IWCF OUTLINE FOR LEVEL 3& 4

IWCF Well control DRILLING L 3& 4		
COURSE OUTLINE		
DAY1		
TIME	***Subject***	***Lesson plan***
8:00 - 9:00	The impact of a well control incident The need for well control training and assessment Factors that affect hydrostatic pressure Hydrostatic pressure calculations Formation pore pressure Formation pore pressure as the lower limit of the mud weight window	Lesson plan -1
9:00 - 10:0	Fracture pressure Fracture pressure as the upper limit of the mud weight window The effects of water depth on formation fracture pressure. Factors that can influence primary well control Pore and fracture pressure estimation and the potential impact on primary well control Secondary well control Appropriate secondary well control equipment selection	Lesson plan -2
10:00 - 10:15	COFFEE BREAK	
10:15 - 11:15	The well barrier elements in well operations The principles of different well barrier element types Barrier terminology Verification of well barrier elements	Lesson plan -3
11:15-12:30	The criteria to test barrier elements Documentation for well barrier tests The correct action to take when a well barrier element test fails	Lesson plan -4
12:3013:00	Launch Time	
13:00-14:00	Risk management The Management of Change (MOC) process The importance of checklists for operations with well control implication The need for well control drills The management of nonshearable and nonsealable tubulars through the BOP	Lesson plan -5

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14:00-15:00	Factors that affect fluid density Operations which can reduce hydrostatic head The effect of fluid properties in the riser, booster, choke, and kill lines The effect of riser margin on bottom hole pressure	Lesson plan -6
15:00-15:15	COFFEE BREAK	
15:1516:00	Gas cutting of drilling fluid The causes of gas cutting The potential causes of lost circulation The actions to take in the event of losses during normal operations The possible consequences of losses on riser integrity	Lesson plan -7
16:00-17:00	The causes of swabbing and surging The consequences of swabbing and surging Downhole swabbing and surging from the vessel motion on floating rigs The tripping process The risks associated with tripping Actions to take when there are deviations from predicted trip tank volume The actions to take after trip sheet evaluation shows an influx Common tripping practices influx in the tubular	Lesson plan -8
HOMEWORK	**Find these Questions at STC exercise book then solve all of them:** ➢ Barriers – Page #6 Qs (2:5) ➢ Pressures in the Earth's Crust Page #10 Qs (10:12) ➢ Static and dynamic Pressures – Page #10 Qs (15:17)	
DAY 2		
08:00-10:00	Homework Revision Kick warning signs while drilling and/or circulating Kick warning signs when tripping Actions to take after recognising a kick warning sign Kick indicators and the importance of early kick detection The interpretation of well flow-back (for example finger-printing' and trend analysis) The effect of rig motion on detecting kick indicators	Lesson plan -9
10:00-10:15	COFFEE BREAK	
10:15-11:00	Shallow Gas The consequences of shallow gas kicks Prevention of shallow gas kicks The requirements for operations in a shallow gas zone Managing shallow gas flow	Lesson plan -10

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	implications of drilling top hole with or without a riser The methods to identify and minimize the impact of a shallow gas kick	
11:00-12:30	Bottom hole circulating pressure and Equivalent Circulating Density (ECD) The relationship between pump pressure and pump speed The relationship between pump pressure and mud density	Lesson plan -11
12:30-13:00	LAUNCH TIME	
13:00-14:00	The process of taking Slow Circulation Rates(SCR) The factors that influence selection of slow circulating rates How to establish choke line friction when using a subsea BOP	Lesson plan -12
14:00-15:00	The purpose of a Leak Off Test (LOT), and the difference between a LOT and a Formation Integrity Test (FIT) How to perform a LOT or a FIT The pressure versus volume graph from the LOT or FIT data How to select MAASP from LOT/FIT results When and why MAASP must be recalculated The principles of kick margin/tolerance/intensity and how it is applied to well operations	Lesson plan -13
15:00-15:15	COFFEE BREAK	
15:15-17:00	The different types of influx and the hazard they present How an influx can change as it is circulated up a well The importance and use of the gas laws Influx migration The effects of influx fluids on the primary fluid barrier The solubility of hydrocarbon, carbon dioxide and hydrogen sulphide gases when mixed under downhole conditions with water based or (pseudo) oil based drilling fluid The behaviour of dissolved gas in different drilling fluid types when circulating the influx to surface including the effects of temperature and pressure The impact of downhole conditions on the hydrocarbon gas state (gas or liquid influx) The actions required to mitigate the effects of gas break out The behaviour of a gas influx as it circulates a horizontal well The effects of gas expansion in the riser The actions to take with gas expansion in the riser	Lesson plan -14
HOMEWORK	**Find these Questions at STC exercise book then solve all of them:** ➢ Top hole – Page #13 Qs (22:26) ➢ L.O.T and MAASP – Page #15 Qs (28:30) ➢ Kick Warning signs – Page #17 Qs (39:57)	

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	DAY 3	
08:00-10:00	Homework Revision A suitable shut-in procedure if a primary barrier fails Monitoring the well after it is shut-in The actions to take with gas in the riser above the BOPs The hard shut-in method How to confirm if well closure is successful When and how to hang off the string in a well control situation Wire line movement effect on BHP Shut-in procedures while wire line logging operation The limitation of BOP during wire line operations	Lesson plan -15
10:00-10:15	COFFEE BREAK	
10:15-10:45	recording parameters when shut-in well Obtaining and interpreting shut-in pressures Trapped pressure The SIDPP with a float valve in the drill string limitations of pressure gauges and different readings on rig using of dedicated gauges for SIDPP and SICP gas migration and causes of pressures increase and actions taken Controlling BHP when an influx is migrating	Lesson plan -16
10:45-11:30	Standard well control methods The difference between controlling and killing a well Selection of kill pump rate The appropriate kill methods with the bit on bottom The appropriate course of action to take when not on bottom Maintaining constant BHP when starting and stopping circulation The effect of Choke Line Friction (CLF) on BHP when starting and stopping circulation The effect of CLF on BHP when changing pump speed The measures to mitigate the impact of CLF How to reduce well annular pressure if MAASP (at the well weak point) is approached Maintaining constant BHP when changing pump speed the driller's method the wait and weight method The actions required to establish kill mud weight in the riser and associated lines The actions required to safely remove gas trapped in the BOP Complete a kill sheet based on given vertical well data.	Lesson plan -17
	The principles of the volumetric process The procedure required for controlling a well with the Volumetric Method	

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11:30-12:30	When the Volumetric Method is the appropriate well control method The principles of the Lubricate and Bleed Method The procedure required for controlling a well with the Lubricate and Bleed Method When the Lubricate and Bleed Method is the appropriate well control technique The principles of stripping The procedure required to safely strip into a well The factors which limit or complicate the ability to strip in the hole	Lesson plan -18
12:30-13:00	LAUNCH TIME	
13:00-13:45	Factors that increase the risk of kicks while casing operation how to reduce surge and swabbing pressures The limitations of self-filling float systems Monitoring returns when running and pulling casing The calculation of displacements when tripping casing line actions if losses happen when running casing The changes to BHP during a cementing operation cement job result events result from entering formation fluids to casing or open hole after a cementing operation The actions to take if a well starts to flow during a cementing operation The steps to shut-in a well when running casing	Lesson plan -19
13:45-14:15	The concept and implementation of well control drills as specified by API standards Indications that MAASP is exceeded during a well control operation	Lesson plan -20
14:15-15:00	Indications of downhole or surface problems that can arise during well control operations How to detect when gauges are malfunctioning The actions to take when operating limits are being reached or have been reached in a MGS Leak identification and responses to well control equipment failure What hydrates are and the conditions likely to lead to their formation Hydrate prevention and removal Monitoring and managing losses during a well control event HOMEWORK	Lesson plan -21
15:00-15:15	COFFEE BREAK	
15:15-17:00	PRACTICAL TRAINING ON SIMULATOR	
HOMEWORK	**Find these Questions at STC exercise book then solve all of them:**	

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	➢ Well Shut-In Procedures – Page #24 Qs (68:72) ➢ Well Killing Procedures– Page #27 Qs (77:90) ➢ Driller's Method – Page #32 Qs (93:95) ➢ Wait and Weight Method – Page #33 Qs (100:105) ➢ Well Killing Problems– Page #37 Qs (115:120) ➢ Volumetric Method – Page #40 Qs (125:127) ➢ Well Control Calculations – Page #45 Qs (16:22)	
	DAY 4	
08:00-10:00	Homework Revision BOP function, configuration and the well control operation that can be carried out The overall pressure rating requirements of a BOP stack The configuration of the Marine Riser, Lower Marine Riser Package (LMRP) and subsea BOP The operational limits associated with particular BOP ram equipment changing ram equipment The function and operating principles of ram locks The operating principles of BOP blind/shear equipment Shear ram operational procedures The operating principles of annular preventers The deterioration and failure of annular preventers in service How hydrostatic pressure can affect annular preventers The application of the annular manufacturer data and well bore pressure The optimal location and size of side outlet valves on a BOP stack The importance of correct gasket selection and make up procedures	Lesson plan -22
10:00-10:15	COFFEE BREAK	
10:15-12:30	The two most common types of diverter The principles of diverter operations The operating mechanisms of common types of diverters used The different types of safety valves The application of the IBOP The capabilities and limitations of using float/flapper valves in the string DPSV installation during tubular running operations The alternative circulating routes to the well and through the choke manifold during well control operations The operating principles and limitations of adjustable chokes The operating principles and limitations of a Mud Gas Separator (MGS) The operating principles and the role of a vacuum degasser	Lesson plan -23

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12:30-13:00	LAUNCH TIME	
12:30-15:00	The importance of the procedures for maintaining and testing BOP stack and choke and kill manifolds (with reference to API standards) The required frequency and test values of BOPs and well control equipment during well operations Monitoring the non-pressured side of the barrier being tested The inverted test ram in a subsea BOP stack the pressure test requirements for DPSVs, Kelly cocks and IBOPs The required frequency and test values for DPSVs and IBOPs The required BOP operating pressures and closing times Pressure and strength ratings for equipment used to test well control equipment the function test and frequency requirements for BOP The correct procedures to test diverter systems The frequency and test values required for diverter systems The principles of inflow testing Factors to be considered during an inflow test Mitigations to minimize the kick size if the test should fail The procedures required for an effective inflow test	Lesson plan -24
15:00-15:15	COFFEE BREAK	
15:1517:00	BOP Control Systems The general operating principles of the remote control panel The normal operating pressures and stored volumes contained in the BOP control system The normal operating pressures and stored volumes contained in the BOP control system The purpose and criteria for a successful accumulator drawdown test How to confirm if a specific function has successfully operated Possible functional problems during BOP/Diverter operations The general operating principles of subsea BOP control systems The general operating principles of the remote control panel with a subsea installed BOP How to confirm if a specific function has successfully operated on a subsea BOP Functional problems during operations of a subsea installed BOP The purpose of having accumulator bottles at the subsea BOP The secondary closure systems and emergency device that are installed on the subsea BOP stack (with reference to API RP 53)	Lesson plan -25
HOMEWORK	**Find these Questions at STC exercise book then solve all of them:**	

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	➢ Diverter – Page #64 Qs (5:10) ➢ BOP-Annular Preventer – Page #74 Qs (30:36) ➢ BOP-Control System – Page #83 Qs (61:65) ➢ Choke – Page #93 Qs (91:94) ➢ Mud Gas Separator – Page #99 Qs (111:112)
PRACTICAL TEST ON SIMULATOR	