

Well production

Name of function	Well is producing normally
Description	This function serves the purpose of the system's final outcome which is producing oil and gas in a normal operation.
Aspect	Description of Aspect
Input	Xmas tree valve is opened
Output	Oil is produced
Precondition	Well is controlled
Resource	
Control	
Time	

Name of function	Operator opens the Xmas tree valve
Description	This function describes the decision applied on the last control valve on the surface of a drilling rig before the process phase. With this decision, the oil will enter the choke and manifold and on its way to the separators for processing.
Aspect	Description of Aspect
Input	The command to open the Xmas tree valve
Output	Xmas tree valve is opened
Precondition	
Resource	
Control	General safety requirements
Time	

Name of function	General safety requirements are defined
Description	This function describes the organizational procedures such as health and safety codes for all the employers in certain sectors of the plant to follow.
Aspect	Description of Aspect
Input	
Output	General safety requirements
Precondition	
Resource	
Control	
Time	

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Name of function	Control room confirms the well's stability
Description	This function defines the duty of the control room in monitoring the stability of the well and providing the operator with the necessary commands.
Aspect	Description of Aspect
Input	
Output	The command to open the Xmas tree valve
	Well is controlled
Precondition	Well is stable
	Well is completed
Resource	
Control	BOP is functioning
Time	

Name of function	Achieve well stability
Description	This function defines the only state in which production is acceptable.
Aspect	Description of Aspect
Input	Kick does not exist
Output	Well is stable
Precondition	
Resource	Mud column
Control	
Time	

Name of function	Detect kick
Description	This function defines the procedure to identify a possible threat; kick.
Aspect	Description of Aspect
Input	Human detection and action
Output	Kick does not exist
Precondition	Reservoir/pore pressure prediction
Resource	
Control	Gas content
	Pit gain
	Flow-out/in
	Drill pipe pressure
Time	

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Name of function	Install Xmas tree
Description	This function defines one of the steps before the well is completed.
Aspect	Description of Aspect
Input	
Output	The Xmas tree is installed
Precondition	
Resource	
Control	
Time	

Name of function	Complete well
Description	Well completion is achieved using a perforating gun the perforates the well bore allowing the oil and gas to enter it.
Aspect	Description of Aspect
Input	Production tubing is installed
	The Xmas tree is installed
	The BOP stack is removed
Output	Well is completed
Precondition	
Resource	
Control	
Time	

Name of function	Install production tubing
Description	This function defines one of the steps before the well is completed.
Aspect	Description of Aspect
Input	
Output	Production tubing is installed
Precondition	
Resource	
Control	
Time	

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Name of function	Remove the BOP stack
Description	This function defines one of the steps before the well is completed.
Aspect	Description of Aspect
Input	
Output	The BOP stack is removed
Precondition	
Resource	
Control	
Time	

Name of function	Pit gain is controlled
Description	
Aspect	Description of Aspect
Input	
Output	Pit gain
Precondition	
Resource	
Control	System interface and control
Time	

Name of function	Operators are on site
Description	
Aspect	Description of Aspect
Input	
Output	Human detection and action
Precondition	
Resource	
Control	
Time	

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Name of function	Flow-out/in is monitored
Description	
Aspect	Description of Aspect
Input	
Output	Flow-out/in
Precondition	
Resource	
Control	System interface and control
Time	

Name of function	Drill pipe pressure is controlled
Description	
Aspect	Description of Aspect
Input	
Output	Drill pipe pressure
Precondition	
Resource	
Control	
Time	

Name of function	Gas sensors in place
Description	
Aspect	Description of Aspect
Input	
Output	Gas content
Precondition	
Resource	
Control	
Time	

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Name of function	Predictions and well design
Description	The very first step in oil and gas production.
Aspect	Description of Aspect
Input	
Output	Reservoir/pore pressure prediction
Precondition	
Resource	
Control	
Time	

Name of function	BOP monitor, maintenance and activation
Description	BOP is the blow out preventer and shall be monitored and maintained. It is activated in case of emergency.
Aspect	Description of Aspect
Input	
Output	BOP is functioning
Precondition	Topside activation and signal transfer system
	Annular/ram preventers
	Hydraulic actuation system
Resource	
Control	
Time	Human activation (ICE)

Name of function	Emergency
Description	This is the case of an emergency if the kick develops into a blowout and is not detected nor controlled previously.
Aspect	Description of Aspect
Input	Operational procedures
Output	Human activation (ICE)
Precondition	
Resource	
Control	
Time	Emergency procedures

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Name of function	Organizational emergency prediction
Description	Since we have the risk picture, the emergency procedures shall be defined and clear.
Aspect	Description of Aspect
Input	
Output	Emergency procedures
Precondition	
Resource	
Control	
Time	

Name of function	Organizational procedures
Description	Operator(s) confirm the state of the barrier or activates it based on the procedures in case of emergency
Aspect	Description of Aspect
Input	
Output	Operational procedures
Precondition	
Resource	
Control	
Time	

Name of function	Hydraulic actuators in place and functioning
Description	All the hydraulic actuators shall be monitored and functioning.
Aspect	Description of Aspect
Input	
Output	Hydraulic actuation system
Precondition	
Resource	
Control	
Time	

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Name of function	Signals are transferred and understood
Description	Signals from the BOP shall not be interrupted and misinterpreted.
Aspect	Description of Aspect
Input	
Output	Topside activation and signal transfer system
Precondition	
Resource	
Control	
Time	

Name of function	Annular/ram preventers are functioning
Description	To check and maintain the preventers in the BOP.
Aspect	Description of Aspect
Input	
Output	Annular/ram preventers
Precondition	
Resource	
Control	
Time	

Name of function	Mud circulation system
Description	The circulation of mud to provide enough pressure on the formation without fracturing it.
Aspect	Description of Aspect
Input	Mud is provided Human interaction
Output	Mud column
Precondition	Valves are functioning Choke and kill valve
Resource	Utility
Control	System interface and control
Time	Reservoir/pore pressure prediction

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Name of function	Mud pumps and cementing system
Description	
Aspect	Description of Aspect
Input	Mud is ready
Output	Mud is provided
Precondition	
Resource	Cement
Control	
Time	

Name of function	System interface and control
Description	
Aspect	Description of Aspect
Input	
Output	System interface and control
Precondition	
Resource	
Control	Sensors and positioners
Time	

Name of function	Mud mixing and bulk systems
Description	
Aspect	Description of Aspect
Input	
Output	Mud is ready
Precondition	
Resource	
Control	
Time	

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Name of function	Sensors and positioners in place
Description	
Aspect	Description of Aspect
Input	
Output	Sensors and positioners
Precondition	
Resource	
Control	
Time	

Name of function	Mud circulation valve
Description	
Aspect	Description of Aspect
Input	
Output	Valves are functioning
Precondition	
Resource	
Control	
Time	

Name of function	System utilities
Description	
Aspect	Description of Aspect
Input	
Output	Utility
Precondition	
Resource	
Control	
Time	

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Name of function	Choke and kill valve
Description	
Aspect	Description of Aspect
Input	
Output	Choke and kill valve
Precondition	
Resource	
Control	
Time	

Name of function	Cement systems
Description	
Aspect	Description of Aspect
Input	
Output	Cement
Precondition	
Resource	
Control	
Time	

Name of function	to the process phase
Description	
Aspect	Description of Aspect
Input	Oil is produced
Output	
Precondition	
Resource	
Control	
Time	

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Name of function	Human behavior
Description	
Aspect	Description of Aspect
Input	
Output	Human interaction
Precondition	
Resource	
Control	Operational guides
Time	

Name of function	Operational procedures
Description	
Aspect	Description of Aspect
Input	
Output	Operational guides
Precondition	
Resource	
Control	
Time	

Name of function	To the drilling step
Description	
Aspect	Description of Aspect
Input	Mud column
Output	
Precondition	
Resource	
Control	
Time	

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