier envelopes during snubbing operations</p>	<p>From a given snubbing situation or surface rig-up diagram, identify which are primary and secondary barrier elements and group them into envelopes</p>	<p>From a given changing snubbing situation or surface rig-up diagram, identify which are primary and secondary barrier elements and group them into envelopes Assess from a given barrier configuration and PCE design if the snubbing operation can be completed safely Assess where potential leak paths may develop</p>	Manual video	Open Question Q & A
	4.14	<p><b>Other Operations - PCE Stack SN</b> A snubbing pressurised deployment system</p>	<p>Describe when a snubbing pressurised deployment system is used  Explain the barrier configuration and PCE design required</p>	<p>From a given situation, assess when a snubbing pressurised deployment system is used  Explain the barrier</p>	Manual White board	Open Question Q & A

			to maintain the double barrier philosophy	configuration and PCE design required to maintain the double barrier philosophy		
	4.15	<b>Other Operations - PCE Stack SN</b> Changes to ram equipment for different pipe sizes including tapered string	Describe the ram equipment required for different pipe sizes including tapered string  Explain how to change the rams at the changeover from one size to another	From a given description or diagram, assess the ram equipment required for a specific tapered string operation  Explain how to change the rams at the changeover from one size to another	Manual	Discussion
	4.16	<b>Safely repair or replace failed primary barrier element SN</b>  The reasons for changing worn elastomers	Explain the steps to make the well safe when changing out sealing elements within the stack  Explain why it is important to maintain two barriers	Explain the steps required to make the well safe when changing out sealing elements within the stack  Explain why it is important to maintain two barriers	Manual White board	Discussion
13:45 - 14:15	4.17	<b>Safely repair or replace failed primary barrier element SN</b>  Secondary barrier elements and envelopes for snubbing if a primary barrier element fails	Explain the correct actions to take if a primary barrier element fails during snubbing operations  Describe how and when to apply the secondary barrier elements/envelopes considering: - Equipment operating limits - Testing after closure - Monitoring for	From a given situation, explain the correct actions to take if a primary barrier element fails during snubbing operations considering: - How to maintain double barrier protection - Operating limits of secondary barrier element - Ability to verify	Manual White board	Open Question Q & A

			pressure - Double barrier protection	barrier envelope integrity		
	4.18	<b>Safely repair or replace failed primary barrier element SN</b>  Maintaining a double barrier when changing the annular element during intervention	Explain how to maintain double barriers when changing the annular element during intervention  From a diagram or description of changing the annular element, identify the barriers	Explain how to maintain double barriers when changing the annular element during intervention  From a diagram or description of changing the annular element, identify the barriers	Manual video	Group discussion
14:15 - 14:30		<b>Coffee Break</b>				
14:30 - 15:00	4.19	<b>PCE Rig Up SN</b> The equipment required for a safe and compatible snubbing PCE rig-up	Explain which PCE is required to complete a safe and compatible snubbing rig-up	Analyse given information of the PCE stack, and explain which equipment is required to complete a safe and compatible snubbing rig-up	Power point Manual	Open Question Q & A
	4.20	<b>PCE Testing SN</b> PCE pressure tests and function tests with the workstring in place	Explain how to do pressure tests and function tests on the PCE with the workstring in place	From a given situation, verify how to do pressure tests and function tests on the PCE with the workstring in place, and assess if the test results are acceptable	Manual White board	Discussion
	4.21	<b>Operational Considerations (with well control consequences) SN</b>  The forces on the workstring created by well pressure	Explain the forces on the workstring created by well pressure, flow and conditions to produce: - Pipe light and pipe	Explain the effects of flow and well condition changes on the work string  Describe the steps required to	Manual	Open Question Q & A

			heavy - Buckling Explain the procedure of transition from pipe light to pipe heavy and from pipe heavy to pipe light	manage the forces produced during: - Pipe light and pipe heavy - Buckling  Explain the procedure of transition from pipe light to pipe heavy and from pipe heavy to pipe light		
15:00 - 15:30	4.22	<b>Operational Considerations (with well control consequences) SN</b>  Snubbing pipe in and out of a live well (with square collars/ram to ram)	Explain the process of snubbing pipe with square collars by opening and closing the stripper rams in sequence	Explain the process of snubbing pipe with square collars by opening and closing the stripper rams in sequence	Manual White board	Open Question Q & A
	4.23	<b>Controlled Well Shut in SN</b>  How to shut in the well quickly and safely with or without work-string in the hole	Explain how to safely shut in the well during a snubbing operation: - With workstring in the hole - Without workstring in the hole - With BHA tools and components positioned at surface	From a given situation, assess how to safely shut in the well during a snubbing operation: - With workstring in the hole - Without workstring in the hole - With BHA tools and components positioned at surface	Manual	Open Question Q & A
15:30 - 15:45	4.24	<b>Controlled Well Shut in SN</b>  Snubbing shear ram equipment operating limits	From a given diagram or description, identify the non-shearable BHA tools and components	From a given diagram or description, assess what action to take if there are non-shearable BHA tools and component across the BOP	White board Manual	Group discussion
	4.25	<b>Loss of Pressure Control During Well Intervention Operations SN</b>	From a given diagram or description of a snubbing BOP,	From a given diagram or description of a snubbing BOP,	White board Manual	Open Question Q & A



		How to identify defects that could affect BOP function during a snubbing operation	<p>explain what to do when there is a defect:</p> <ul style="list-style-type: none"> <li>- Leaking flange/fitting connections</li> <li>- Leaking weep holes</li> <li>- Damaged seals</li> </ul>	<p>explain what to do when there is a defect:</p> <ul style="list-style-type: none"> <li>- Leaking flange/fitting connections</li> <li>- Leaking weep holes</li> <li>- Damaged seals.</li> </ul> <p>Explain the further actions required once the situation is made safe</p>		
15:45 - 16:15	4.26	<p><b>Loss of Pressure Control During Well Intervention Operations SN</b></p> <p>What to do if surface equipment fails while the work string is in the well during a snubbing operation</p>	Explain how to make the operation safe while maintaining control of the well if surface equipment fails while the work string is in the well during a snubbing operation	Assess what to do if surface equipment fails while the work string is in the well during a snubbing operation, and explain the further actions required once the operation is made safe	White board Manual	Discussion
	4.27	<p><b>Loss of Pressure Control During Well Intervention Operations SN</b></p> <p>What to do if the slip bowl fails during a snubbing operation</p>	<p>Explain how to make the operation safe while maintaining control of the well if the slip bowl fails during a snubbing operation when in:</p> <ul style="list-style-type: none"> <li>- Pipe light</li> <li>- Pipe heavy</li> </ul>	From a given situation, assess what to do if the slip bowl fails during a snubbing operation, and explain the further actions required once the operation is made safe when in:	Manual	Open Questions
	4.28	<p><b>Loss of Pressure Control During Well Intervention Operations SN</b></p> <p>What to do if there is a leak from the surface equipment to the atmosphere during a</p>	Explain how to make the operation safe while maintaining control of the well if there is a leak from the surface equipment to the atmosphere during a	From a given situation, assess what to do if there is a leak from the surface equipment to the atmosphere during a snubbing operation, and	Manual	Discussion

		snubbing operation	snubbing operation: - Below the stripper BOPs - Below the safety BOP - Above the shear/seal BOP - Below the blind/shear BOP	explain the further actions required once the operation is made safe: - Below the stripper BOPs - Below the safety BOP - Above the shear/seal BOP - Below the blind/shear BOP		
16:15 - 16:30	4.29	<b>Loss of Pressure Control During Well Intervention Operations SN</b>  What to do if pressure is seen at surface inside the work string during a snubbing operation	Explain how to make the operation safe while maintaining control of the well if pressure is seen at surface inside the work string during a snubbing operation	From a given situation, assess what to do if pressure is seen at surface inside the work string during a snubbing operation, and explain the further actions required once the operation is made safe	White board Manual	Class discussion
	4.30	<b>Loss of Pressure Control During Well Intervention Operations SN</b>  What to do if an alarm sounds when the workstring is in the well and you are required to muster in a safe area	Explain how to make the operation safe while maintaining control of the well if an alarm sounds and you are required to muster in a safe area when the workstring is in the well	From a given situation, assess what to do if an alarm sounds and you are required to muster in a safe area when the workstring is in the well and explain the further actions required once the operation is made safe	White board Manual	Discussion
16:30 - 16:45	4.31	<b>Loss of Pressure Control During Well Intervention Operations SN</b>  What to do if the workstring down hole check valves (back pressure valves) leak	Explain how to make the operation safe while maintaining control of the well if the workstring down hole check valves (back	From a given situation, assess what to do if the workstring down hole check valves (back pressure valves) leak while in	Manual	Open Question Q & A

		while in the hole during a snubbing operation	pressure valves) leak while in the hole during a snubbing operation	the hole during a snubbing operation and explain the further actions required once the operation is made safe		
1 hr.		Homework exercises			Exercise Book	To be discussed next day