International Well Control Forum

Rotary Drilling Well Control
Surface & Subsea BOP Stack
Certification Syllabus

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Version 5.0

Rotary Drilling Well Control
Practical Assessment & Written Test Syllabus

Surface & Subsea BOP Stack Standards and Performance Criteria

Syllabus Structure

This edition of the syllabus has been restructured into two major sections, Practical Assessment and Written testing, to reflect the way in which candidates are tested. The Written test section is further divided into Surface BOP operations and Subsea BOP operations.

Section.1 Practical Assessment Syllabus

The syllabus is divided into eight sections: -

A. Well Control Equipment.
B. Kill Sheet Information.
C. Kicks While Drilling/Tripping.
D. Shut in Procedures.
E. Shut in Pressure Observation.
F. Kill Handling Methods.
G. Kill Problems.
H. Well Control Management.

Section.2 Written Test Syllabus

Surface Equipment

A. Blowout Preventers.
B. BOP Control System.
C. Chokes and Manifolds.
D. Auxiliary Equipment.

Subsea Equipment

SA. Blowout Preventers.
SB. BOP Control System.
SC. Chokes and Manifolds.

Surface Principles & Procedures

E. Pre-recorded Information.
F. Causes of Kicks.
G. Kicks while Drilling/Tripping.
H. Shut in Procedures
J. Shut in Pressures.
K. Kill Methods.
L. Perform Calculations.
M. Kill Problems.
N. Well Control Management.

Subsea Principles & Procedures

SE. Slow Circulating Rates.
SF. Causes of Kicks.
SG. Positive Kick Signs.
SH. Shut in Procedures.

SK. Kill Methods
SL. Perform Calculations
SM. Kill Problems

Standards

The standards in the syllabus are based on the practical skills and knowledge required when drilling wells of all known geometries.

Performance Criteria

Performance criteria have been developed for each of the standards contained in the syllabus. The criteria indicate how each standard is to be tested, and is the basis on which practical assessment exercises and written test questions are developed.

Driller or Supervisor Level

The importance of each standard in the syllabus is indicated by a ranking number of 1 – 5. This number appears in the appropriate “Driller” or “Supervisor” column of the syllabus.

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	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
CHOKE MANIFOLDS & CHOKES					
Choke control panel					
A 01.01	To be able to competently operate all the controls on the choke control panel; e.g. pneumatic controls, closing speed adjustment, pump stroke counters, etc.	During a simulated well control exercise, demonstrate changing the choke closing speed, resetting the pump counter and monitoring the operation of the pump in use.	3	5	
A 01.02	To be able to recognise malfunctions on the panel and know how to activate back up systems.	During a simulated well control exercise, recognise when rig air is lost, and demonstrate knowledge of back-up systems within the choke control system.	2	4	
AUXILIARY EQUIPMENT					
Pit Volume Totaliser (P.V.T)					
A 02.01	To know how to set up and adjust the P.V.T equipment for a given gain/loss situation and set alarm values.	During a simulated well control exercise, demonstrate the ability to set up P.V.T alarms and justify the chosen limits.	5	5	
Flow indicator					
A 03.01	To know how to set up and adjust a flow indicator for a given gain/loss situation and set alarm values.	During a simulated well control exercise, demonstrate the ability to set and use a flow control system, and justify the chosen limits.	5	5	
Depth recorder					
A 04.01	To know how to set up, adjust and read the depth recorder.	During a simulated well control exercise, demonstrate the ability to set up, adjust, and read the depth recorder.	5	5	
Drilling parameters					
A 05.01	To know how to read and interpret common drilling parameters.	During a simulated well control exercise, demonstrate the ability to read and interpret drilling parameters, such as rate of penetration (ROP), torque, weight on bit, and pump pressure; in relation to kick detection.	5	5	
Pressure measuring devices					
A 06.01	To know how to read pressure gauges (pump, standpipe, drill pipe, casing and choke).	During a simulated well control exercise, demonstrate the ability to accurately read the correct value and appropriate units on pressure gauges (pump, standpipe, drill pipe, casing and choke).	5	5	
Pump stroke counter					
A 07.01	To know and understand how pump stroke counters function.	During a simulated well control exercise, demonstrate the ability to use the single and cumulative pump stroke counters and relate to flow rate and volume displaced.	5	5	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
AUXILIARY EQUIPMENT					
Mud density measuring devices					
A 08.01	To know how to use, read and interpret mud density measuring devices.	During a simulated well control exercise, demonstrate the ability to use a (pressure) mud balance and to accurately read and interpret the obtained value.	5	5	
Gas detection equipment					
A 09.01	To know and understand the meaning of gas readings.	During a simulated well control exercise, demonstrate the ability to read and understand changes in trends of Connection, Trip, and Background gas. Demonstrate the ability to take appropriate action when these changes in trends have been identified.	4	5	
Trip tank					
A 10.01	To be able to set up and run the trip tank equipment and measuring devices.	During a simulated tripping exercise, demonstrate the ability to run the trip tank re-circulating pump in conjunction with the measuring device.	5	5	
A 10.02	To know how to record and interpret trip tank displacement volumes.	During a simulated tripping exercise, demonstrate the ability to record the drill string displacement volume for each stand pulled (or part thereof) and to identify discrepancies between theoretical and actual recorded volumes.	5	5	
TESTING					
BOP Testing					
A 11.01	To know how to record critical test parameters such as closing time for all functions during a test.	Given a simulated BOP stack and control system, demonstrate how closing times should be recorded, and whether or not these are within specified limits.	2	4	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
SLOW CIRCULATION RATES					
Slow Circulating Rates					
B 01.01	To know how to accurately record slow circulating pressures, and when and how often this should be performed during drilling operations.	During a simulated well control exercise, demonstrate ability to record system pressure losses at different pump rates and fluid densities.	4	5	
B 01.02	To know where to read the standpipe pressure when recording slow circulating rates. To recognise the error in standpipe pressure when reading from different gauges.	During a simulated well control exercise, demonstrate ability to accurately read standpipe pressure at the appropriate gauge (choke panel) when recording slow circulating rates, and recognise disparities in standpipe pressures when reading from different gauges.	5	5	
B 01.03	To know how to record pressure losses in the choke and kill lines at slow circulating rates.	During a simulated well control exercise,demonstrate ability to record necessary pressure losses in the choke and kill lines and record the effect on bottom hole pressure.	4	5	
LEAK-OFF TEST					
B 02.01	To know how to line up for a leak-off test, how to instruct the pump operator, and how to apply the correct procedure with respect to pump speed, volume pumped and method (intermittent and/or continuous) of pumping.	During a simulated well control exercise with incomplete and/or superfluous data,demonstrate the specific requirements to perform an acceptable leak-off test (hook-up, instructions and method of pumping).	2	5	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
KICKS WHILE DRILLING					
Early Warning Signs					
C 01.01	To know the most probable warning signs that the well MIGHT be going under-balanced i.e.: - - Rate of penetration trends. - Drilling break. - Trends shown in torque/drag	During a simulated drilling exercise, recognise the most important parameters that might indicate that the well is going under-balanced.	5	5	
Positive Kick Signs					
C 02.01	To know the positive indications of a kick: - - Flow from well (pumps off). - Increase in flow from well (pumps on). - Pit volume gain.	During a simulated well control exercise, recognise positive kick indicators.	5	5	
C 02.02	To know how to investigate and establish the cause of any pit gain which results in no shut-in pressure e.g., mud transference, water dilution, gas cut mud.	During a simulated drilling exercise diagnose pit gain and describe your reasoning.	2	5	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
MANIFOLD VALVES					
General Mechanisms					
D 01.01	To know how to identify trapped pressure when opening or closing lines.	On a simulated pipe and manifold, showing manifold valves (open and closed) gauge pressure readings and operations previously carried out, indicate which elements of the manifold should be under pressure; how this can be verified (i.e. opening or closing valves, connecting gauges etc.).	4	4	*01/08/2005*
D 01.02	Understand the possible consequences of opening and closing valves under pressure.	List the precautions to be taken when opening or closing valves under pressure..	4	4	*29/11/2005*
SHUT-IN PROCEDURES					
Shut in Procedures					
D 02.01	To know how to shut the well in, according to the selected procedure (in accordance with API RP.59), in different operational situations.	During a simulated well control exercise, perform a shut-in within the shortest possible time, in accordance with the selected procedure, for the following situations: - - Drilling on bottom. - Tripping in/out of the hole. - Running casing. - Cementing. - Wireline operations.	5	5	*01/08/2005*

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
SHUT IN PRESSURES					
Shut in pressure observations					
E 03.01	To know how to react when there are indications of influx migration in a closed well.	During a simulated well control exercise, demonstrate the appropriate actions to follow when influx migration takes place in a closed well.	4	5	
E 03.02	To know how to determine the Shut in Drill Pipe Pressure if a float valve is present in the drill string.	During a simulated well control exercise, with a float valve installed in the string, demonstrate how to determine the Shut in Drill Pipe Pressure.	3	4	
E 03.03	To know how to assess the well bore conditions if MAASP is approached.	During a simulated drilling situation, identify the hazards when annulus pressures are approaching MAASP, and demonstrat the possible actions.	3	4	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
KILL HANDLING METHODS					
Kill method principles					
F 01.01	To know how to bring the pump up to kill speed while maintaining bottom hole pressure constant.	During a simulated well control exercise, demonstrate how to bring the pump up to kill speed while maintaining bottom hole pressure constant.	5	5	
F 01.02	To know how to change pump speed and shut down a kill operation while maintaining bottom hole pressure constant.	During a simulated well control exercise, demonstrate how to change pump speed and shut down the kill operation while maintaining bottom hole pressure constant.	5	5	
F 01.03	To understand the minimal effect of hydrostatic head of influx on the choke pressure when circulating influx through a highly deviated or horizontal section.	Given a simulated kick situation in a highly deviated or horizontal well, list the reasons for little or no change in choke pressure when circulating influx through the highly deviated or horizontal hole section.	5	5	
F 01.04	To know how to operate a remote choke and make adjustments in accordance with the time delay to maintain constant bottom hole pressure for a given well configuration.	Given a simulated kick situation on a simulator, operate a remote choke and make adjustments in accordance with the time delay to maintain constant bottom hole pressure.		5	
F 01.05	To recognise the gas rise velocity profile in a vertical and highly deviated/horizontal well.	Given a simulated kick and well data, describe the difference between the gas rise velocity in vertical wells and those in highly deviated/horizontal wells.		5	
Wait & Weight and Driller's Method					
F 02.01	To know the step by step procedure required to carry out the Wait and Weight method or the Driller's Method, and demonstrate the capability to perform it.	During a simulated well control exercise and shut in kick situation, fill in the kill sheet and then control the influx using the Wait and Weight Method or the Driller's Method. (N.B. Driller acting under direction of the Supervisor.)	3	5	*01/08/2005*
Choke line friction					
F 04.01	To understand how to commence the kill operations taking into account the effect of Choke Line Friction.	During a simulated well control exercise, demonstrate how to bring the pumps up to kill speed while maintaining bottom hole pressure constant, taking into account the effect of Choke Line Friction on the (Dynamic) Casing Pressure Gauge or by using the (Static) Kill Line Pressure Gauge	5	5	
F 04.02	To know how to change pump speed and shut down a kill operation taking into account the effect of Choke Line Friction, and maintaining bottom hole pressure constant.	During a simulated well control exercise, demonstrate how to bring the pumps up to kill speed while maintaining bottom hole pressure constant, taking into account the effect of Choke Line Friction the (Dynamic) Casing Pressure Gauge or by using the (Static) Kill Line Pressure Guage	5	5	

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KILL HANDLING METHODS					
Bullheading					
F 05.01	To understand the conditions under which you might use the "Bullheading" procedure.	During a simulated well control exercise, decide and explain if the kick could be controlled using the bullhead method.	5	5	
Trapped gas					
F 06.01	To recognise the effect of gas trapped beneath a BOP and know how the danger can be minimised or removed.	During a simulated well control exercise, demonstrate the procedure for removing trapped gas from beneath or within the BOP.	5	5	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
DOWNHOLE PROBLEMS					
Plugged or washed bit nozzle					
G 07.01	To know how to identify a plugged (or washed) bit nozzle according to the changes in drill pipe pressure and casing pressure.	During a simulated well control exercise, identify a plugged (or washed) bit nozzle according to the changes in drill pipe pressure and casing pressure.	4	4	
G 07.02	To know how to maintain the bottom hole pressure constant with a plugged or washed bit nozzle.	During a simulated well control exercise, maintain the bottom hole pressure constant with a plugged or washed bit nozzle.	4	4	
Blockage - downhole					
G 08.01	To know how to detect a possible blockage in the annulus.	During a simulated well control exercise, and the presence of a blockage downhole, identify the most appropriate response from a list of possible procedures.	1	4	
Fluid losses					
G 09.01	To know how to detect fluid losses during a well control operation.	During a simulated well control exercise, detect fluid losses during a kill operation.	4	3	
G 09.02	To understand the possible actions which can be taken to reduce pressure at the weak zone.	During a simulated drilling exercise describe the possible actions that can be taken to reduce pressure at the weak zone, e.g. during start up of pumps. Driller to communicate and be aware of their influence when bringing pumps up to speed.	2	4	
SURFACE PROBLEMS					
BOP failure					
G 10.01	To know how to identify and respond to BOP failures (such as leakage's at/of a flange connection, weep-hole, ram packer, annular preventer element, closing line etc.)	During a simulated well control exercise, demonstrate the ability to respond adequately and rapidly, e.g. by closing a preventer below the failing BOP in question.	5	5	
Plugged or washed chokes					
G 11.01	To know how to identify a plugged choke according to observed changes in drill pipe and casing pressures.	During a simulated well control exercise, identify a plugged choke according to observed changes in drill pipe and casing pressure.	4	4	
G 11.02	To know how to isolate a plugged choke and to switch to an alternative choke.	During a simulated well control exercise, isolate the plugged choke and switch to an alternative choke, preventing excessive formation pressure build up.	4	4	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
SURFACE PROBLEMS					
Plugged or washed chokes					
G 11.03	To know how to identify a washed out choke according to observed changes in drill pipe and casing pressure.	During a simulated well control exercise, identify a washed out choke according to observed changes in drill pipe and casing pressure.	4	4	
G 11.04	To know how to isolate a cut-out choke and to switch to an alternate one.	During a simulated well control exercise, isolate the cut-out choke and switch to an alternative choke, while maintaining constant bottom hole pressure.	4	4	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
PRE-OPERATION PLANNING					
H 01.01	To know how to accurately communicate to the crew on the drill floor their roles and responsibilities during a well control operation.	Demonstrate the ability to inform subordinates of their roles and responsibilities in a well control situation.	4	5	
H 01.02	To know how to simulate the conditions of a well kick and provide corrective instructions for those crew members whose alertness, reaction and performance falls below an acceptable level.	Demonstrate the ability to observe and react upon the performance of subordinates which falls below acceptable levels during well control drills.		5	
H 01.03	To know how to assign operational tasks for well control situations to crew members and ensure that the individuals can carry them out competently.	Demonstrate the ability to assess crew performance to ensure competent handling of well control situations.	4	5	
H 01.04	To know that all pre-recorded information is accurate and that regular updates are carried out.	Demonstrate the ability to convey to the crew when and how to collect accurate data.	4	5	
H 01.05	To know how to organise instruction to all relevant personnel concerning the expected well control conditions, and inform them of the contingency plan.	Demonstrate the ability to communicate potential problems to the crew and the necessary actions to take.	2	5	
DURING THE KILL					
H 02.01	After a kick has been shut in, know how to assign competent crew members to the required operational tasks and provide effective briefing on the well kill procedure to be followed.	Demonstrate the ability to instruct the crew to take up their assigned positions.		5	
H 02.02	For a given fluid tank configuration, know how to direct crews to increase fluid density, to change required associated properties and to handle fluid volume increases.	From a given fluid tank configuration, fluid volumes, fluid properties, mixing systems and available personnel, prepare a detailed plan of action, including personnel assignments, to increase the fluid density and handle the resulting increased volumes.	4	5	
H 02.03	Given the stressful conditions of a well kick incident, know how to tightly control the lines and means of communication and flow of information, both to rig based and shore based personnel.	Demonstrate the ability to manage the organisational constraints, using managerial skills to control resources and the situation.		5	
H 02.04	To know how to identify those crew members whose performance and competence during a well kill operation falls below acceptable standards, and take appropriate corrective action.	Demonstrate the ability to assess crew performance to ensure competent handling of well control situations.	2	5	

	Standard	Performance Criteria	Driller Practical	Supervisor Practical	Amended
DURING THE KILL					
H 02.05	To know how to communicate in concise terms alterations to the kill procedure, and provides relevant information about potentially hazardous situations. Ensuring that changed instructions are communicated and understood by all relevant personnel.	Demonstrate the ability to perform proficiently in face-to-face communication, building rapport with others. Demonstrate the use of questioning and listening skills to effectively meet changing conditions.		5	
H 02.06	To know how to accurately record all data and events concerning the well kick and the kill procedure followed	Demonstrate the ability to ensure that relevant data is collected so that a chronological record of events is maintained.	4	5	
H 02.07	To know how to instruct the crew in the practices to be followed during a well kill operation to minimise pressure at the casing shoe.	Given a simulated critical kick situation, demonstrate the ability to instruct the crew on the practices that will minimise the risk of fracturing the formation.		4	
H 02.08	To know how to instruct and conduct the practice of performing well control drills, such as:- - Pit drill - Trip drill - Abandonment drill	Demonstrate and/or list the steps involved in conducting well control drills, such as pit drills, trip drills and abandonment.	4	5	
H 02.09	To know how to instruct and conduct the practice of performing a stripping operation.	Demonstrate the method and steps required to strip drill pipe in or out of the hole, such as: - Lining up of the trip tank and (optional) strip tank - Adjustment of annular preventer closing pressure (if used) or ram preventers (if used). - Preparation and lubrication of tooljoint. - Volumetric calculation versus choke pressures. - Compensation for closed end displacement.	5	5	
H 02.10	To know how to plan for a well control situation while tripping with a Top Drive System	Demonstrate the ability to follow appropriate procedures when taking a kick while tripping with a Top Drive System and with volumetric stripping operations to follow.	5	5	

	Standard	Performance Criteria	Driller	Supervisor	Amended
BLOWOUT PREVENTERS					
	Connections				
A 00.01	To know the different types of flanges, hub connections and ring gaskets	From diagrams or descriptions identify different types of connections and ring gaskets and their purpose.	**2**	**3**	*08/12/2005*
	BOP stack configuration				
A 01.01	To understand what well control operations can be carried out with a given stack configuration.	From a stack and choke manifold configuration together with a list of possible operations, recognise which can, or cannot, be carried out.	**2**	**3**	
A 01.02	To be able to calculate the required volumes to operate different stack functions.	Calculate the required volumes from data.		**4**	*08/12/2005*
A 01.03	To understand the general rating of a BOP stack.	Analyse the BOP stack rating according to the different components and their rated working pressures.	**2**	**4**	*08/12/2005*
	Ram type preventers				
A 02.01	To be able to distinguish between sealing elements and know how to instal them correctly.	From a diagram recognise the different types of sealing elements and describe correct installation procedure.	**3**	**4**	
A 02.02	To be able to recognise BOP ram type preventers.	From a diagram or description identify BOP ram type eqipment and components.	**3**		*08/12/2005*
A 02.03	To know the operating principles of BOP ram type equipment.	From a diagram, description or data, analyse or describe operating principles of BOP ram type equipment.	**3**	**5**	*08/12/2005*
A 02.04	To know when the ram equipment must be changed for specific operation.	From a diagram of a ram configuration, a description of the ongoing operations and a description of the next operation, analyse which ram equipment has to be changed and why.	**2**	**5**	*08/12/2005*
A 02.05	To be able to assess the extent of damage to the ram packing and the preventer seals, and take the right corrective action.	From diagrams of rams and preventer seals, identify significant damage to ram packings and preventer seals. Decide on the correct course of action.	**4**	**5**	*08/12/2005*
	Blind/shear preventers				
A 03.01	To be able to recognise the BOP blind/shear ram equipment.	From a diagrams or schematic drawing identify the different components of BOP blind/shear ram equipment..	**3**		*08/12/2005*
A 03.02	To know the operating principles of BOP blind/shear equipment.	From a diagram or given data describe operating principles.	**3**	**5**	*08/12/2005*

	Standard	Performance Criteria	Driller	Supervisor	Amended
BLOWOUT PREVENTERS					
	Annular preventers				
A 04.01	To be able to distinguish between different sealing elements and know how to install them correctly.	Recognise different types of sealing elements on schematic diagrams and describe correct application.	**3**		
A 04.02	To be able to recognise the BOP annular equipment.	From a diagram or schematic drawing identify the different components.	**3**		*08/12/2005*
A 04.03	To know the operating principles of BOP annular equipment.	From a diagram or given data describe operating principles.		**5**	*08/12/2005*
A 04.04	To be able to use manufacturer's data, well bore pressure data, to select and adjust the correct closing pressure for a particular annular BOP.	From a given manufacturer's data and well-bore pressure, select the correct closing pressure and indicate how to proceed for adjustment.		**3**	*08/12/2005*
	Side outlet valves				
A 05.01	To know the correct locations for remotely operated side outlet valves, check valves and other valves, and be able to state the pressure rating and correct hydraulic fluid operating pressures for a given hydraulically operated side outlet valve.	From a piping layout diagram, indicate the position of certain valves, or from a set of manufacturer's data answer questions about pressure rating and hydraulic fluid operating pressures for specific valves.	**3**	**4**	*08/12/2005*
	Inside BOP's & kelly cocks				
A 06.01	To be able to check that Full Open Drill Pipe Safety Valves (DPSV's) and inside BOPs have compatible thread connections with the tubulars in use.	Given specific information of tubular thread connections in use, identify compatibility with the Full Opening Drill Pipe Safety Valves (DPSV's) and inside BOPs and possible crossovers required to make up a connection.	**5**	**5**	
A 06.02	To be able to describe and recognise the elements of Inside BOP and Drill Pipe Safety Valves.	Identify components from a schematic drawing or an equipment specification.	**3**		*08/12/2005*
A 06.03	To understand the operating principles and application of the inside BOP in use on the rig.	From a schematic drawing or equipment information, describe operating principles and analyse use and installation.	**3**	**4**	*08/12/2005*
A 06.04	To understand the advantages and disadvantages of using a float valve in the string.	Explain the advantages and disadvantages of using a float valve in the string.	**2**	**4**	*08/12/2005*
A 06.05	To understand the function of, and the reasons for using, a Drill Pipe Safety Valve (DPSV) (also called Kelly Cock and Lower Kelly Valve) as well as lower and upper full opening drill pipe safety valves on Top Drive Systems.	Describe the operating principles and list the reasons for using a Drill Pipe Safety Valve (DPSV), or from a schematic drawing of a Top Drive System identify where the lower (manual) and upper (auto) Full Opening Safety Valves are located..	**4**	**5**	*08/12/2005*

	Standard	Performance Criteria	Driller	Supervisor	Amended
BLOWOUT PREVENTERS					
	Diverters				
A 07.01	To be able to describe and recognise the components of a diverter.	Identify components parts from a diagram or schematic drawing.	**2**	**3**	*08/12/2005*
A 07.02	To understand the operating principles of a diverter.	From a specific equipment layout, list the operating principles and the sequence of opening and closing the different components.	**3**	**5**	*08/12/2005*
	BOP and equipment testing				
A 08.01	For a given BOP stack, choke and kill manifold configuration, to be able to recognise correct and incorrect test procedures, and frequencies. In particular to know the correct actions to pressure test a valve or BOP function consistent with the direction of the well bore.	From a schematic of a BOP, Choke Manifold and Standpipe Manifold hook-up, indicate the valves to be opened or closed to perform a specific test, e.g. test of Blind/Shear Rams. To answer questions related to test frequency.	**3**	**5**	
	Inside BOP's & kelly cocks				
A 08.02	To understand the pressure test requirements for drill pipe safety valves, kelly cocks and inside BOP's.	Describe the pressure test requirements for drill pipe safety valves, kelly-cocks and inside BOPs		**5**	*08/12/2005*
	BOP testing				
A 08.03	To know the recommended BOP closing pressures and closing times.	From manufacturers BOP equipment data identify correct closing pressures and times.	**2**	**4**	*08/12/2005*
A 08.04	To understand pressure ratings for equipment used to test blowout prevention equipment.	From data provided calculate the rating of the equipment to be used in the test process.		**4**	*08/12/2005*

	Standard	*Performance Criteria*	*Driller*	*Supervisor*	*Amended*
BOP CONTROL SYSTEMS & REMOTE CONTROL PANEL					
B 01.01	To be able to describe and recognise the components of a BOP Control System.	From a diagram or description, identify and describe the components of a BOP Control System..	**3**		*08/12/2005*
B 01.02	To understand the general operating principles of the BOP Control System.	From a diagram or description, identify and describe the operating principles of a BOP Control System.	**3**	**4**	*08/12/2005*
B 02.01	To understand the general operating principles of the remote control panel when drilling with a surface installed BOP.	From a diagram or description, identify and describe the operating principles of the remote control panel.	**3**	**4**	
B 03.01	To know the normal operating pressures and/or volumes in the system	From a diagram or description, describe the normal operating pressures and/or volumes for all circuits in the control system.	**2**	**4**	
B 03.02	To be able to calculate the required number of accumulator bottles in the system.	From a full set of data, calculate the required volume of accumulator hydraulic fluid.		**4**	*08/12/2005*
B 03.03	To understand the sequence of events that take place between operating the Driller's Panel and a BOP opening or closing.	From a diagram or description, analyse the sequence of events and processes occurring when the stack is operated.	**2**	**4**	*08/12/2005*
B 03.04	To be able to diagnose simple functional problems during Stack operation	Given a set of symptoms, identify the likely cause of a malfunction and state the possible remedial or alternative actions that can be carried out.	**2**	**4**	*08/12/2005*

	Standard	Performance Criteria	Driller	Supervisor	Amended
CHOKE MANIFOLDS & CHOKES					
	Routing of lines				
C 01.01	To know what alternative circulating paths exist from the pump through the choke manifold to the disposal system.	From a simple diagram of the piping system for the choke and standpipe manifold with valves, indicate possible valve status for a specific circulating path.	**2**		
	Adjustable and fixed chokes				
C 02.01	To understand the mechanical operating principles of the adjustable chokes.	Describe operating principles and use.	**1**	**2**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
AUXILIARY EQUIPMENT					
	Mud/gas separators				
D 01.01	To understand the operating principles of Mud/Gas Separators.	From a diagram of a Mud/Gas Separator configuration, indicate the flow-paths and describe the function of each connected line.	**2**	**4**	
D 01.02	To know the pressure and flow operating limitations of a Mud/Gas Separator.	From operational data, calculate at which pressure gas 'blow-through' occurs.		**4**	
	Vacuum degasser				
D 02.01	To understand the application of a Vacuum Degasser.	Describe the application of Vacuum Degassers.	**1**	**3**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
SLOW CIRCULATION RATES					
E 01.01	To understand how well bore and pump parameters influence the choice of slow circulation rates.	Select the equipment and well-bore conditions that can determine the choice of a specific slow circulation rate.	**2**	**4**	
E 01.02	To know how to accurately record slow circulating pressures, and when and how often this should be performed during drilling operations.	Demonstrate ability to record system pressure losses at different pump rates and fluid densities.	**4**	**5**	
E 01.03	To know where to read the standpipe pressure when recording slow circulating rates. To recognise the error in standpipe pressure when reading from different gauges.	Demonstrate ability to accurately read standpipe pressure at the appropriate gauge (choke panel) when recording slow circulating rates; demonstrate ability to recognise disparities in standpipe pressures when reading from different gauges.	**5**	**5**	
E 01.04	To know how to calculate the approximate pressure changes resulting from changes in pump speed and/or drilling fluid density.	Given pump speed, drilling fluid density and pressure calculate the new pump pressure when changing the pump speed and/or drilling fluid density.		**2**	
LEAK-OFF TEST/MAASP					
E 02.01	To know how to line up for a leak-off test, how to instruct the pump operator, and how to apply the correct procedure with respect to pump speed, volume pumped and method (intermittent and/or continuous) of pumping.	Given rig information with incomplete and/or superfluous data, indicate specific requirements to perform an acceptable leak-off test (hook-up, instructions and method of pumping).	**2**	**5**	
E 02.02	To understand the reasons for correct well conditioning to ensure accurate leak-off test results.	List the well condition required for accurate leak-off tests.	**2**	**4**	
E 02.03	To know how to record and interpret the pressure versus volume graph from the leak-off test, and identify the leak-off point and interpret the results.	From a leak-off test plot, indicate at which point on the graph leak-off takes place.		**4**	
E 03.01	To know how to obtain MAASP from leak-off test results or from assumed maximum pressure limits.	From a set of well data, calculate the MAASP.	**2**	**5**	
E 03.02	To understand how often and why MAASP must be recalculated.	From a list of parameter changes, indicate which ones will necessitate a new MAASP calculation, e.g. drilling fluid density, leak-off test etc.	**2**	**5**	
E 03.03	To know the maximum allowable pressure ratings for surface and sub-surface equipment as they apply during a well kill operation.	From a set of well data select the critical maximum safe working pressures (BOP, Wellhead, Casing and Drill String) applicable during a well kill operation.		**4**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
NORMAL & ABNORMAL PRESSURES					
F 01.01	To know the main geological conditions that can result in abnormal formation pressures..	Distinguish between 'Normal', 'Abnormal' and 'Overburden' pressures and list the main geological conditions that lead to abnormal formation pressures.		3	
TOP HOLE DRILLING					
F 02.01	To understand the means required to control critical drilling parameters when drilling top hole, to prevent a shallow gas influx, e.g. penetration rate, drilling fluid density, trip speed and pump rate.	Define the critical parameters when drilling top hole.	3	3	
F 02.02	To understand the difference between shallow and deep hole well control.	Compare top hole with deep hole drilling and note the differences in well control procedures and practices.	3	5	
GAS CUTTING					
F 03.01	To understand the effects on hydrostatic pressure when drilling through gas bearing formations.	Given well conditions with a reduction in drilling fluid density, recognise the appropriate reduction in hydrostatic head.	2	4	*08/12/2005*
LOST CIRCULATION					
F 04.01	To know how to assess the possible effects of a drop in the level of drilling fluid in the annulus on the hydrostatic pressure required to balance formation pressure.	From details of the well condition and drilling fluid density, calculate hydrostatic head at a specific depth.	4	4	
F 04.02	To know how to assess the actions to be taken in the event of a total loss of returns.	From an example of total losses, determine the correct initial action to take.	3	3	
KICKS AS A RESULT OF SURFACE INITIATED PRACTICES					
	Swab And Surge Effects				
F 05.01	To understand the causes of swabbing and surging in a well.	List the causes of surging and swabbing.	5	5	
F 05.02	To understand the effect of the following parameters on the magnitude of swab and surge pressures: - Well and pipe geometry - Well depth - Fluid characteristics - Hole conditions and formation properties - Tool pulling and running speeds - BHA configuration (stabilisers, packers etc.) - Horizontal reservoir sections	Describe the consequences of surging and swabbing.	4	4	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KICKS AS A RESULT OF SURFACE INITIATED PRACTICES					
	Hydrostatic Effects				
F 06.01	To know how to calculate the reduction in hydrostatic pressure due to failure to fill the hole.	From well data and fluid density, calculate hydrostatic head..	**3**	**5**	
F 06.02	To know how to recognise the causes of fluid density reduction in the drilling fluid processing and storage systems, e.g. centrifuge removing barite, water dilution.	List the possible causes of fluid density reduction and the checks to be carried out.	**4**	**4**	
F 06.03	To know how to calculate the effect on hydrostatic pressure when fluids of different densities are pumped into a hole of known geometry.	From well data and fluid density, calculate hydrostatic head.	**2**	**5**	
F 06.04	To know the causes of reduced hydrostatic pressure, e.g. - Cement setting - Temperature effects on liquid - Settling of weighting material	List causes of possible reduction of hydrostatic head.	**2**	**4**	
F 06.05	To understand the effect of Trip Margin on the maintenance of bottom hole pressure.	Describe the reasons for selecting Trip Margin and how it can effect bottom hole pressure.	**3**	**5**	
MECHANICAL CAUSES OF KICKS					
F 07.01	To know the possible causes of uncontrolled flow from one zone to another or trapped pressure between casings, and to understand the precautions that should be taken to prevent this.	List possible causes of uncontrolled flow from one zone to another or trapped pressure between casings, and the precautions to be taken.		**3**	*08/12/2005*

	Standard	Performance Criteria	Driller	Supervisor	Amended
KICKS WHILE DRILLING					
	Early Warning Signs				
G 01.01	To know the possible warning signs that a well MIGHT be going under-balance, and how to respond correctly.	Be able to identify and recognise the parameters that might indicate that a well is going under-balance, and inidicate actions to be taken in the event of kick warning signs. i.e. - Rate of penetration changes - Cuttings size and shape - Drilling fluid property changes, e.g. Chlorides - Drilling fluid temperature changes - Connection and background gas - 'd' exponent changes	**4**	**4**	*08/12/2005*
	Positive Kick Signs				
G 02.01	To know the positive indications of a kick: - - Flow from well (pumps off). - Increase in flow from well (pumps on). - Pit volume gain.	Recognise positive kick indicators from rig and well data.	**5**	**5**	
	Hydrocarbon Kick Behaviour				
G 03.01	To understand the solubility of hydrocarbon, carbon dioxide and hydrogen sulphide gases when mixed under down hole conditions with water based or (pseudo) oil based drilling fluid.	Analyse the downhole conditions under which hydrocarbon, carbon dioxide, or hydrogen sulphide gases are likely to go into solution with water based and/or oil based drilling fluid.	**2**	**5**	
G 03.02	To understand the impact of hydrocarbon gas compressibility under downhole conditions on its state (gas or liquid) and migration rate (rising or stagnant influx).	List the possible effects of gas compressibility under downhole conditions.	**2**	**4**	
G 03.03	To understand the behaviour of dissolved gas in drilling fluid when circulating the influx to surface.	Describe how dissolved gas will behave under specific downhole conditions, how and when dissolved gas will evolve out of the drilling fluid if the influx is circulated to surface and list the possible subsequent consequences.	**2**	**4**	
G 03.04	To understand the behaviour of gas in relation to velocities and flow patterns in horizontal and vertical sections.	Describe the differences likely to occur in different kick situations.		**5**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KICKS WHILE TRIPPING					
	Kicks while tripping				
G 04.01	To understand incorrect fill or return volumes and diagnose if an influx may have occurred.	Given well data, calculate the correct fill up and describe possible remedial steps.	**5**	**5**	
G 04.02	To understand the difference between swabbed kicks in horizontal and vertical sections.	Calculate the reduction in bottom hole pressure from similar kicks in the vertical and horizontal sections.	**5**	**5**	
G 04.03	To understand the significance of high volume swabbing in comparison to low volume swabbing and the purpose of having a non-return valve in the string.	Explain the purpose of a non-return valve in the string.	**5**	**5**	*08/12/2005*

	Standard	*Performance Criteria*	*Driller*	*Supervisor*	*Amended*
SHUT IN PROCEDURES					
H 02.01	To understand the steps taken to shut a well in using the hard or soft shut-in method (as described in API Recommended Practice No. 59), in different operational situations.	List the steps taken to shut a well in, in accordance with the hard or soft shut-in method, for the following situations:- - Drilling on bottom. - Tripping in/out of the hole. - Running casing. - Cementing. - Wireline operations.	**2**	**4**	

		Standard	Performance Criteria	Driller	Supervisor	Amended
SHUT IN PRESSURES						
		Shut in pressure observations				
J	01.01	To know how a pressure gauge should be read and to recognise the accuracy depending on the range.	Given a certain scale of a pressure gauge, indicate different pressure values on it, within the accuracy range.	2	4	
J	01.02	To understand the possible difference in pressure readings which can result from taking Shut in Drill Pipe Pressure and Shut in Casing Pressure at different gauges on the rig.	From a schematic drawing of a standpipe and choke line systems with pressure gauges at different locations, explain the reason for different pressure readings (e.g. attach different values to certain gauges in the system).	2	4	
J	01.03	To understand the possible causes for a pressure increase with time in a shut-in well.	Describe the causes of pressure changes in a shut in well.	4	4	
J	01.04	To know how to react when there are indications of influx migration in a closed well.	Given a kick situation with well data, describe the appropriate actions to take when influx migration takes place in a closed well.	4	5	
J	01.05	To know how to determine the Shut in Drill Pipe Pressure if a float valve is present in the drill string.	Given a kick situation with well data, demonstrate how to determine the Shut in Drill Pipe Pressure with a float valve installed.	3	4	
J	01.06	To know how to assess the well bore conditions if MAASP is approached.	Identify the hazards when annulus pressures are approaching MAASP and describe possible actions.	3	4	
J	01.07	To understand the reasons for having a kick and losses concurrently over a highly deviated or horizontal section.	List the reasons for having a kick and losses concurrently over a highly deviated or horizontal section.	3	5	
		Shut in pressure interpretation				
J	02.01	To understand the possible reasons for differences between Shut In Drill Pipe (or String) Pressure and Shut In Casing (or Annulus) Pressure: - · Influx density · Cuttings loading · Density of influx greater than drilling fluid · Position of bit and or pipe . Flow through the drill string . Blockage in the annulus . Inaccuracy of the guages . Well deviation	Given well and/or kick data, provide interpretation of the difference between Shut In Drill Pipe and Shut In Casing Pressure.		4	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KILL HANDLING METHODS					
	Kill method principles				
K 01.01	To know how to select kill pump rate consistent with the formation strength, annulus friction loss, mud/gas separator capacity, choke operator reaction time, baryte delivery time and pump safe valve settings.	Describe the effects of different kill pump rates on formation strength, annular friction loss, mud/gas separator capacity, choke operator reaction time, baryte delivery time and pump safe valve settings.		**4**	
K 01.02	To know how to select the most appropriate kill method with the bit on bottom.	Given a set of well bore conditions, but with the bit on bottom, select a kill method and explain the choice.		**4**	
K 01.03	To be able to select the most appropriate course of action when tripping or not on bottom.	Given a set of well bore conditions, and while tripping or not on bottom, select and reason the safest course of action to be followed.		**4**	
K 01.04	To know how to bring the pump up to kill speed while maintaining bottom hole pressure constant.	Given well and kick data, demonstrate how to bring the pump up to kill speed while maintaining bottom hole pressure constant.	**3**	**5**	
K 01.05	To understand the minimal effect of hydrostatic head of influx on the choke pressure when circulating influx through a highly deviated or horizontal section.	Given well and kick data for a highly deviated or horizontal well, list the reasons for little or no change in choke pressure when circulating an influx through the highly deviated or horizontal hole section.	**5**	**5**	
K 01.06	To know how to change pump speeds and shut down a kill operation while maintaining bottom hole pressure constant.	Given well and kick data, shut down the kill operation while maintaining bottom hole pressure constant.	**5**	**5**	
	Wait & Weight and Driller's Method				
K 02.01	To know the step by step procedure required to carry out the Wait and Weight method and the Driller's Method, demonstrating the capability to perform it.	Given well information or data. Analyse problems relating to the use of the Wait and Weight Method or Driller's Method to remove an influx from the well. (N.B. Driller acting under direction of the Supervisor.)	**3**	**5**	*08/12/2005*
	Volumetric method				
K 04.01	To know the step-by-step procedure required for controlling a well according to the volumetric principle.	Describe how the volumetric principle can be applied.		**4**	
K 04.02	To understand when the volumetric principle is the appropriate well control technique.	List some situations when the volumetric principle should be applied.		**4**	
	Stripping				
K 05.01	To know the step-by-step procedure for a stripping operation.	List the step-by-step procedure of a stripping operation.	**3**	**5**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KILL HANDLING METHODS					
	Stripping				
K 05.02	To know how to assess the suitability of stripping back to bottom given simulated well bore and rig equipment	Given well bore and rig equipment data, decide and explain if stripping back to bottom is possible.		**4**	
	Gunk and barite				
K 06.01	To know when gunk and barite plugs are used.	Given well and kick data, describe the application when gunk and barite plugs are used.		**4**	
	Shallow gas				
K 07.01	To know the step-by-step procedure to be followed in order to secure the safety of the personnel and rig when a shallow gas kick is in progress.	List the step-by-step procedure to be followed by rig personnel when a shallow gas kick is in progress.	**4**	**5**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KILL SHEET EXERCISES					
	Perform kill sheet calculations				
L 01.00	To know how to complete a Surface BOP kill sheet from well data.	Complete a kill sheet based on vertical, deviated or horizontal well data and answer calculation questions based on Standards L01.01 through L01.32.	**4**	**4**	
	Perform calculations				
L 01.01	Volume of tanks and pits.		**4**	**4**	
L 01.02	Formation pressure.		**4**	**4**	
L 01.03	Open hole capacity per unit length.		**4**	**4**	
L 01.04	Displacement of open and closed pipe.		**4**	**4**	
L 01.05	Annular capacity per unit length.		**4**	**4**	
L 01.06	Annular volume.		**4**	**4**	
L 01.07	Hydrostatic and Bottom Hole pressure.		**4**	**4**	
L 01.08	Fracture and Leak-off pressure.		**4**	**4**	
L 01.09	Convert from pressure to equivalent fluid density.		**4**	**4**	
L 01.10	Kill fluid density.		**4**	**5**	
L 01.11	Circulation time.		**4**	**4**	
L 01.12	Bottoms up time for normal drilling.		**4**	**4**	
L 01.13	Total circulating time, including surface equipment.		**4**	**4**	
L 01.14	Surface to bit time.		**4**	**4**	

		Standard	Performance Criteria	Driller	Supervisor	Amended
KILL SHEET EXERCISES						
		Perform calculations				
L	**01.15**	Bit to shoe time.		**4**	**4**	
L	**01.16**	Bottom up strokes		**4**	**4**	
L	**01.17**	Surface to bit strokes		**4**	**4**	
L	**01.18**	Bit to shoe strokes		**4**	**4**	
L	**01.19**	Total circulating strokes, including surface equipment.		**4**	**4**	
L	**01.20**	Pump output from tables.		**4**	**4**	
L	**01.21**	Equivalent circulating density based on given annular pressure drop data.			**4**	
L	**01.22**	Relationship between pump pressure and pump speed, simplified by an approximate formula.			**4**	*08/12/2005*
L	**01.23**	Relationship between pump pressure and mud density.		**2**	**3**	
L	**01.24**	MAASP.		**2**	**4**	
L	**01.25**	Gas Laws P1V1 = P2V2			**3**	
L	**01.26**	Weighting material required to increase density per volume.		**1**	**4**	
L	**01.27**	Volume increases due to increase in density.		**1**	**4**	
L	**01.28**	Volume to be bled off, corresponding to pressure increase.			**4**	*08/12/2005*
L	**01.29**	Initial circulating pressure.		**4**	**5**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KILL SHEET EXERCISES					
		Perform calculations			
L	**01.30**	Final circulating pressure.	**4**	**5**	
L	**01.31**	Pressure drop per step.	**4**	**4**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
GAUGE PROBLEMS					
	Surface BOP operations				
M 01.00	To be able to analyse the downhole or surface problems that might arise while killing a well.	Given a completed kick sheet with pressure and stroke readings, anlayse the problems that may be occurring while kill fluid is being circulated in a well and take the appropriate actions.		**5**	
DOWNHOLE PROBLEMS					
	Plugged or washed bit nozzle				
M 02.01	To know how to identify a plugged (or washed) bit nozzle according to the changes in drill pipe pressure and casing pressure.	Given well and kick data, identify a plugged (or washed) bit nozzle according to the changes of drill pipe pressure and casing pressure.	**3**	**5**	
M 02.02	To know how to maintain the bottom hole pressure constant in case of a plugged or washed bit nozzle.	Given well and kick data, maintain the bottom hole pressure constant in case of a plugged or washed bit nozzle.		**5**	
	String washout				
M 03.01	To know how to detect the occurrence of a string washout and list the consequences on the fluid circulation path and bottom hole pressure.	List the parameters which are effected by a string washout and explain the inter-relationship (i.e. drill pipe pressure, hydrostatic head, bottom hole pressure, etc.).		**4**	
M 03.02	To know the alternative procedures required to control the well with a washout in the string.	Indicate the action to be taken to maintain control of the bottom hole pressure when a string washout is detected.		**4**	
	Blockage - downhole				
M 04.01	To know how to detect a possible blockage in the annulus.	Given well bore and rig data, and the presence of a blockage downhole, identify the most appropriate response from a list of possible procedures.		**5**	
M 04.02	To know the appropriate procedures (e.g. reciprocate the drill string) to follow if a blockage is detected, and understand the possible consequences of a blocked annulus on the well kill operation.	From a diagram of a blockage down hole, with well bore and rig data, identify the most appropriate procedure from a list of possible procedures.		**4**	
	Fluid losses				
M 05.01	To understand the possible actions which can be taken to reduce pressure at the weak zone.	List the possible actions that can be taken to reduce pressure at the weak zone, e.g. during start up of pumps. Driller to communicate and be aware of their influence when bringing pumps up to speed.	**2**	**4**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
SURFACE PROBLEMS					
	Pump related issues				
M 06.01	To understand the effects of changes in pump rates on the bottom hole pressure when circulating out a kick.	From diagrams of pipe and casing gauges, pump speed indicator, etc.; identify bottom hole pressure variations when parameters change (i.e. with constant string pressure and different pump rates).	**4**	**4**	
M 06.02	To know how to maintain a constant bottom hole pressure, in the case of a complete failure of pumps,	From hole data, indicate which pressure must be controlled if no restrictions prevent reading of string and annulus gauges.		**5**	
	Pressure gauge failure				
M 07.01	To know how to read pressures when gauges are malfunctioning.	List the pressures (i.e. bottom hole, shoe, formation, etc.) which are unknown if the drill pipe or casing gauge is not working properly.	**2**	**4**	
M 07.02	To understand the procedure to control the well, when the drill string pressure gauge reading is not available.	From hole data, indicate an alternative procedure in the event that a restriction prevents the use of the drill pipe pressure gauge; and prepare calculations for this new procedure.		**4**	
	Downstream choke problems				
M 08.01	To understand the problems that might arise from incorrect hook-up, line up, valve working pressure, capacity of mud/gas separator inlet, ability to vent, etc.	Given a diagram of a choke (back pressure) manifold and downstream flow conduits, indicate possible problems which might arise when hook-up, line up, valve working pressure, capacity of mud/gas separator inlet, vent lines, etc. are not adequately in place	**2**	**5**	
	Mud/gas separators				
M 08.02	To know what corrective action to take when operating limits are being reached or have been reached.	Describe the corrective action that should be taken before and when the mud-seal is lost.	**2**	**4**	*08/12/2005*
	BOP failure				
M 09.01	To know how to identify and respond to BOP failures (such as leakage's at/of a flange connection, weep-hole, ram packer, annular preventer element, closing line etc.)	Given equipment, well and kick data, list the possible BOP failures and demonstrate or indicate the ability to respond adequately and rapidly, e.g. by closing a preventer below the failing BOP in question.	**5**	**5**	*08/12/2005*
	Plugged or washed chokes				
M 10.01	To know how to identify a plugged choke according to observed changes in drill pipe and casing pressures.	Given well and kick data, identify a plugged choke according to observed changes in drill pipe and casing pressure.	**3**	**5**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
SURFACE PROBLEMS					
	Hydrate formation				
M 11.01	To understand what hydrates are, the conditions likely to lead to their formation, and the main methods of hydrate prevention and removal.	Define hydrates. List the conditions likely to lead to their formation. List the main methods of hydrate prevention. List the main methods of removal.	**3**	**3**	*08/12/2005*

		Standard	*Performance Criteria*	*Driller*	*Supervisor*	*Amended*
N	01.01	To understand the importance of well control and emergency drills. - Pit drill - Trip drill - Abandonment drill - Strip drill	List the purpose, and the steps and generic procedures for well control and emergency drills: - - Pit drill. - Trip drill. - Strip drill. - Abandonment drill.	**4**	**5**	*08/12/2005*
DURING THE KILL						
N	01.02	To know how to instruct and conduct the practice of performing a stripping operation.	Demonstrate the method and steps required to strip drill pipe in or out of the hole, such as:- - Lining up of the trip tank and (optional) strip tank - Adjustment of annular preventer closing pressure (if used) or ram preventers (if used). - Preparation and lubrication of tooljoint. - Volumetric calculation versus choke pressures. - Compensation for closed end displacement.	**4**	**5**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
BLOWOUT PREVENTERS					
	Lower marine riser				
SA 01.01	To understand the function of the Lower Marine Riser Package (LMRP).	From a diagram, recognise the main components of the LMRP and state their function.	**2**	**3**	
	Ram type preventers/valves				
SA 02.01	To know the functions and operating principles of ram locks	Describe the operating principles of ram locks and indicate when and how ram locks are used.	**3**	**3**	
	Diverters				
SA 03.01	To understand the operating mechanisms of common types of diverters used on floating operations.	From a specific layout, list the sequence of opening and closing the different elements and operating principles.	**2**	**4**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
BOP CONTROL SYSTEMS					
SB 01.01	To know the general operating principles of the BOP control system when drilling with a subsea BOP installed.	From a diagram or description, identify and describe the operating principles.	**3**	**4**	
SB 01.02	To know the general operating principles of the subsea accumulators.	From a diagram or description, describe the main components, how they function and effect the process	**3**	**4**	*08/12/2005*
SB 01.03	To know the general operating principles of the subsea pods.	From a diagram or description, describe the function and operation of subsea pods.	**2**	**4**	*08/12/2005*
SB 01.04	To know the general operating principles of the subsea manipulator, shuttle and selector valves.	From a diagram or description, describe the function and operation of subsea valves.	**3**	**4**	*08/12/2005*
SB 01.05	To understand the BLOCK position of the 4-way valves.	From a diagram or description, describe the function and operation of the BLOCK process.	**2**	**3**	*08/12/2005*
SB 01.06	To understand the principle of redundancy relating to subsea control systems (e.g. pods).	Describe the principle of redundancy and identify back-up equipment for subsea control systems.	**3**	**4**	*08/12/2005*
SB 01.07	To know and understand the emergency devices installed on the BOP stack, both acoustic systemss and ROV.	From a diagram or description, describe the main components and functions.	**3**	**4**	*08/12/2005*

	Standard	*Performance Criteria*	*Driller*	*Supervisor*	*Amended*
CHOKE MANIFOLDS, CHOKES AND KILL LINES					
	Routing of lines				
SC 01.01	To know the different stack line-ups during the kill operation.	From a BOP stack diagram for a specific kill operation, select the appropriate line-up of choke lines; kill lines and valves upstream and downstream of chokes.	**2**	**3**	

	Standard	*Performance Criteria*	*Driller*	*Supervisor*	*Amended*
SLOW CIRCULATION RATES					
SE 01.01	To know how to record pressure losses in the choke and kill lines at slow circulating rates when drilling with a subsea BOP stack.	Demonstrate ability to record or analyse pressure losses in the choke and kill lines and determine the effect on bottom hole pressure.	**4**	**5**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
TOP HOLE DRILLING					
SF 01.01	To understand the advantages and disadvantages of drilling top hole with or without a riser.	Analyse the basic principles only.	2	4	
GAS CUTTING					
SF 02.01	To understand the effects of gas expansion in the riser.	Describe the effects of gas expansion in a subsea riser and the potential problems at surface.	3	3	
KICKS AS A RESULT OF SURFACE INITIATED PRACTICES					
	Swab And Surge Effects				
SF 03.01	To understand the causes of down-hole swabbing resulting from the heave effect on floating rigs.	Describe the consequences of surging and swabbing.	4	4	
	Hydrostatic Effects				
SF 04.01	To understand the effect of fluids of different densities in the choke and kill lines.	From well data, describe the effect on well control operations and the necessary action(s) to take.	2	5	
SF 05.01	To understand the effect of Riser Margin on the maintenance of bottom hole pressure.	Describe the reasons for selecting Riser Margin and how it can effect bottom hole pressure.	3	5	
SF 06.01	To understand the effects of riser disconnect on well-bore pressures.	Describe and calculate the effect on bottom hole pressure after riser disconnect, and the differential pressure across the BOP stack.	2	5	
SF 06.02	To understand the problems that can occur and know the procedure to be used during riser disconnect operations.	From specific well data, describe the process of safe re-connect of the riser.	2	5	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KICKS WHILE DRILLING					
	Positive Kick Signs				
SG 01.01	To understand the effect of heave on pit level, flow rate and flow check monitoring.	List the problems associated with monitoring the well on a floating rig.	**4**	**4**	

	Standard	*Performance Criteria*	*Driller*	*Supervisor*	*Amended*
SHUT IN PROCEDURES					
SH 01.01	To understand the steps taken to shut a well in from a floating vessel using the hard or soft shut-in method (as described in API Recommended Practice No. 59), in different operational situations.	List the steps taken to shut a well in, in accordance with the hard or soft shut-in method, for the following situations:- - Drilling on bottom. - Tripping in/out of the hole. - Running casing. - Cementing. - Wireline operations.	**2**	**4**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
KILL HANDLING METHODS					
	Wait & Weight and Driller's Method				
SK 01.01	To know the step by step procedure required to carry out the Driller's Method and the Wait and Weight method, and demonstrate the capability to perform them when drilling with a subsea BOP installed.	Given well and kick data, demonstrate how to bring the pumps up to kill speed while maintaining bottom hole pressure constantf. Take into account the effect of choke line friction on the (Dynamic) Casing Pressure Gauge or by using the (Static) Kill Line Pressure Gauge.	**3**	**5**	*08/12/2005*
	Choke line friction				
SK 03.01	To understand how to commence the kill operations taking into account the effect of Choke Line Friction.	Given well and kick data, demonstrate how to bring the pumps up to kill speed while maintaining bottom hole pressure constant. By taking into account the effect of Choke Line Friction on the (Dynamic) Casing Pressure Gauge or by using the (Static) Kill Line Pressure Gauge	**3**	**5**	
SK 03.02	To know how to change pump speed and shut down a kill operation taking into account the effect of Choke Line Friction, and maintaining bottom hole pressure constant.	Given well and kick data, demonstrate how to bring the pumps up to kill speed while maintaining bottom hole pressure constant. By taking into account the effect of Choke Line Friction the (Dynamic) Casing Pressure Gauge or by using the (Static) Kill Line Pressure Guage	**3**	**5**	
	Riser & kill line displacement				
SK 04.01	To know how to displace Riser and Kill line prior to opening up the stack.	Describe the procedure for displacing the Riser and Kill line following completion of Kill operations.	**3**	**5**	
	Trapped gas				
SK 05.01	To recognise the effect of gas trapped beneath a BOP and know how the danger can be minimised or removed.	Describe and demonstrate the procedure for removing trapped gas from beneath or within a BOP.	**3**	**5**	

	Standard	*Performance Criteria*	*Driller*	*Supervisor*	*Amended*
KILL SHEET EXERCISES					
	Perform kill sheet calculations				
SL 01.00	To know how to complete a Subsea BOP kill sheet from well data.	Complete a kill sheet based on vertical, deviated or horizontal well data and answer calculation questions based on Standards L01.01 through L01.32 plus Standards L02.01 through L02.06	**4**	**4**	
	Perform calculations				
SL 01.01	Effect of Water Depth on formation strength calculation.			**2**	
SL 01.02	Volume and fluid required to displace the Riser.		**4**	**4**	
SL 01.03	Choke and kill line volumes.		**4**	**4**	
SL 01.04	Choke and kill line strokes.		**4**	**4**	
SL 01.05	Choke and kill line circulation time.		**4**	**4**	
SL 01.06	Dynamic casing pressure		**4**	**4**	

	Standard	Performance Criteria	Driller	Supervisor	Amended
GAUGE PROBLEMS					
	Subsea BOP operations				
SM 01.00	To be able to analyse the downhole or surface problems that might arise while killing a well.	Given a completed kick sheet with pressure and stroke readings, anlayse the problems that may be occurring while kill fluid is being circulated in a well and take the appropriate actions.		**5**	
SURFACE PROBLEMS					
	Kill or Choke Line Problems				
SM 02.01	To know how to identify a problem in the choke line or kill line according to observed changes in drill pipe and casing pressure on a subsea BOP stack installation.	Given well and kick data, identify problems in the choke line or kill line according to observed changes in drill pipe and casing pressure.	**3**	**5**	*08/12/2005*