REVIEW OF HSE MANAGEMENT SYSTEM ONSHORE DRILLING RIG

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ABSTRACT

The Drilling & Workover Operation in Oil & Gas industry considered the riskiest operation. The involvement of personnel and interaction with heavy machinery with no stop or rest. There are several types of Oil Well Drilling system named as Exploratory Wells, Development Wells and Workover operation. There are plenty of contracting companies around the world and out of them few are present in Kuwait.

Fire, explosion, release of Hydrocarbon to open air are the high risk factor in this industry. The Drilling operations involve high risk operations demanding more systematic approach to minimize the risk to Human life and Environment. The Drilling Contractors follows the international standards like OHSAS, IOSH, HSE UK, API, etc. to develop the systematic approach to develop the incident free drilling operations. This project study reviews the "Health, Safety & Environment Management System" recommendations and compliances to the Drilling Company.

Keywords: Back ground of Drilling Operation, Drilling Equipment's with Certification, Risk & Hazards Management, Audit/ Inspection, Incident classification, reporting & Investigation and Implementation of HSEManagement System.

Introduction to KOC Drilling Operation

Crude oil remains as one of the most important source of energy in the world. Despite the latest emerging renewable energy, crude oil is still at the top due to its level of sustainability, available production facilities and current technologies. Having said that, the burden lies on all companies committed to oil drilling in further expanding its scope to attain maximum production along with the life span of a well. Among these burdens are efforts and means exerted in protecting the environment while exploring and drilling for this so-called "black gold".

This project intends to give a simple orientation to readers with an interest in the oil industry about the Health Safety Management in oil industry. The project, in its simplest form, journeys from source of hydrocarbons, to drilling, to the factors effecting the industry and the mitigation measures. The project maps the web of industries involved in the oil, its intricacies, how one is connected from another and its impact to oil production.

The project also contains many photos to give the reader an impression of the typical facilities or equipment on a drilling rig. Online sourced photo sources are indicated below the photograph.

Hydrocarbon is an organic compound consists mostly of hydrogen and carbon. Each compound consists of hydrogen and Carbon atoms. As the name suggests these are large molecules made up of hydrogen atoms attached to a backbone of carbon. (Fig. 1.1)

Hydrocarbons can be in the three states of matter: gases, liquids and solids.

Hydrocarbons are very important because they are one of the Earth's most important energy resources. The predominant use of hydrocarbons is as a combustible fuel source. The role of hydrocarbons in human development cannot be underestimated. Essentially without them, the modern age would not have manifested.

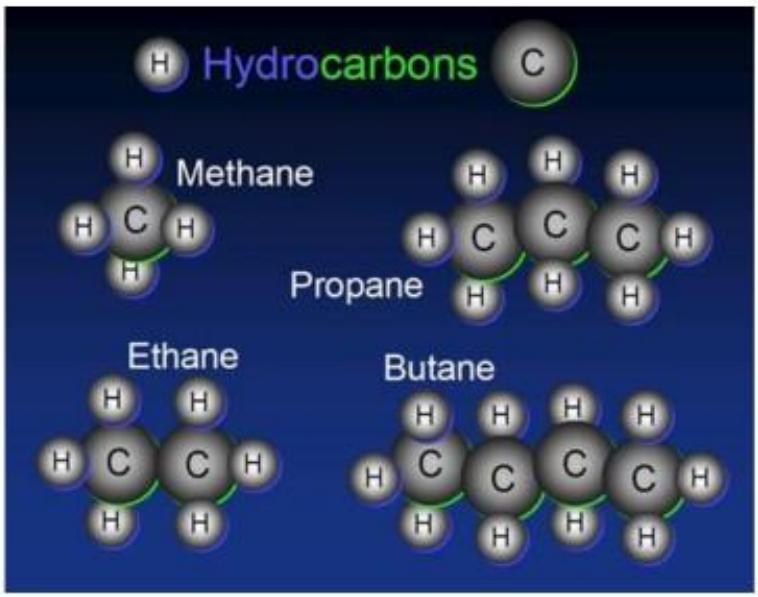


Fig 1.1 - Hydrocarbons

Source: http://www.universetoday.com/83833/hydrocarbons/

There are many theories on the origin of hydrocarbons which can be classified into two categories, organic theories and inorganic theories. The organic theory has been accepted more than the inorganic theory because it has more supporting evidence.

The organic theories state that hydrocarbons are the result of the decomposition and transformation of plants and marine animals under the impact of high temperature and high pressure conditions. The depth also plays as a factor as well.

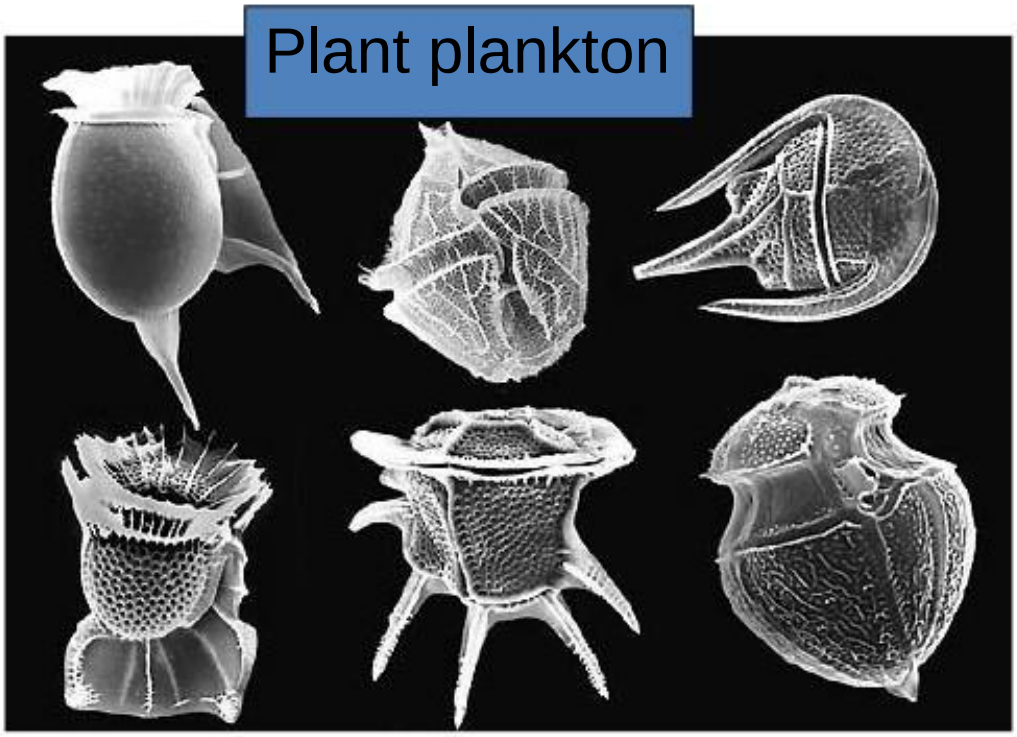
Oil is a fossil fuel that is formed from the remains of tiny plants and animals, known as plankton that died in ancient seas between 10 million and 600 million years ago (Fig 1.2). The plankton fell to the bottom of the sea and after decaying, the organisms formed sedimentary layers.In the layers, little or no oxygen is present and this allows microorganisms to break down the remains into carbon-rich compounds that form organic layer.

The organic material is mixed with the sediments to form fine-grained shale, or source rock. As the sedimentary rocks layer, they exert extreme heat and pressure to distil the organic material into crude oil and natural gas (Fig 1.3). The oil then flows from the

Source rock and accumulates in thicker, more porous limestone or sandstone known as reservoir rock.

When the earth moves the oil and natural gas is trapped in reservoir rocks, which are between layers of impermeable rock, or cap rock. The whole process takes millions of years.

Most oil and natural gas around the world is found in layers that were deposited during the Cenozoic era about 50 million years ago.



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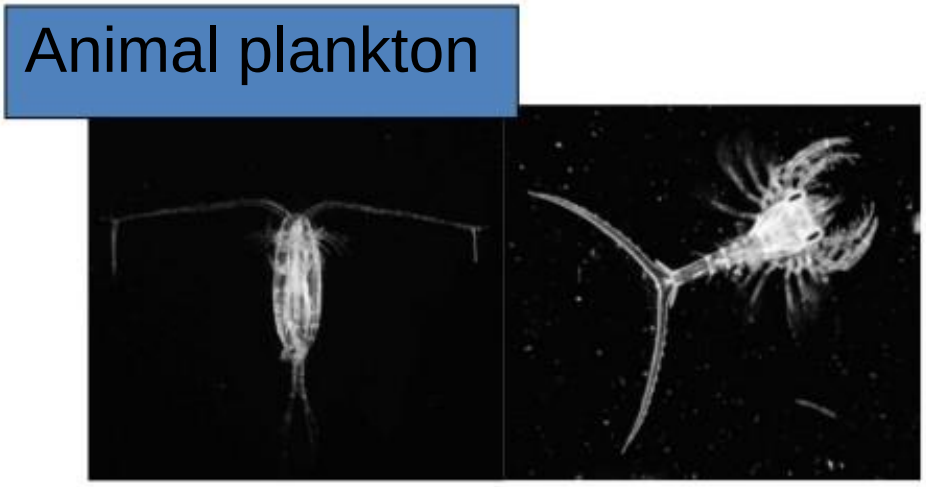

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Fig 1.2 - Plankton

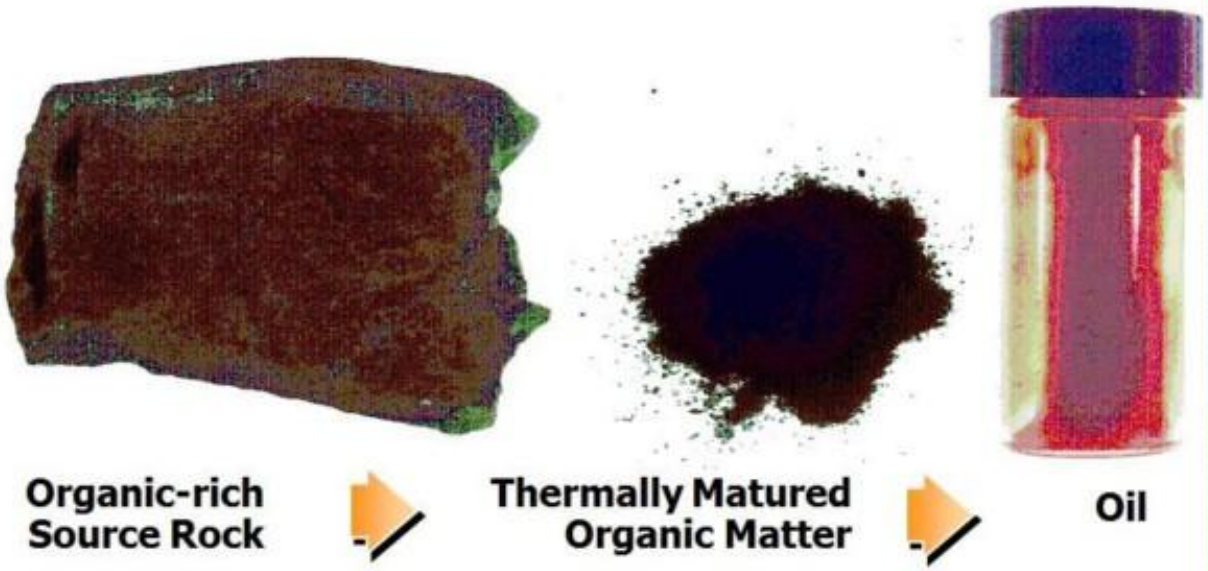


Fig 1.3 - Organic Source Rock to Oil

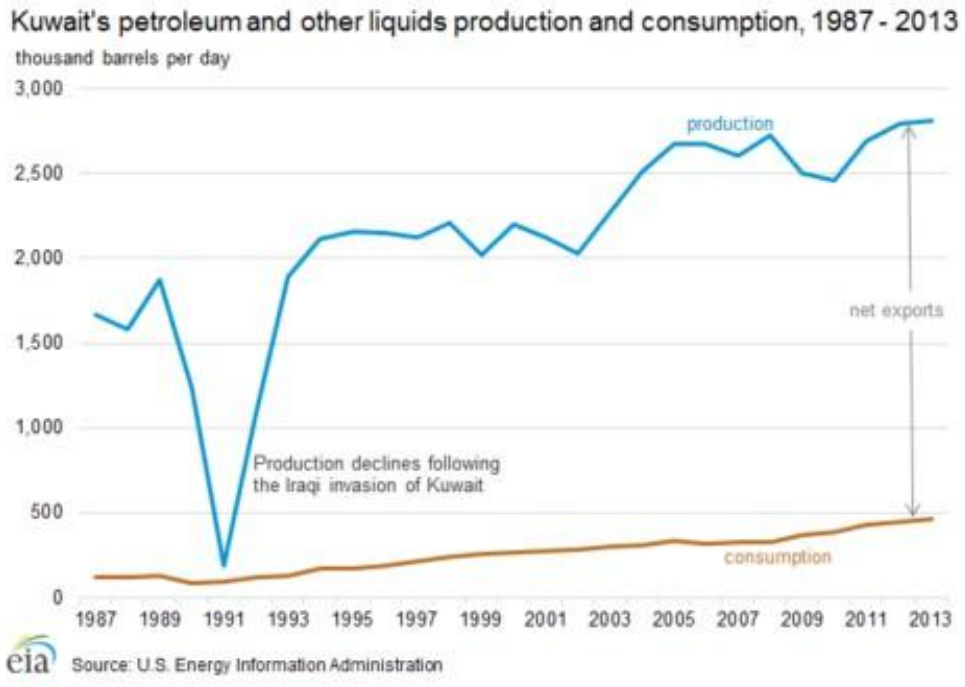
1.2 Brief History of Kuwait Oil Company

Kuwait Oil Company was established in 1934 by the Anglo-Persian Oil Company, which is known today as BP (British Petroleum), and Gulf Oil Corporation, now known as Chevron.

By 1938, oil was found in commercial quantities at Burgan Field. In June of 1946, His Highness Sheikh Ahmad Al-Jaber Al-Sabah, the late Amir of Kuwait, inaugurated the export of Kuwait's first crude oil shipment.

Shortly after, new fields were developed and export facilities were expanded, resulting in the construction of the North and South Piers, the Sea Island, and the Single Point Mooring.

In 1975, the Kuwait Government took 100% control over Kuwait Oil Company, and by 1980, the Kuwait Petroleum Corporation was established to bring all state owned oil companies under one entity.



The Iraqi invasion of 1990 devastated KOC facilities. However, within months of Kuwait's liberation in February of 1991, production gradually returned to full capacity.

Super light crude oil was discovered at the Sabriya Field in 2005. The discovery of the API 52 crude oil represented a great leap forward for the company's exploration abilities.

In 2006, gas was discovered in the deep Jurassic reservoirs at Rahiya, Mutriba, Um Nigaand other fields throughout Kuwait. These discoveries fulfilled a long-standing Kuwaiti dream of becoming self-sufficient in gas that can be used for power generation.

In 2011, KOC successfully achieved its goal of reducing gas flaring to approximately 1%. Compared to gas flaring levels of as high as 17% just a few years earlier, this represented a major accomplishment for KOC.

Today, KOC continues to live up to its stated mission of exploring, developing and producing Kuwait's hydrocarbon resources for its customers around the world in a way that is environmentally sound and economically viable.

1.3 Drilling Rig Types

To take the hydrocarbon entrapments from the crust, there are many different type of drilling rigs such as Land Rigs, Drill Ship, Semisubmersibles, Jack ups, and many more (fig 1.4). They are different based on where the reservoir is located, the depth of the reservoir, power needed and other factors.

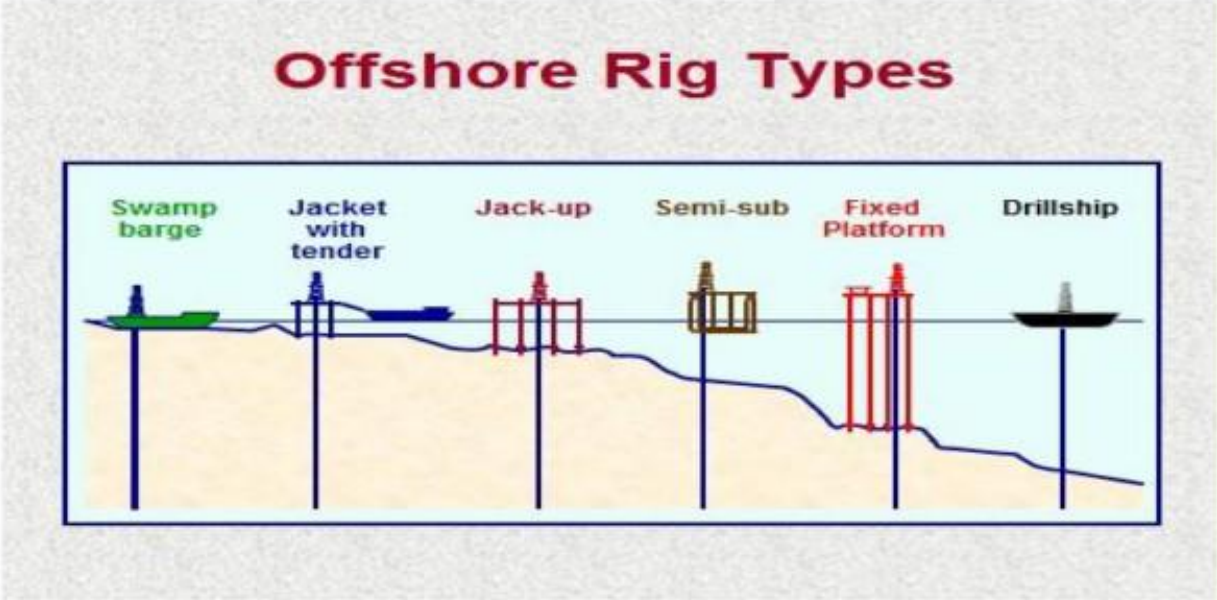


Figure 1.4 Types of Drilling Rigs

There are three different rigs used based on Horse Power:

1- Work over Rigs

Work over Rigs used to any kind of oil well intervention involving invasive techniques, such as wire line, coiled tubing, snubbing, expensive process of pulling and replacing a completion. Work over Rig's Engine is smaller than the Drilling Rig Engine. Work over rig HP varies from 350 to 950 HP, but some Work over Rigs needs high HP for deep wells.

2- Development Drilling Rigs

Drilling rig used to drill a well in a known field, so there are plenty of drilling records and experience from drilling many wells in the same field in the past.

The main objective is to drill a well to further develop the field by increasing the recovery and production. These are called "Development Wells".

The engine HP varies from 1000 HP to 3000 HP depending on the Rig capacity and the load that can be handling.

3- Exploration Operation

Drilling a well in a new area with no previous drilling experience and record for the area to be drilled .Exploration operations usually proposes drilling such a well to find new

reserve that requires Deep drilling (10,000 to 28,000 ft) which uses Super Rigs (High HP). The Super Rigs have engine that can generate more than 3000 HP.

There are many factors that impact the selection of the proper Horse power to use on the Drilling Rig such as:

1- Depth of the Well for Drilling & Work Over.

2- Maximum Weight of string and BHA (Bottom Hole Assembly).

3- Maximum Pump Capacity.

4- Maximum Hoisting Load.

5- Over pull jobs (like Jarring, Fishing, stuck & others).

6- Mud System.

Mud Pumps

1.4 Types of drilling well geometries

Wells can be drilled in a number of different geometries from the simplest vertical well to complicated multilateral completions.

There are many different types of well but the most common one are as vertical, deviated, and horizontal well. (Fig. 1.5)

The selection of drilling type is based on the reservoir conditions and economic analysis.

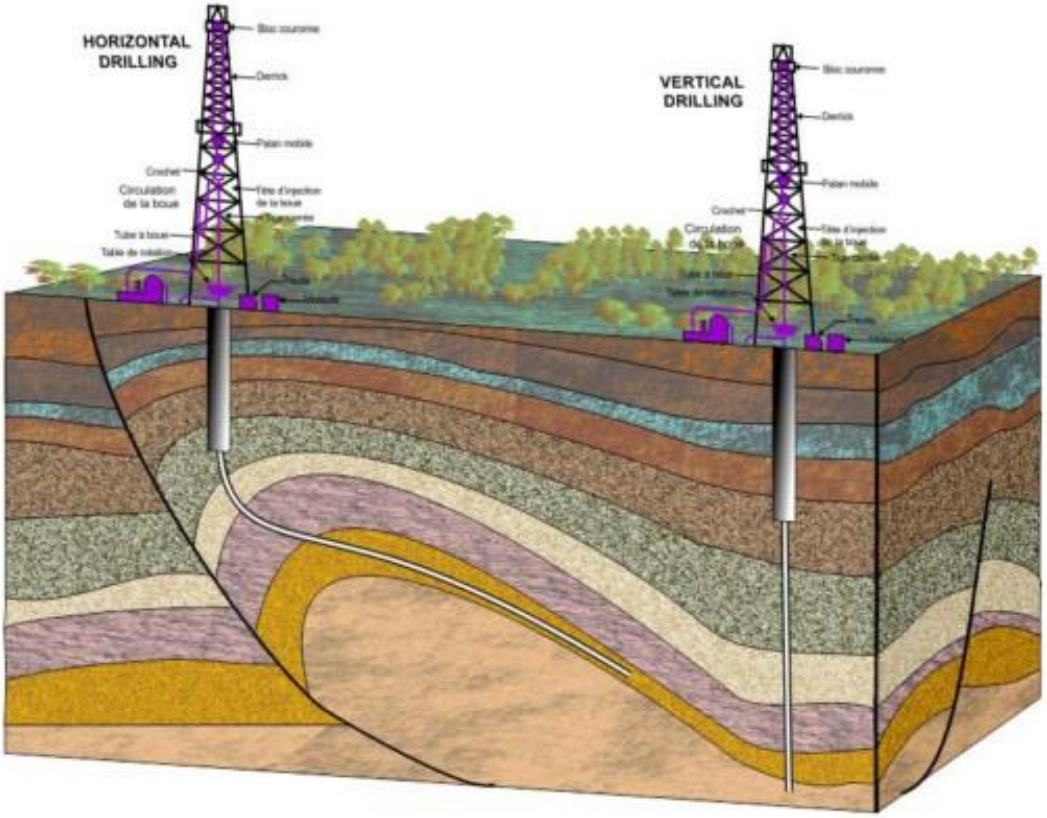


Figure 1.5 Vertical & Horizontal Drilling

Source: http://www.intragaz.com/en/geophysics_drilling.html

Vertical Wells:

Vertical well are the most common wells and conventional. They are selected for thick, permeable formation. (fig 1.6)

Vertical wells are used with vertical hydraulic fractures for thick, low permeability formations.

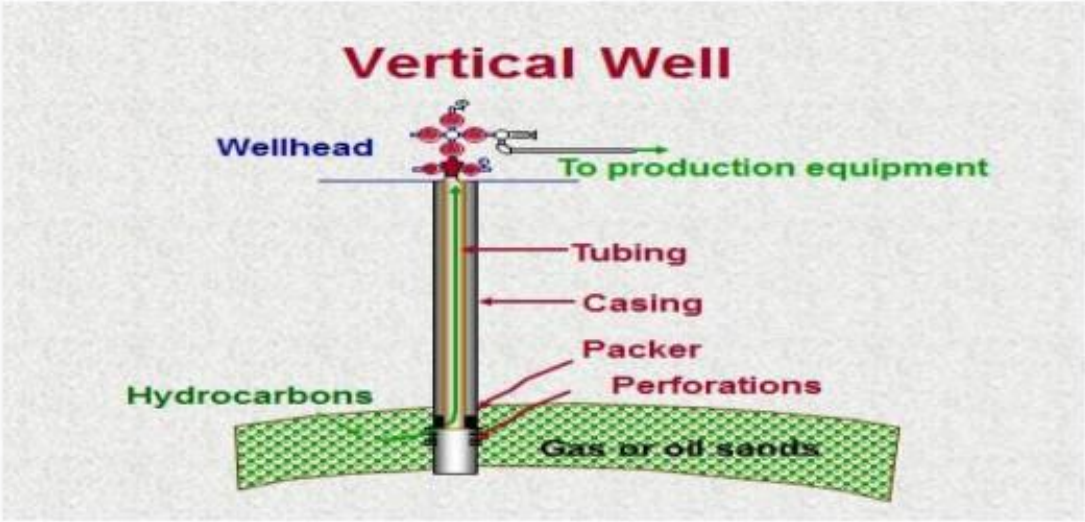


Figure 1.6 Vertical well

Directional Wells or Deviated Wells:

Deviated wells drilling non-vertical hole which purposely deviated from the vertical, using controlled angles to reach an objective location other than directly below the surface location. A directional well may be the original hole or a directional "sidetrack" hole that deviates from the original bore at some point below the surface. (fig 1.7)

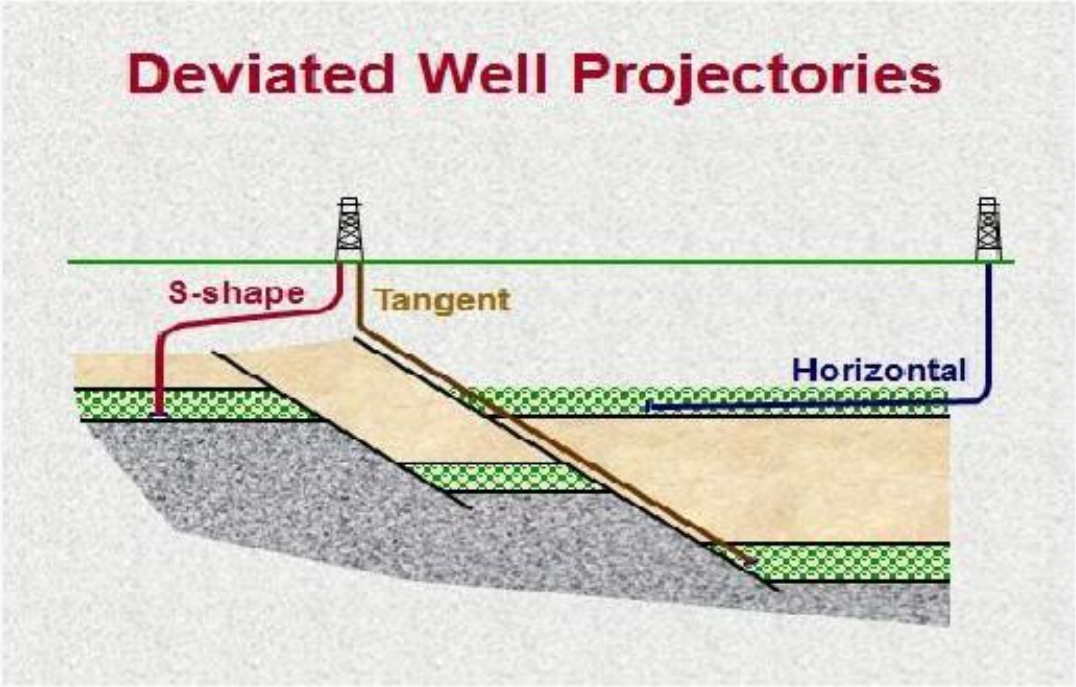


Figure 1.7 Deviated Well

The Objective of directional drilling:

☐ Drill multiple wells from the same location.

☐To intersect multiple targets (reservoir) from the same well.

☐To reach targets below an inaccessible areas for drilling.

☐ Directional drilling can be utilized to perform sidetrack a fish and avoid drilling in trouble some formation such as salt dome and fault lines.

☐To save cost and time.

Reasons of Directional Drilling

1. Drilling multiple wells from offshore structures with the same rig.

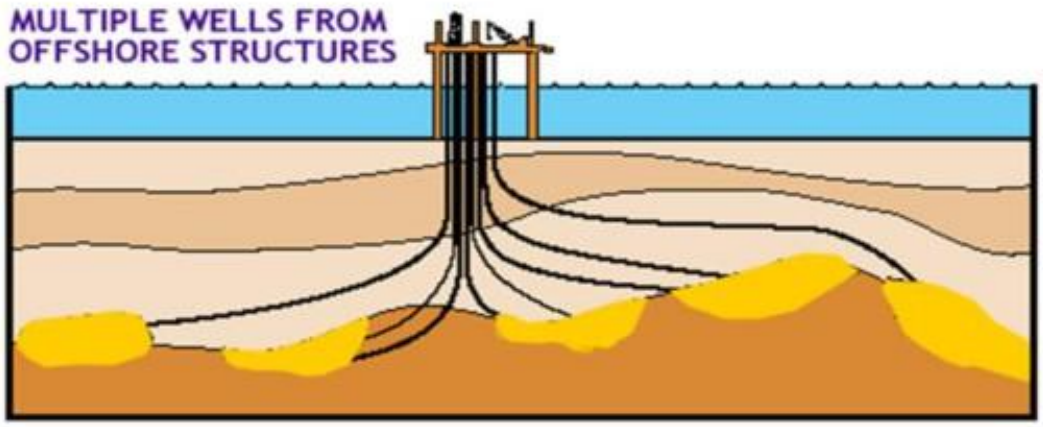


Figure 1.8 Multi Well Drilling

2. Directional drilling technology allows the industry to access deposits underneath obstacles or buildings. Without the directional drilling it maybe otherwise considered as inaccessible.

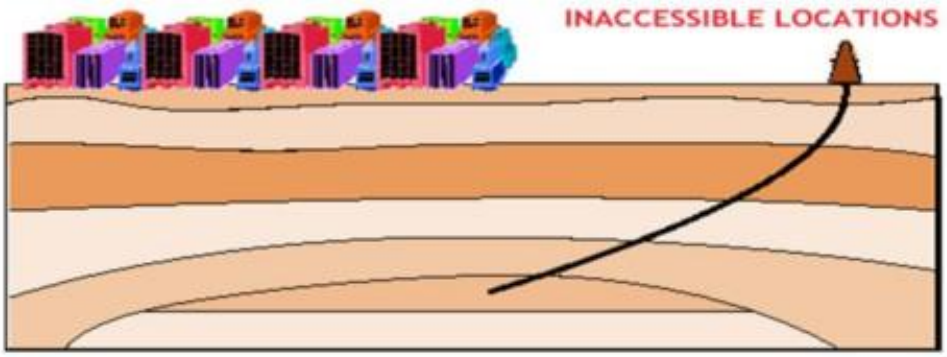


Figure 1.9 Inaccessible Locations

3. Sidetracking

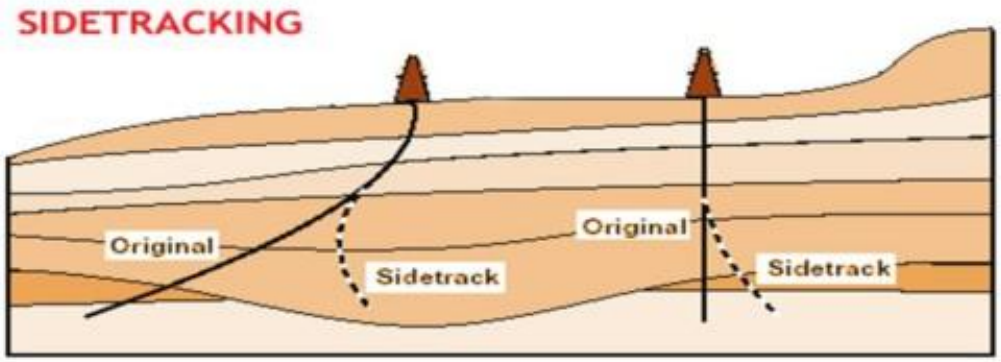


Figure 1.10 Side Tracking

4. Controlling Vertical Drilling

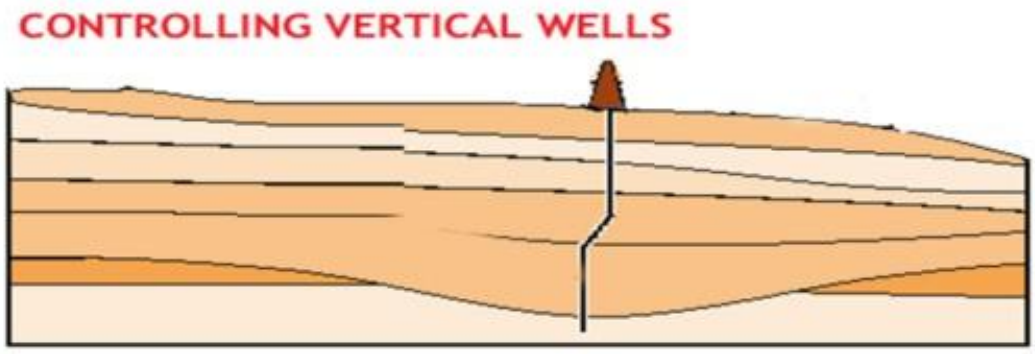


Figure 1.11 Controlling Vertical Drilling

5. Directional drilling can be as a relief well.

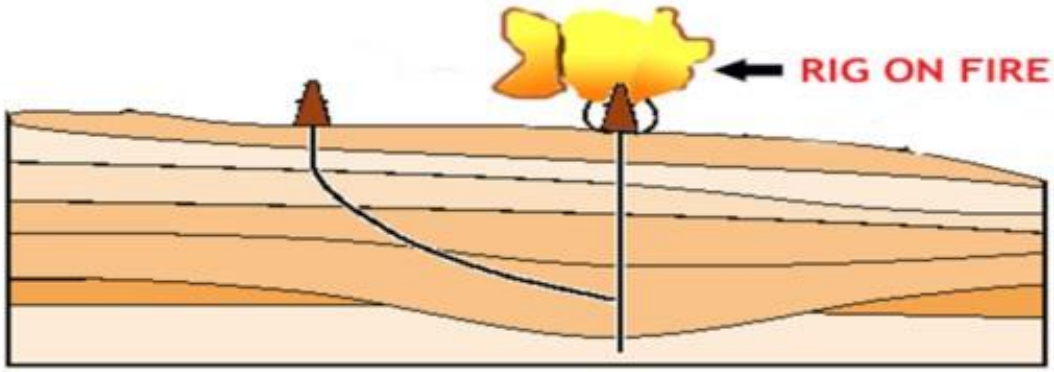


Figure 1.12 Relief well

6. Shoreline Drilling

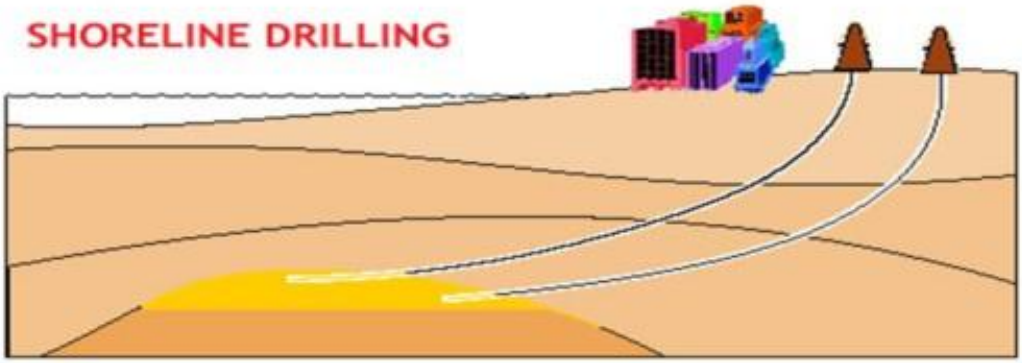


Figure 1.13 Shoreline Drilling

7. Fault Drilling

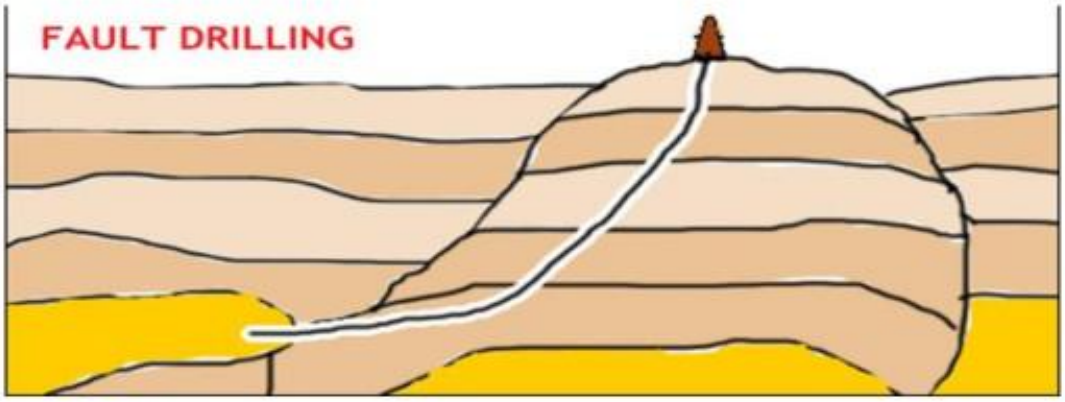


Figure 1.14 Fault Drilling

8. Salt Dome Drilling

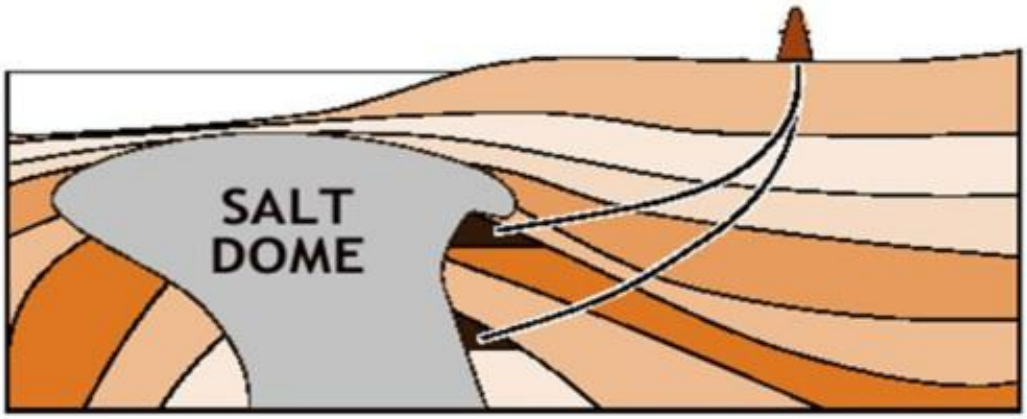


Figure 1.15 Salt Dome Drilling

Horizontal Wells:

Horizontal wells are used for thin, permeable formations. Thin oil columns over laid by gas and/or under laid by water.

Horizontal wells are also used for naturally fractured reservoirs.

The Objective of Horizontal drilling:

☐To increase production.

☐To reduce water conning problem.

☐To reduce sand production problem.

☐To intersect vertical natural fractures that are filled with oil and located in a low permeability reservoir.

Multi- Lateral Wells:

Multi-Lateral well is a well that has one vertical section and several lateral (horizontal) sections.

Multilaterals drilling is used for layered reservoirs to maximize oil/gas production. Multi-Lateral wells combine the benefits of the directional and horizontal wells.

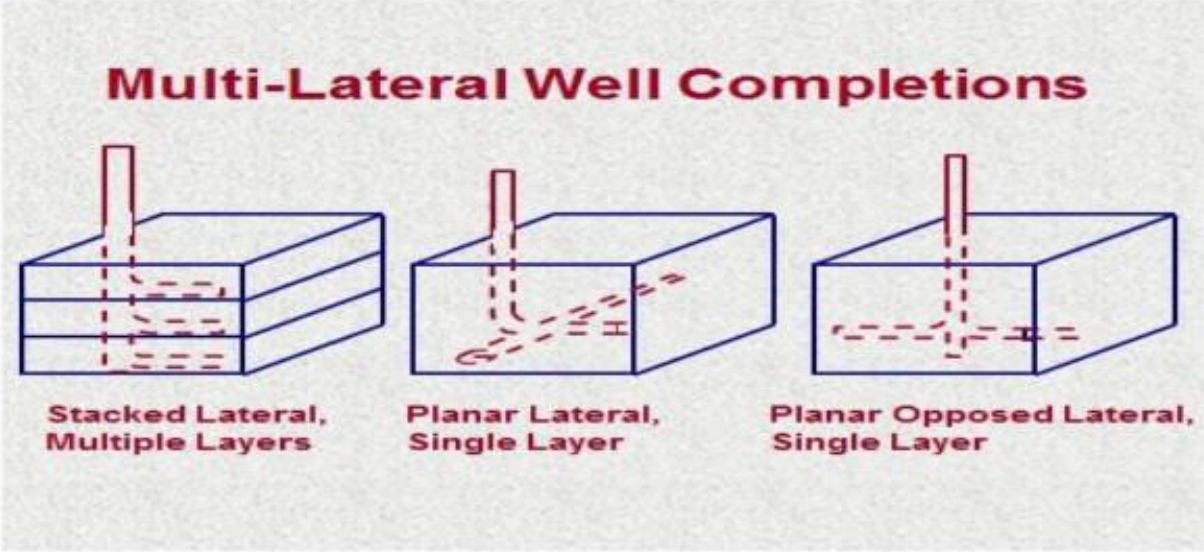


Figure 1.16 Multi-Lateral Well

1.5 Introduction to Drilling Contractor

Operating Company

An operating company primary business is working with oil and gas. The Operating Company, for example Kuwait Oil Company (KOC) obtains the right to drill oil wells to produce oil at a particular site or area from the ministry.

Drilling Company

Most operating companies find it more cost effective to hire expertise and equipment from drilling companies / contractors. Drilling Companies responsible on drilling activities based on operating company objectives and programs.

Operating company and drilling contractor sign an agreement called Drilling contract which describes the drilling project, determines the cost of each operation and states type of services.

Service Company

Service companies provide the required tools and services necessary to complete the drilling of the well. These services include sales of chemicals, mud, cement, logging, wire-line, running casing and installing wellheads, etc.

Rig Personnel

Drilling a well requires hiring many skilful employees to run the rig and operate the drilling operations. Each one of them is very important and has to have a full awareness on the drilling operations to ensure safety. There are usually two shifts, each work for 12 hours shift. Each shift consists of a driller, assistant driller, Derrick man, and Floor hands. The tool pusher oversees the drilling crew and ensures to keep the drilling operations going according to the drilling program.

Rig Superintendent - Tool pusher

Tool pusher works for the drilling contractor. Tool pusher supervises the drilling crew and coordinates between the drilling contractor and the operating company. He is responsible on the drilling operations and the drilling crew.

Night Tool pusher

Night tool pusher relieves the Tool pusher during night time.

Driller

Driller operates drilling equipment to drill hole of the well and supervise the drilling crew such as the assistant driller, derrick man, and floor hands (also called rotary helpers or roughnecks). The driller operates from the driller's console to maintain proper bit weight, pump rate, pump pressure and RPM. Driller works in shifts which is usually 12 hours shift.

Assistant Driller (A/D)

Assistant Driller assists the driller in the drilling operations and helps him out to monitor the drilling operations parameters and supervise the rest of the drilling crew on the rig floor.

Derrick man

Derrick man responsible on handling the upper part of the pipe from the derrick's Monkey board while tripping. He maintains mud and solids control equipment while drilling. He also maintains the crown block.

Derrick man has to wear a fall protection equipment to prevent him from falling and keep him safe.

Floor hands

Floor hands usually consist of two to three floor hands depending on the size of the rig, the rig operations and many other factors. Floor hand work on the rig floor near the rotary table and they work in rough working tasks such as handling drill pipes connections or drill pipes disconnections, using large wrenches called tongs to screw and unscrew the pipe.

Floor hands also maintain the rig equipment, repairing the rig equipment, cleaning the rig floor and the equipment, and painting.

Floor hands are also called rotary helpers, or roughnecks.

Additional Personnel:

Electrician

He is responsible on the rig electricity devices and maintains the condition of these devices to run smoothly without any major shutdowns.

Mechanic

He is responsible on the rig engines devices and maintains the condition of these devices to run smoothly without any major shutdowns.

Drilling Fluids Engineer / Mud Engineer

He is responsible on the mud properties and mud analysis during the drilling operation to help out the drilling operations and adding chemical additives based on the well conditions.

The mud is very similar to the human blood in a way. It is very important for the system and brings energy and it cleans the system.

For that reason the Drilling Fluid Engineer is called the Mud Doctor, he diagnose what is wrong with the mud and the system overall and ensures that the drilling operation remains fit and healthy, which is same as the normal doctor checks the blood for anything abnormal. He checks for any genetic defects (downhole problems) and the blood disorders (contaminants).

He must be knowledgeable of the total system (formation and well), so he can prescribes the appropriate remedial treatments to ensure the correct problems and maintain a chemical balance to maximize performance.

Safety officer

He is responsible for the safety on the rig and supervises the rig operations. He mitigates the hazards on the rig and work to eliminate or minimize the impact of these hazards.

Medic

Medic do minor medical checks and first aid to the rig crew.

Forklift Operator

He operates the forklift and other similar type of machinery to help out with the operations.

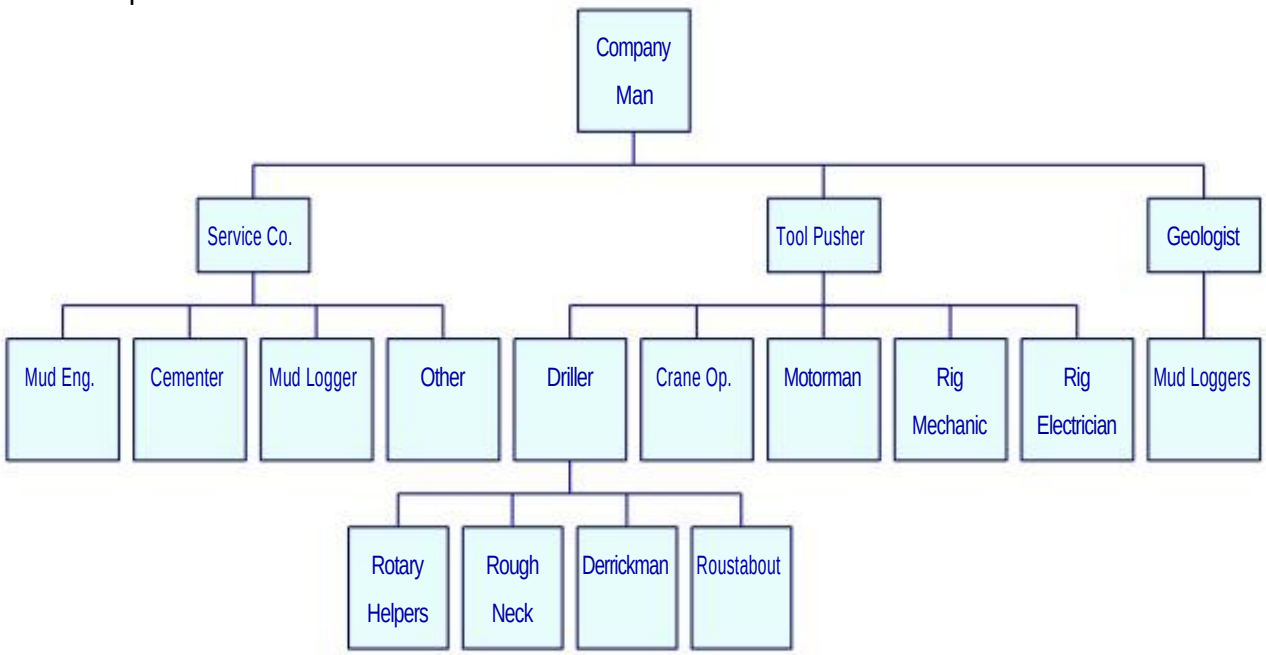


fig 1.17 Rig Personnel Chart

Fig 1.18 Rig Crew

Source: http://oilrigdrillings.com/2011/12/30/oil-rig-worker/

1.6 Drilling Operational Problems

There are many problems that might occur while drilling such as:

☐ **Lost circulation**

Lost circulation happens when there is uncontrolled flow of drilling fluids comes into down hole formation. This can be either a partial loss, some returns to the surface or a complete loss with no returns to the surface. This happens when the drilling encounters a highly fracture zone, one with low pressure-high permeability or a cave-in and weak formations. If drilling is continued with no returns it is called dry or blind drilling.

Lost circulation problem could lead to high costs and could be an expensive problem in drilling.

Lost circulation problem could happen at any depth regardless of the mud type or the mud weight which being used.

Poor cement job is the most common cause for lost circulation.

The best solution to this problem is to:

1. Maintain proper mud weight
2. Minimize annular friction pressure
3. Maintain adequate hole cleaning
4. Set casing to protect weaker formations
5. Treat mud with loss circulation materials if anticipated.

When loss circulation happens, then the best thing to do is:

1. Pump loss circulation materials in the mud
2. Seal the zone with cement or other blockers
3. Set casing
4. Dry drill (clear water)

☐ **Drill Pipe Failures**

There are common drill pipe failures such as:

- Twist off
- Parting
- Burst or collapse
- Fatigue
- Leaking

Most of these are prevented by starting with a good string. Drill pipe and collars should be constantly inspected, and regularly tested.

☐ **Differential and Mechanical sticking of drilling string**

Pipe Sticking happens when you experience the inability to move the pipe or rotate.

There are two types of sticking differential and mechanical sticking.

Differential Sticking:

There are several factors that might causes of differential sticking such as:

1. High differential pressures (over balance)
2. Thick mud cake (continuous high fluid loss to formation)
3. Low-lubricity mud cake (high coefficient of friction)
4. Pipe left stationary for some time (delay in operations).

Several signs indicate the pipe differential sticking such as:

1. Increase in torque and drag.
2. Inability to move the pipe.
3. Circulation of drill fluid is interrupted.

There are ways to minimize differential sticking such as:

1. Using proper mud characteristics (weight, fluid loss)
2. Using collar shape (spiral or square collars)
3. Keep drilling solids low in the mud
4. Keep rotating the drill string

Mechanical Sticking:

Mechanical Sticking happens when you high accumulation of cuttings accumulate in the annulus. Usually it happens in wells that do not have efficient well hole cleaning. This problem is common in directional or horizontal wells.

Increase in circulating pressure while drilling, or increase in drag when tripping is a good indication of the problem. It is a good idea to circulate bottoms up before tripping the pipe as this cleans the hole.

There are ways to minimizing mechanical sticking such as:

1. Using efficient drilling hydraulics, rate and viscosity
2. Using high rotation rate in directional holes

☐ **Hole Deviation**

The bit tends to walk while drilling when the hole deviates from the vertical or planned course. The formation dip and rock properties can influence the path of the bit.

This can be a result of:

1. Using improper drill string that suits the formation
2. Having insufficient Weight on bit.
3. Rock characteristics and rock nature which can lead to deviation in the hole.
4. Using improper RPM of the drill string.

The hole deviation problem can be corrected by changing the BHA or by adding more stabilizers. Lowering the Weight on bit & slowing the rotation can also happen to minimize the problem.

Hole deviation also known as Dog leg problem.

☐ **Borehole Instability**

Borehole Instability problems are common in shale sections of the hole. Shale can plastically flow inward or slough causing mechanical sticking.

Salt also exhibits plastic behaviors. Any weak formation can collapse if the mud weight higher that the formation pressure. Indications of trouble are an increase in the torque, increase in circulating pressure or even the blocking of returns to the surface.

Borehole Instability problems can be caused by erosion due to drilling fluid and the nature of the corrosive materials. Also, it can be caused by chemical reaction between the formation and the fluids. Or even from the mechanical stresses while drilling.

To prevent the borehole instability starts with having a good mud design, maintain and control the mud weight and water loss

☐ **Corrosion**

The corrosion happens when destruction of metal by chemical or electrochemical interaction with the environment. The drill pipe gets affected by the corrosion and as result of this the pipe gets weaker and weaker till the pipe failure and cause washouts.

Carbon dioxide (CO_2) and Hydrogen sulfide (H_2S) and dissolved oxygen (O_2) are the main corrosive materials.

There are influencing factors such as temperature, fluid chemical composition, velocity, pressure.

There are ways to minimize the impact of corrosion by close monitoring and maintenance.

☐ **Bit Balling**

Bit balling happens when shale formation forms soft and sticky clay when exposed to water. Sticky clay can adhere to water wet metal. This problem can become serious when the clay starts to block the annulus or cover the bit completely.

There are ways to prevent the bit balling by maintain good bit and hole cleaning.

☐ **Torque and Drag**

Torque is rotational resistance arising from contact with the wellbore. Drag is the linear resistance. Excessive wall contact and sticky clays can increase the torque and drag. The drilling efficiency reduced when we have the torque and drag problem.

Additives such as lubricants can be added to minimize the effect of the torque and drag problem.

☐ **Key Seat**

The key seat is formed when drill string is not aligned right or the hole is not straight. That drill string start to press against the side of the hole and as a result of that a cutting groove gets formed, so when pulling out of the hole the BHA will catch on the groove.

That is why it is always recommended to keep the hole in proper alignment.

☐ **H2S**

H2S is Hydrogen sulfide. It is a poisonous gas. Hydrogen sulfide is a serious hazard. H2S has the odor of rotten eggs at low concentrations but it is odorless at high concentrations.

Even in low concentrations; H2S is hazardous to workers and sometimes can be lethal. The effect of H2S depends on duration, frequency and intensity of exposure as well as the susceptibility of the individual.

H_2S stress cracking is a hydrogen embrittlement phenomenon, where the equipment in contact with H2S containing liquid undergo atomic reactions and cracks develop.
For this reason it is essential to control the hazard of Hydrogen sulfide by the following:

1. Crew adequate training & conduct H2S drills.
2. Conduct Pre-job meetings.
3. Install H2S Detection devices.
4. Using Respiratory Equipment.
5. Implement safe work procedures.
6. Implement emergency response procedures.
7. Monitor H2S concentration in the rig.
8. Good maintenance of H2S devices & NACE certifications.
9. Planning ahead.

☐ **Fishing**

If a tool is lost or the drill string breaks, the obstruction in the well is called junk or fish. It cannot be drilled through. Special grabbing tools are used to retrieve the junk in a process called fishing. In extreme cases, explosives can be used to blow up the junk and then the pieces can be retrieved with a magnet

☐ **Well control**

Well control is very critical to the safety of the whole drilling operation and the crew. Well control can be an issue when having a kick. A kick is an entry of formation fluid such as water, gas and oil or other formation fluid into the borehole. If the well left

uncontrolled a kick can develop into a blowout (uncontrolled release of crude oil and/or natural gas from an oil well or gas well after pressure control systems have failed).

Well control procedures might vary from one rig to another and from one company to another.

There are several safety measures to control the well such as:

1. Rig control

BOP's, FOSV, Mud pumps, Draw works and other rig equipment. Thedrilleris responsible on rig control equipment.

Blow Out Preventer (BOP)

2. Mud Control

Mud engineer and the Derrick man operate the mixing system and chemical addition to have a good mud mixture that suits the drilling situation and the drilling formation. Chemical addition operations are usually an addition of weighting material such as barite to the mud to increase its density. Kill mud reserve is maintained in case of an emergency.

Mud Quality Control - De-Sander and De-Silter

3. Choke Control

The Driller & A/D calculates the relationship between pressures and time.

The Driller & A/D should be the best trained employee on the rig in kick control.

The rig superintendent or the tool pusher will supervise these three well control measures to ensure the well control operations and the safety of the operations.

It is very important to have a written well control manual with policies and procedures in details to avoid confusion and wasting critical time during a kick.

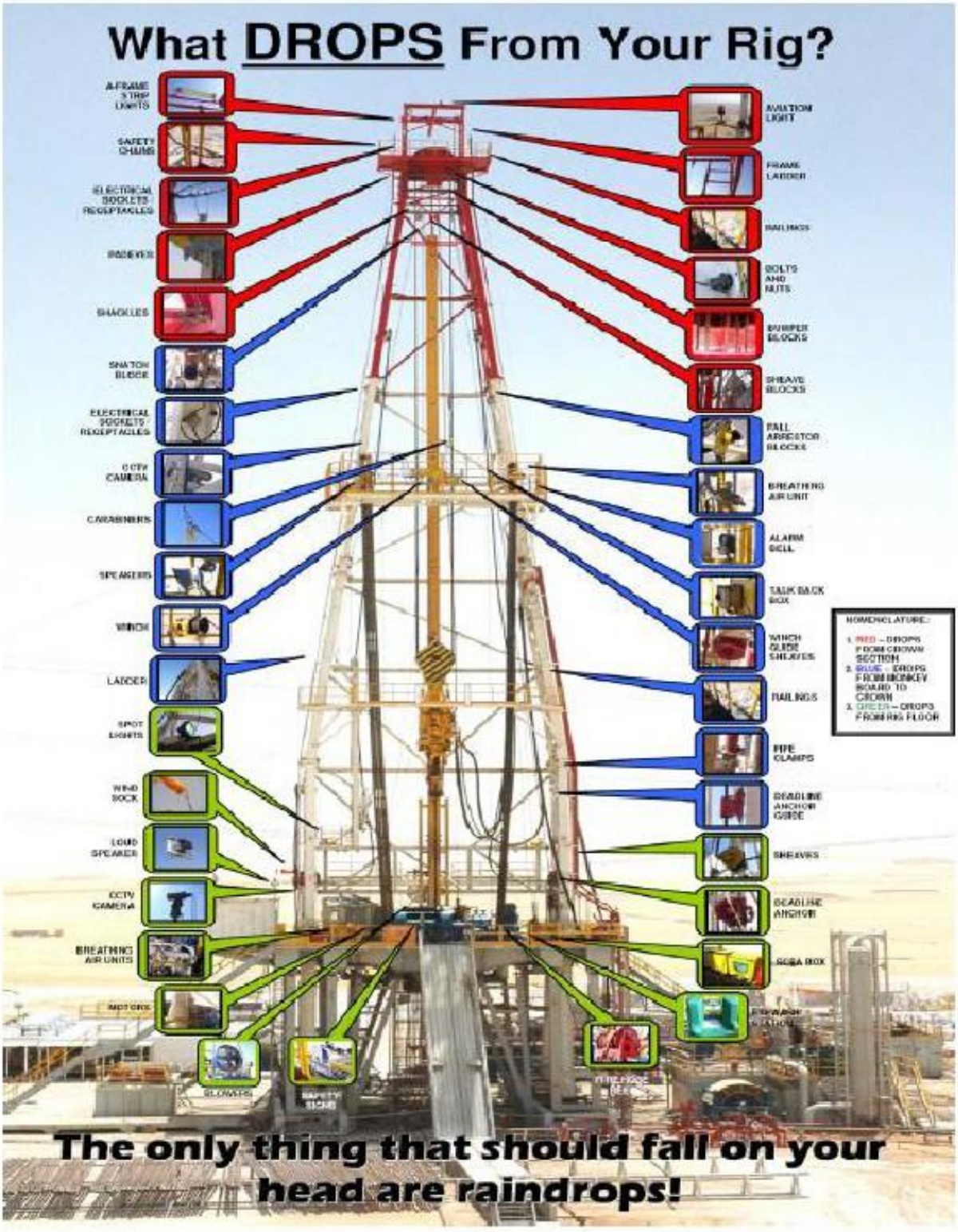
1.7 Drilling HSE Hazards and Mitigation Measures

Physical Hazards Register (Significant Only)

Sr. No.	Activity	Operation	Hazard Description	Hazard Classification	Hazard	Risk Rating	Existing Controls
1	Manriding Operations	Riding Man's operations	Uncontrolled movement or snapping of the lifting gears	Physical	Fall From Height	9	Checking Harness/Winch Line; Dedicated Signal Man & Standard Signals & Maintaining line of sight with tugger operator
2	Working on Stabbing Board	Positioning of Casing	Leaning out from board to hold and position casing.	Physical	Fall From Height	9	Ensure Standard Fall Protection Practices
3	Working on monkey board	Person working at height	Improper use of Fall Protection system	Physical	Fall From Height	9	Use of Standard Fall Protection Practices

4	Power Generation	Power Generation / Distribution	Improper Earthing for the Equipments	Physical	Electrical Shock	**6**	Isolation of electrical equipment and integrity of cables
4	Power Generation	Maintenance	Improper Earthing for the Equipments	Physical	Electrical Shock	**6**	Correct isolation procedures
171	Working with equipment'sin Galley	Working with Hot plate, Mixer, grinder, Refrigerator, various cutting devices, etc.	Improper Earthing for the Equipments	Physical	Electrical Shock	**6**	Isolation of equipment, keeping equipment dry and not to damage cables
100	Mud Pump Liner / Piston Change	Electrical Isolation of Mud pumps	Insulation Damage	Physical	Electrical Shock	**4**	Awareness and handling techniques
133	Cutting / Welding Operation on Rig Floor.	Routine Drilling	Concurrent gas /oil operations in adjacent wells.	Physical	Fire Explosion	**4**	Ensuring Nil explosive gases with gas detector and Emergency shut Down System Working

143	Handling & Storage of Chemicals	Mixing, Storage and danger fro m rotating equipments	Improper Loa d Handling on Forklift	Physical	Caught in Between	**4**	Training an d awareness, audio-
113	Draw Works	Drilling Operations - Rotating High Speed Equipment	Rotating machinery	Physical	Caught in Between	**4**	Guarding o f equipment
121	Hopper / Pits / Tanks	Rotating Equipments	Improper positioning near rotatin g	Physical	Caught in Between	**4**	Isolation and de-energizing agitators
55	Stabbing Operation - Running completion	Use of stabbing board	Bolts/ hinges loose / not secured properly (**DROPS**)	Physical	Falling object injury	**3**	Tools tied off while working o
4	Racking of Drill Pipe and Drill Collar	Lifting by Crane	Uncontrolled movement of the load	Physical	Falling object injury	**3**	Training & implementation
58	Stabbing Operation - Running completion	Person working at height	Tools not secured properly	Physical	Falling object injury	**3**	Tools tied off while working at height



Drops Survey Categories to be checked on rig

Health and Welfare Hazards

Chemical and Acid Splash Hazards

Drilling involves extensive use of chemicals for preparation of drilling fluids used as lubricant and lifting the cutting to the surface. Whilst few of the chemicals are classed as irritants and few are mixed with diesel to form drilling fluids. High concentrated acids are used during completion operation to fracture the reservoir.

There is a risk of employees coming into contact with the chemicals and acids in particular on their hands, face and eyes and suffering subsequent chemical burns, which could lead to extensive absence from work.

The company must assess the risks associated with the use of these chemicals in compliance with MSDS (Material Safety data Sheet) and put in place measures to ensure the safety of employees working with these chemicals. This includes mandatory use of personal protective equipment

Radiation

Radioactive materials are used for measuring various parameters below the surface of the earth after drilling operation is completed. This is in order to collect data on different kinds of formation and hydrocarbon presence.

Although these radioactive materials are handled by highly professional representatives with specialized tools, there is a risk of exposure of radioactive material to the personnel working

around rig floor. Whilst these radioactive materials are enclosed in interlocked storage case, there is a risk that crew members, who habitually open the interlocks, could come into contact with the radiations. Accidental exposure to this radiation can lead to skin cancer or organ damage.

The organisation should implement to ensure that the radiation is not exposed to personnel. It should also ensure its employees should be aware of the potential harm from these materials and the precautions to take.

Lifting Trauma

Drilling Operations involve manual handling during the shifting process within the rig site. Chemical bag, drill pipes, casings etc. require manual handling while shifting by forklift or crane.

Injuries resulting from these lifting include injuries to employees in the form of damaged ligament, tendon and musculoskeletal injuries. These injuries can lead to employees taking time off work for short or extended periods due to back injuries.

Bacterial Exposure

The sewage produced from the human and food waste are being collected for transportation at the rig site. Maintenance to the various pipelines and the storage tank(bio-cube) is a common practice on the rig site.

Exposure to these sewage would result in exposure to certain bacteria like Enterobacter species, fecal streptococci and campylobacter and pathogenic organisms.

Sewage Treatment Plant with Sewage lines

Employees working on sewage lines are most likely to be effected by this disease with 'flu like symptoms in infected individuals which can lead to fatalities. The company should take all precautions to assess the probability of the propagation of Cholera, Rotavirus, and Hepatitis etc. and take appropriate preventive measures.

Noise

Characteristics of noise of a diesel engine is caused largely by the diesel combustion process. The top drive is driven by electric motor and during high torque the gears to the drilling tools rub to each other forming high noise.

These personnel could be at risk of noise related hearing damage if the exposed for longer period to these noise levels.

Health & Welfare Hazards Register (Significant Only)

Sr. No.	Activity	Operation	Hazard Description	Hazard Classification	Hazard	Risk Rating	Existing Controls
1	Use of SOBM as Drilling Fluid	Synthetic Oil Based Mud is used as drilling fluid for drilling Operations	Uncontrolled flow of Mud	Health & Welfare	Chemical Splash	6	Provision of PPE; Chemical Proof disposable suits and use of Barrier Cream
5	Using Mud bucket	Control splash / flow of Drill Fluid, while breaking of joint / connection	Improper use of Mud Bucket	Health & Welfare	Chemical Splash	6	Provision of PPE; Chemical Proof disposable suits and use of Barrier Cream
12	Acidizing	Pumping Acid via Acid Lines	Connectors not tightened or leak from pin holes/ crack of hose	Health & Welfare	Acid Splash	6	Ensuring care while handling and leak proof connections and periodic health check-ups
10	Use of Explosive & Radio active Equipment - Downhole	Use of Explosive & Radio active Equipment - Downhole	Use of Radioactive source	Health & Welfare	Radiation Injury	6	Use under controlled circumstances with barricading and dosimeters for handlers
13	Cutting / Welding Operation on Rig Floor and Platform Jacket	Routine Drilling	Radiation from welding	Health & Welfare	Radiation Injury	6	Use of Proper PPE
4	Using Chain tongs or bull tongs	Drilling Operations	Improper self positioning while using Tongs	Health & Welfare	Lifting Trauma	4	Using proper lifting techniques

2	Setting & Pulling Slips & Collars	Running in Hole / Pulling out of Hole	Improper positioning and handling of Slips or collars	Health & Welfare	Lifting Trauma	**4**	Awareness and Training in lifting of Slips & Collars
24	Working on sewage piping	Opening up of paneling, Working with fittings, fixing scaffolding when vertical lift required.	Spill of sewage water	Health & Welfare	Bacterial Exposure	**3**	Use of proper PPE and awareness
19	Power Generation	Running of diesel engines for generating electricity	High noise produced during running of generators in tandem	Health & Welfare	Noise	**3**	Use of Ear muffs and Isolating the Generator room.
9	Drilling in hole	Achieving the target depth for tapping the reservoir	High noise produced from Top drive while running in and out of hole with torque	Health & Welfare	Noise	**3**	Use of Ear muffs.

Review of Health, Safety and Environment Management System

2.1 HSE - Kuwait Oil Company

The above problems are related to operation and can be controlled mechanically or by building an engineering solution, however Safety is important in everything that we do, it is important to work safely so you can go back to your family and the people that love you and care about you in the end of the day.

Safety is the responsibility of every individual. Safety always starts with the employee himself.

Organizations work hard and invest lots of money to promote safety and mitigate risks as much as possible. The employee and the organization want to have accident free work place.

Health, Safety and Environment (HSE) helps to protect or at least minimize the impact of any event that might cause harm to people, heath and the environment.

The oilfield business considered as one of the hazardous businesses in the world besides coal mining.

Kuwait Oil Company (KOC) maintains the HSE Policy of the Parent Company Kuwait Petroleum Company (KPC).


SINOPEC-185

2.2 KPC HSE Policy

KPC HSSE POLICY

We are committed to provide a safe, secure and healthy working environment for everybody who works with us, and are responsible for working towards the goal of no accidents, and no harm to our people, environment, our assets, and the communities in which we operate.

We believe that all incidents, injuries and workplace illnesses are preventable. We will prevent pollution and the negative/adverse impacts our operations have on the environment by reducing waste, emissions and discharges, and use resources efficiently. We will produce, market and distribute quality products that can be used safely by our customers.

To accomplish this, we will:

- Ensure that **management** at all levels demonstrate and encourage commitment to create and sustain a culture where HSSE is the responsibility of all employees.
- Set **objectives and targets** that result in continual improvement of our HSSE performance.
- Provide adequate **resources** to implement HSSE processes and programs.
- Maintain and continually improve a **HSSE management system** that meets local and international industry standards and regulatory requirements.
- Identify, assess and manage the health, safety, security, and environmental **risks** and impacts of our existing and planned operations.
- Use globally recognized standards, procedures and processes for **facility design, construction** and start-up activities.
- Apply effective procedures, structured inspections, **maintenance programs** for critical equipment, and competent personnel to ensure that our facilities are **operated** within established parameters and according to regulations.
- Ensure that all of the **workforce including employees and contractors** are performing work in a manner that is consistent and compatible our expectations on HSSE.
- **Inform and provide documentation** necessary for industry approved design, operation, inspection, and maintenance of facilities, and ensure that these are identified, accessible, reviewed, maintained and appropriately safeguarded.
- Adequately **train our workforce** and regularly assess and improve their skills and competency.
- Develop a motivated and committed workforce and enhance the overall **HSSE culture** by involving employees at all levels in HSSE initiatives.
- Proactively **communicate** our HSSE expectations, lessons learnt and other HSSE information openly with the community, our staff, our contractors and other stakeholders.
- Assess, manage and communicate the hazards associated with our products to help users and other handling **our products** in a safe and environmentally friendly manner.
- **Manage changes** to operations, procedures, systems, site standards, facilities, structure or organisations to ensure that risk arising from these changes remains at an acceptable level.
- **Openly report** all incidents and near misses, and structurally investigate where appropriate to establish root cause and take corrective/preventive actions. Study and learn/share from past incidents and historical practices.
- Plan and prepare to handle any **emergencies** resulting from an incident and take necessary actions to protect the people/communities, the environment, assets and our reputation.
- Monitor the effectiveness of, and compliance with our HSSE management system, objectives and targets through **internal and external audits** and verifications.
- Implement formal process for **senior management to review** the continuing suitability, adequacy and effectiveness of our Management System in managing HSSE risks and ensuring continual improvement in HSSE performance.

Kuwait Petroleum Corporation
and subsidiaries

March 2015

2.3 Introduction to Burgan HSE Management System

I have carried out a workplace occupational health and safety cultural project of Burgan drilling company, Kuwait also to identify the overall H &S culture of the company. I have build and compiled the project at RIG 133 at the location AH-231(Kuwait). The site safety officer and the safety superintendent were supportive in building the project. The purpose of the survey is to assess the safety culture of Burgan Company and provide the ALARP recommendations to enhance the positive health and safety culture.

2.4 Project : Review of Burgan Health Safety Environment Management System

2.4.1 Aim of the Project

The main aim of this project is to identify the over-all health and Safety Culture of Burgan drilling company, Kuwait. In addition to the project it is aimed to come up with the strategies based on the findings which is as low as reasonably practical, so that the workplace Health and Safety culture can be enhanced to look forward for the continual improvement, It is also be aimed to prepare a business case through which management can be advised on resource allocation to prepare overall Health and Safety Culture.

2.4.2 Project Objective

The main objectives of this project are to enable the management to minimize the accident, achieve the legal compliance with respect to the Health and Safety through maintenance of positive health and safety culture by implementing the recommended strategies, moreover achieve more worker's participation, gain more management commitment, leadership commitment and enhance organizational overall reputation so that organization would be able to maintain positive H&S Culture which can assure long term business sustainability and continuity.

2.4.3 Scope of the Project

The scope of this project is limited to the Rig 133, one of the Burgan drilling company's project situated at AH-231 and it's running with 70 crew members for its operation. By selecting this Rig, I could assess the safety culture practiced and focus on 70 crew members in an effective way and can come up with the perfect project and the business strategy by means of gathering the physical and other evidences of both negative and positive Health and Safety Culture. Since the selected area was dealing with various critical and other activities and more number of people the selection was beneficial in many ways. Forms and Inspection schedules etc. defined and documented from the period of last 2 years.

2.4.4 Description of the workplace

Burgan Company for Well Drilling, Trading & Maintenance K.S.C.C was founded in 1970. Burgan Drilling was listed on the Kuwait Stock Exchange in 2005. Burgan Drilling is the largest oil drilling company in Kuwait and one of the leading oil drilling companies in Middle East. Burgan Drilling has operations principally in Kuwait and Bahrain. Burgan company currently holds 3000 employees, it possesses the ISO 9001, OSHA, OSHSAS 18001 and ISO 14001 certifications. The company is under the legal obligations of the KEPA regulations enforced by Kuwait government. Precautionary measures to protect workers from danger of accidents and occupational diseases (Res.22), 1974, Kuwait regulation article Min. Resolution 22 of 1974, and (5) Executive Regulations of Law No. 21 of 1995 as amended by Law No. 16 of 1996 establishing the Public Authority for Environment.

☐ Burgan Drilling currently engages in the following primary business activities:
Onshore and offshore exploration services for new oil fields in Kuwait

☐ Oil well drilling and work over services of existing oil wells;

The operation being carried out at the rig is by drilling the earth and place the casing until the oil reservoir as discussed in our earlier chapters. The type of drilling activity carried out at Rig 133 is by means of top drive drilling. A top drive is a mechanical device on a drilling rig that provides clockwise torque to the drill string to facilitate the process of drilling a borehole. The basic activity of the drilling rig is to develop the well by means of drilling to the pre-defined depth and inserting the casing for the further crude oil extraction processes. Drilling, mud mixing, mud circulations, casing, pull out, run-in-hole, casing, logging and cementing are the common activities performed in the drilling rig. The following drilling equipment's are being used (I) Mud Pump (ii) Mast (iii) Mud system (IV) SCR and (v) Choke manifold etc. Rig Components are shown in **Appendix-7**.

The overall safety culture being practiced in the Burgan drilling company is up-to the mark and it has been found that the employer and the employees has identified and followed their own responsibilities in the aspects of health and safety.

Top Drive

Driller Console

The Health and safety culture of the Burgan drilling company has been assessed by means of the primary and secondary data which has been verified at the rig site, the documents which has been specified in the Health and Safety management system has been analyzed and interpreted. The project is used to find the positive and negative

indicators associated with all legs of the Health and Safety management and which uses to emerge out with the as reasonably practicable recommendations.

2.4.5 Methodologies

The various methodologies have been used to assess the Health and safety culture of the Burgan drilling company. The methodologies used for this projects are like direct observations, cultural survey and the analysis of the Health and safety related documents/credentials and others etc. Observations, Workplace interview are being considered as the primary data and the document analysis and the interpretations are being considered as the Secondary data sources.

2.4.5.1 PRIMARY DATA COLLECTION

Primary Data Collection is a method used for collecting data through direct personal observation; consultation; individual and group interviews and safety questionnaire survey method etc. As part of this study to assess, the overall health and safety culture of Burgan AH-231 project, the data collection methods resorted are direct personal observations; consultation with management and key personnel; individual and group interviews with employees, supervisors and workers selected at random; and onsite safety questionnaire.

Direct Personal Observations

As scheduled, a safety walk has been conducted along with Burgan's HSE Manager Mr. Brajesh Gupta to zone 0, Zone 1 and Zone 3, Examples of both positive and negative health and safety cultures were witnessed, which has been furnished below in detail.

The positive indicators been observed are (i)Welfare facilities such as number of toilets, rest shelters, dining area, washing facilities etc. and accessibility to these are sufficient enough concerned with the current man power on site. (ii)A dedicated site clinic with full time physician and medical nurse for meeting first aid and medical facilities on site is provided. The concerned regulation on Kuwait Labour Law No.6 of the year 2010 is

satisfied with, according to which, a site clinic should be provided with a full time medical nurse at the Rig site. (iii)Improved housekeeping, improved material storage and stacking. (iv)A dedicated fuelling area with advanced facilities approved by KOC in Zone 3. (v)An excellently designed and managed H&S bulletin board for the project conveying aspects such as safety, health, lessons learned, environmental, emergency, first aid, site layout etc.

However, during the safety walk the following discrepancies were found which indicates the health and safety culture were witnessed which has been considered as the negative indicators.(i)Workers inside the confined space were found exposed to Toxic and chemical Hazards. 3 workers working inside a 3-meter depth Mud tank, to clean the mud inside the tanks at the Zone 3, Phase A are found exposed to Hydrogen Sulfide Gas (H2S) and other Confined Space Hazards which was not satisfying the permit to work (PTW) requirements. H2S reading per the multi gas detector was 16 ppm whilst 10 ppm is the permissible exposure limit per OSHA standards (8-hour time- weighted average). Nevertheless, of a work permit on site, the permit conditions were not observed. There was a gas detector but no air ventilation as well as emergency response arrangements were in place. The entrants as well as the supervisor were seen unaware of confined space hazards. Entrants were trained internally, whereas per Kuwait-EPA, all the entrants, supervisor and rescuers must be trained by authorized third party on Confined space hazards and emergency response. Pre-task briefing was not carried out, and last emergency drill conducted was 2 months ago.

Gas Detectors

Fixed Monitor for detectors

Hand held Monitor

Cascade System

Self-Contained Breathing Apparatus

Observation 1: Exposure to high level noise in GENSET and DRAWWORKS at Zone 2.

Around 3 crew were associated with the day to day mud mixing activities are seen exposed to the high noise, By the noise detector it has been found the level more than 90 decibels in a time duration of 5 minutes. Even though the company owns two noise meters, no noise monitoring was carried out for the day. It was evident that noise level was very high beyond the permissible exposure limits, as the raised voice of workers were unable to be heard even at half meter proximity. Cabinets of the GENSET for acoustic protection were left open and none of the personnel were using any hearing conservation PPEs like ear plugs or ear muffs. Exposure to high noise can develop high blood pressure, Noise Induced Hearing Loss such as tinnitus, threshold shift and temporary and/or permanent hearing loss. The risk profile is assessed as high, violation against HSE-TSSA-06-11161 and EPA limits.

Gensets

Solution: Genset noise barrier wall to be provided

Drawworks

Solution: Drawworks brake cover to be always in close condition

Observation 2: High vibration exposure is being found at the Rig floor without vibration protection in Zone 0 & Zone 1.

The 2 floor men and the one roustabout were working with the iron roughneck at the rig floor has been exposed to high vibration and they were not using the anti-vibration PPE's The concerned supervisors did not address the issue and no evidences of communication

on associated hazards were available. These exposures to vibration can cause a collection of hand-arm vibration syndromes such as White finger, Carpel tunnel syndrome, Muscle and joint damage etc. The symptoms would be appearing I future. The risk profile is assessed as high and is a violation of EPA limits.

Solution: Vibration gloves

Observation 3: Usage of Caustic Soda without hand protection and foot protection at Zone 3

The derrick men and one roustabout at the mud mixing area were witnessed mixing caustic soda and barite to increase the mud weight without using any eyes, respiratory, face, skin and hand protection PPEs against associated health and chemical hazards. Communication and implementation of chemical handling procedure and COSHH project as insufficient. This chemical can be entering into body through absorption, ingestion, inhalation and cause damage to eye and olfactory nerve; Dermatitis; Skin and Respiratory Irritation etc. There was no eye wash and emergency shower facility accessible for using during emergency. The associated risk profile is high and it is referred as a violation of Section 3 of Article (26) Chapter IV.

Mud mixing Hopper

Solution: Full PPE with respiratory protection and hand protection for chemical mixing

Observation 4: Unprotected edges of the rig floor posing risk of fall at Zone 1

Multiple instances of unprotected and insufficiently protected rig floor has been noticed which possess high risk of fall. Some of the working areas where seen with intermittent plastic barriers (with gaps), which does not meet the fall protection requirements such as height, load bearing capacity etc. construction team as well as third party people approaching adjacent area of #3 are equally exposed to fall hazard which can result in injury, fractures with temporary and/or permanent disabilities and even can end up in fatality. Applicable regulation is K-EPA.

Solution: V-door gate properly closed

Observation 5: Crane and Forklift were operated without adequate banks men in Zone 4.

Forklift which was in operation for preparation of BHA, all the stabilizers and the bits has been moved from the yard to the pipe racks at the Cat walk area by means of fork lift and sometimes the forklift has to be reversed too near the parking area. Since the work area was in the one of boundaries of project, could not provide effective supervision. This can lead to collision of equipment and overturning, which can lead to injury, permanent or temporary disabilities, fire and explosion and property damages. No pre-task briefing was provided and reversing alarm of this equipment was turned off during operation. Applicable regulation is KEPA section 11 and requirement of HSE-TSSA-05-2018.

Solution: Banksman to be used for Forklift operation

Conclusions:

Overall Health and Safety culture being practiced at the Rig 133 belongs to Burgan drilling company is been found positively by direct observation, however found some above specified negative indicators like (i) Exposure to high level noise in GENSET and DRAWWORKS at Zone 2.(ii) High vibration exposure is being found at the Rig floor without vibration protection in Zone 0 & Zone 1, (iii) Usage of Caustic Soda without hand protection and foot protection at Zone 3 (iv) Unprotected edges of the rig floor posing risk of fall at Zone 1 etc. the negative indicators can be resolved by administrative and engineering controls.

Advantages and limitations of observations

The observation method was so supportive in nature in terms of cultural project as it gave me an opportunity to identify / assess and verify the general behaviour of the

people their attitude towards workplace control, mutual care within the organization and their dependence onto the control measures in place at the same time the observation paused certain limitations as well. The common limitation of observation was; it was carried out in a short duration I could not cover wider area within the workplace. Due to time constraints, I could observe only minimum number of people and overall judgment was made based on those observations. However, the observation methodwas successful in terms of cultural project.

Consultation with management and key personnel:

On 17thFebruary, 2017, as prescheduled, a meeting was held with the Project Director Mr. Mustafa Ismail; Project Manager Mr. Andrew Theaker; and QHSE Manager Mr. Brajesh Gupta of Burgan, to have detailed information on routine health and safety management on site, through which more information on senior management commitment, initiatives and overall health and safety culture were focused. Analysing the consultation process with the management, the following information is gathered.

The Positive Indicators been observed while communicating with the management is that Burgan is having daily HSE inspections is being carried out, it is being monitored through HSE officers and environmental engineers. The findings of the safety inspections are communicated to HSE manager(s) in writing and verbally. Upon these observations, the HSE manager initiates actions for rectifying the non-compliances and observations. The corrective action is recorded and filed for further reference and analysis.

However, the Negative Indicators as follows are also been observed(I) On every Saturdays, it has been declared as the weekly safety meeting and it's been mentioned in the Health and safety plan that, all the site personnel has to attend the meeting, but it's been none of the construction managers and project managers and site engineers attends or witness this safety meeting even at random.(ii) The number of safety officers including engineers required for any rig site in Kuwait is in 50:1 ratio, according to Law Na 28 of the year 1969 concerning Labour in the Oil Sector. Therefore, the number of OHS personnel excluding managers are to be 27, whereas the current number is only 18,

a deficiency of numbers is observed. (Office and managerial staff of #80 are excluded). Moreover, there is no dedicated Health and Safety meetings being organized, but mixed with construction, quality and progress related issues.

Face to Face interviews with employees on general health and safety culture

On 18thFebruary, 2017, a group of employees on site of different levels such as senior mechanics, electricians, worker, foreman, equipment operators, and drivers etc. were selected on a random basis and have conducted an informal interview with them for gathering information on site safety and health culture on site.

The Positive indicators which has been interpreted from the face to face interviews are, All the employees and visitors reaching on site-shall be of main contractor's, sub-contractors' or third party agencies are directed to HSE department for HSE induction. There is a daily and weekly tool box talk meeting on site, thru which the site workforce of different segments is provided with health and safety related training. In addition to special trainings on power tool operation, cleaning and disinfection on drinking water and other welfare facilities, confined space entry etc. are covered under special training. Moreover, Health and safety violators are summoned immediately for refresher training on the concerned violation. Workers are clearly aware of substance abuse policy (drugs and alcohol) of the company. Special trainings are provided on importance of near miss and incident reporting. However, the Negative Indicators are being observed along with the positive culture as follows, most of the worker and technical level staff are provided with in-house training only, whereas the necessity of third party training from approved centres are a regulation per Law Na 28 of the year 1969 concerning Labour in the Oil Sector. Most of the employees stated that they are not aware of any third party trainings provided for someone. Foremen stated that they are often tempted to compromise on safety standards and procedures to meet target stipulated as part of construction progress. They are also seen in concept of compromising safety by assuming certain hazards and risks acceptable even without taking any corrective actions, with a wrong perception of 'reasonably practicable' which is conveyed by some of the construction

managers during construction meeting. Equipment operators and drivers are in concept that usage of seat belts, are required only on roads due to fines from traffic authorities and compliance to PPEs such as reflective jackets, safety shoes etc. are required for site workers only.

Advantages and limitations of observations

The interview methodology gave me an opportunity to gather individual opinion on health and safety matters which normally people would hesitate to give it in writing or express it in public. Moreover, interview could facilitate certain guidance on improvements required against negative health and safety indicators. At the same time, interview was having certain limitations too. Some of the interviewees were not fully convinced with the intention of interviews and doubted the purpose of it which made them to be reluctant or hesitant to answer certain questions. Such reluctance made the interview partially successful.

Safety questionnaire survey

A questionnaire was summarized in order to assess the health and safety culture and the same has been submitted to existing workforce from different segments such as workers, operators, charge hand, floor men, site engineers etc. The survey was intended to gather information on management commitment, level of leadership, employees trust on management, general regards towards health and safety, attitude towards health and safety. The level and effectiveness of upward, downward and horizontal lines of communication within the organization, workers participation, and adequacy of operational controls in place.

The safety questionnaire survey method has been initiated to observe the positive and negative culture implemented in the open end questions for easy interpretation and analysis, 40 crew were selected at random for the survey during the site inspection held on 17thFebruary 2017 at the safety conference hall located at the rig site, among 40 crew, it's been observed that 10 senior crew which includes the manager and supervisors

and 30 junior crew. The identity of the persons responded to the questionnaire are kept confidential. Safety Culture Questionnaires are attached in the **Appendix-1**.

Criteria used for the survey:

As mentioned earlier questions were prepared on above subjects and approved by the project manager. The questionnaires were distributed to participants during the toolbox talks after explaining the purpose of the survey in general. The participants were asked to express their opinions in a yes or no format and a collective opinion above 90% was treated as positive indicator of health and safety culture and a collective opinion below 90% is considered as negative indicators of health and safety culture.

Advantages and disadvantages of cultural survey:

Since the cultural survey could include marginal number of employees it helped me to gather the overall attitude of the people towards health and safety. Moreover, cultural survey could include employees from all profiles so that the findings from the survey helped us in reaching into a conclusion on health and safety culture more realistically. The main limitation of the cultural survey includes: while preparing the survey questionnaire it was expected to get a fair participation from all participants but when it came to real scenario the responses received from the participants were only partially reliable because the questions being raised through the survey were new to most of the participants and some of the participant were finding it difficult to understand the questions since the questions were asked in English language. Moreover, due to workplace operation some of the participants were in hurry and they showed themselves bit hastily while replying and that influenced the quality of the response. However, the survey methodology was overall successful.

Findings of survey:

During the health and safety survey it has been observed that majority of the participants were in support of maintaining good standard of health and safety. 98% of the

participants opinion that good standard of H&S is achievable only through management commitment and worker's participation. 96% of the participants opinioned that the health and safety policy is available in English language and they are not fully aware of the contents of the policy. Which is a negative indicator of health and safety culture. 93% of the participants expressed their opinion that have never received any accident and reporting and investigation training which should also be considered as negative indicator of health and safety culture. Moreover, during the survey 97% of the participants opinion that permit to work system documentation slowing down their task and partial regards to permit to work system to be treated as negative indicator if health and safety culture. 96% of the survey participant's opinion that they are hardly involved in health and safety consultation process which should also be treated as negative indicator of health and safety culture.

2.4.5.2 Summary of primary data

Analyzing the primary data collected, it appears that Burgan has a robust program for provision and maintenance of welfare facilities for the workforce. Adequate custodial staffs are designated to maintain the welfare facilities up to mark. In addition to, a dedicated site clinic has been provided for the existing workforce per the Kuwait Labour law of 2010. Other arrangements such as weather station, fuelling area etc. highlights their liberality of spending resources for the site maintenance. Site monitoring is being carried out with HSE personnel and the awarding system on safety performance established will be contributing for raising the bar. In house training programs are smoothly ongoing, which highlightstheir commitment towardshealth and safety communication and training.

However, a marginal gap has been observed in identifying and complying with certain legal requirements, mainly those are incorporated in K-EPA. Certain training needs are strictly being categorized in Kuwait Labour law of 2010 as third party certifications, which Burgan is not totally complying with. Though the weekly training sessions are ongoing, a few of the hazards identification and communication are not taken place effectively such

as confined space, noise, vibration, chemical, fall hazards etc. Procedural violation has been observed for CSE, dust mitigation, exposure to noise, chemical handling, provision of banks-men, adherence to No smoking, seat belt compliance etc. Violation of No Smoking, violation of PPE compliance, chemical handling, lack of banks-man, work at height regulation etc. are highly reflecting lack of adequate supervision and control on site. Lack of management commitment is evident due to lack of participation in HSE training sessions, absence of documented senior management tour for H&S, lack of a dedicated safety committee and mix up of construction and safety issues in a single meeting, which may not help to address health and safety related issues. Appointment of additional number of safety officers is also not complied with.

2.4.5.3 Secondary Data Collection

As stepping forward in the project of the existing health and safety culture of Burgan Drilling company, the internal information with respect to the Health and safety documents has been collected from the approved HSE plans, policy statement, Safe Operation Procedures, Permit to work documents, Tool box meetings, Review documents, employee profiles, risk projects records, PPE issuance register, PPE management, employee profiles, the inspections reports, audit reports, STOP cards, Incident reports, Investigation records, registers, training matrix, training records, employee grievance reports, organizational chart and the documents present at the rig location. These credentials are being considered as the secondary data and I believe that these documents would assist to assess the health and safety culture being practiced at the Burgan drilling company.

Advantages and Disadvantages of Secondary Data Sources

Since every written document is a permanent record, the secondary data sources assisted me to achieve a comparative and effective study on data in different time frames. However, there were certain limitations to the secondary data sources like; the integrity of the data is directly connected to the competence level of the person on overall existing Health and Safety culture of the Organization.

HSE Policy

While assessing the health and safety policy, it was noticed that the organizations' policy is reflecting the overall attitude of the organization towards health and safety, it has been signed by C.E.O of the organization and it is dated and it reflects the top management commitments towards to health and safety. Since the above factors play a major role in promoting health and safety, those are to be treated as positive indicators of health and safety culture. At the same time, it has been observed that the policies have been dictated only in English, even though majority of the workforce are weak in the same language. Moreover, during the assessing the policy, it was noticed that policy

hardly reflects the objectives towards health and safety. Such factors to be treated as negative indicators of health and safety culture and a strategic approach is essential to convert the above negative indicators into positive one. HSE policy is attached in the **Appendix-2**.

Leadership Commitment & Accountabilities

While assessing the leadership visit register, leadership recommendation tracking sheet and the HSE plan of the rig site, Health and management system insists the top management to periodically visit the rig, communicate, participate and discuss about the HSE issues at the rig site. Also the organization chart has been found, in associate with it, the roles, responsibilities, accountabilities and the delegated authorities of all employees has been defined, allocated, documented and communicated to all the employees and the third party, the frequency of the management visit/leadership visit has been specified which indicates the positive culture of the organization, In spite of that, the absence of the leadership visit for the past 6 months duration and the old leadership recommendation and minutes of meeting has not been followed up anywhere which shows the negative indication of the health and safety culture of the organization.

Permit to Work System:

While assessing the PTW system implemented, it has been observed that the health and management system of Burgan drilling company insists to implement the PTW system effectively for all the non-routine and critical activities performed as a part of the operation, PTW implementation has been carried out in associate with the respective safe work procedures and it's been strictly implied without compromise, which indicates the positive safety culture of the organization, However it is been observed that the PTW register has not been updated and for the past 2 months, the HOT work permit and the radioactive permits has not been issued for the activities performed earlier the past month, also the man-rider permits has been found incomplete without JSA and the pre job safety meeting. The negligence approach in terms of PTW is due to either lack of PTW

system or due to poor documentation, so the reluctant approach towards the PTW system implementation is considered as the negative indicators of the health and safety culture.

Training

While assessing the trainings system of the organization. It was observed that, In the HSE plan the training matrix, training register, training modules, the periodic intervals of the refresher trainings and specific trainings (On the job training, Induction training, In-house training and the third party training)has been defined and appointment of client approved QHSE trainer at the rig site. The training policy of the organization insists to carry out the training sessions as dictated in the HSE plan. Found the records of Induction training conducted for all new employees and the visitors, these attributes show the positive safety culture. However, it has been observed that the no evidence was found for the PTW system and the work at height activity training modules are not present in the training matrix and the refresher training has not been conducted for the past 6 months, the training matrix has been found incomplete as 80% of the crew has comply with the training matrix requirement and the remaining 20% crew has not attended the training, which shows the low level of implementation. The training matrix has been attached in the **Appendix -3**.

Competency

Further to the communication, while assessing the competence of the crew, the eligibility, experience level, education required, skills, certifications, the communication skills and the additional requisites for each and every designations has been clearly described in the HSE plans resource allocation clause. The additional well control certification provided by the company for the enhancement of the competency of the crew has been clearly intimated in the health and the system of the organization which shows the positive culture of the organization. However, it has been observed that, no

evidence of the additional training or know ledged based program or campaign has not been initiated to enhance the competency level of the crew members.

Risk Procedures

While assessing the risk procedures being implemented, it has been observed that the hazard hunt program is been practiced to identify the potential hazards, top most approach to the project and control measures of the risks at the activities in the workplace. The 5x5 matrix qualitative job risk analysis (JRA) methodology of the job plan has been followed by the organization, in addition to it, the tool box talk also has to be conducted to discuss about the job and it has been strictly implied that the JRA has to be discussed with the crew and should be documented with the activity log which indicates the positive health and safety. However, it has been found, the JRAs are not been reviewed for the past 2 years, this negligence in the review of risk project and the reluctant in the documentation of the risk project shows the negative indication of the health and safety culture of the organization. HSE policy is attached in the **Appendix-6**.

HSE Audit

While assessing the Audit system of the organization. It has been observed that, the HSE audit has been considered as the key indicator, Types of audit should be conducted and the auditing procedure has been instilled in the HSE plan of the site. The HSE plan says that the Internal HSE audit has to be conducted at site by corporate HSE superintendent once in three months and the external HSE audit is been done every year by the external agency has been emphasized the plans, found the internal audit reports and the external audit reports at the rig site, having an audit system and policy in-place, shows the positive indicator of the safety culture. However, while analyzing the reports in has been observed that internal audit report of Q2 and Q3 of 2016-2017 reports were not found and recommendations and the corrective actions has not been followed up or rectified and has not been added in the next audit report, it implies the poor quality of the

auditing system being implemented, it indicates the negative safety culture of the organization.

Personal protective Equipment's (PPE's)

While assessing the health and safety culture, it has been found that the PPE issuance policy looks like Dithyramb, the periodic issuance of the personal protective gears with the respective ANSI standards, PPE inspection checklists and provision of the PPEs for the visitors/vendors /an outsider entering inside the site has been clearly dictated in the policy. However, it has been observed that, the issuance PPE register states the Personal safety gears has not been provided on the regular interval as stated in the policy for the past 2 years and meanwhile no provisions or records were found for changing the damaged PPE at the rig site, this June culture of the management issuance shows the negative indication of the health and safety culture. The PPE issuance policy can be finding in the **APPENDIX-4**.

Incident and Investigation reporting

The Incident report and the investigation reports have been considered as the health and safety culture of the organization. while assessing it, it has been observed that the incident reporting system, contingency plan, hierarchy of reporting, methodology of analyzing the immediate cause underlying cause and the root cause has been determined, the software tool has been provided to track of all the incidents at rig site, the causes of the incidents were communicated to the crew in terms of safety alerts, having the incident and the investigation reporting system in place implies the positive indicator of the health and the safety culture, However no evidence of the medical treatment case and the near miss reports were found at the rig site, it shows the poor documentation and the lack in reporting system it indicates the negative culture of the Health and the safety culture being implemented in the organization, The template of the incident report form can be find in the **APPENDIX-5.**

Employee grievance

As a part of the project of the safety culture of the organization, the employee grievance indicator is considered for the project, while assessing it has been found that the grievance reporting system is in place, the responsibilities of the HSE committee, the HR department and the managers obligations has been determined, the quick action plan is dictated, Acknowledgement of the grievance report, examining the methodology of the grievance reports, decision making and the execution and the review phases are been defined in the HSE plan and being the employee grievance reporting system in place indicates the positive safety culture of the organization, However no records of the quick action and the managerial involvement has been recorded, prompt responses for the problems raised, the solutions has not been found in the given time frame, which indicates the poor implementation of the employee grievance reporting system and the lack of involvements of the department in this system expresses the negative indicator of the health and safety culture of the management system.

Health Surveillance

While assessing the health surveillance practice of the organization, it has been found that the periodic health surveillance of the crew who works at the mud system, the medical fitness test of the crew who works at height and the time duration, in case of critical activity like mud mixing and the radioactive activities at the site the typical health surveillance has been drafted, these indicates the positive culture of the organization in terms of health and safety, however the negative culture is that the report has been found which states the health surveillance has been conducted for the crew members in annually basis, 34% of the total crew were exempted in the surveillance when comparing to the reports against the person on board, also its not in an effective method. Health surveillance report for the crew who performs the mud mixing has not been found at the site, no records were found for the medical fitness test for the derrick men who work at height.

2.4.5.4 Outcome of the secondary data

The Health and safety culture of the Burgan drilling company has been analyzed with the above specified tools, the overall positive culture with respect to the positive indicators like policies, procedures and the required safety tools specified above are drafted in the HSE plan and the associated documents but the negative indicators are as follows(i)The policy has not been defined in multilingual (ii) Most of the STOP card and incident report shows that the lack in procedural implementation (iii) The lack of leadership visit and the management commitment towards the safety culture is found (iv) The risk project is not been reviewed and drafted for some of the critical activities associated with the operations (v) The consultation with the crew members were not found (vi) Internal audit as per the HSE plan has not been found or recorded (vii) The PPE issuance frequency is not complied with the PPE issuance policy and the PPE management is lacking (viii) In the incident reporting system nowhere it's not found any near miss reports (ix) for the past 2 quarters the HSE audit report has not been found and the previous audit reports recommendations were not followed up (x)The training matrix is not fulfilled and the lack of the external training has not been facilitated as stated in the policy(xi)The welfare facilities provided to the crew has not been well maintained or recorded, (xiii) The disciplinary action taken by the company is in biased state (xiv) The recommendations or solutions specified in the grievance report has not been implemented or in other words the actions has not been taken with respect to it and (xv) The Health surveillance of the crew was not conducted as per the policy dictated in the HSE plan.

2.5 Strategy For Improving Effective Occupational Health And Safety

Following strategy is prepared based on the observations made through primary and secondary data sources. During the primary and secondary data analysis, certain positive and negative indicators of health and safety culture were identified and an effort has been made to change negative indicators to positive through below strategy.

2.5.1 Aim of the Strategy

The main aim of the following strategy is to plan and prepare effective measures to convert existing negative indicators into a positive one. It is also aimed to allocate roles and responsibilities to the people to enhance existing negative safety culture into appositive one. Overall it is aimed to provide a smart recommendation to enable the organizations to enhance its overall safety culture into a positive one.

2.5.2 Objectives

The main objective of the above aim and strategy in general is to assist the organization to achieve higher level of legal compliance management commitment towards health and safety, worker's participation, corporation, etc. through reasonably practicable recommendations and implementations. By following recommendations organizations' will be able to minimize incident potential as well.

2.6 PROPOSAL FOR ACTION

Reviewing the HSE Policy

The HSE policy is not been written in multilingual and the policy has not been reviewed for the past 3 years, so following actions are been recommended in this project to rectify the negative indicators in the HSE policy (i)The board of the directors, the chairman and the operational heads obligation or responsibility to draft the policy in the multilingual format (ii) The HSE policy has to be reviewed by the top management in yearly basis (iii) The policy has to be prominently displayed in all the designated places by the site safety engineers. The above recommended actions has been expected to be implemented in one month of time and the policy statement has to be named in the version and the policy register has to be made to record the changes and reviews of the policy statement. (iv)The objective and the aim of the policy has to be communicated to all the crew by the respective supervisors and have to make sure that everyone understands the same without and semantic barriers. The implementation of this strategy is being expected in 21 days' time scale.

How the success is to be monitored:

Success of Translation, transmission and the implementation of Health and Safety policy can be monitored during the daily safety inspection by the safety officer present at site, internal audits and during external audits. In addition to that, it is being advised to the top management to find the awareness of the policy implementation by means of consultation, direct questioning during safety tours and safety committee meetings.

Enhancing the Leadership visit and commitment

The negative indicator of the Burgan Top management's involvement towards the health and safety culture can be improved by means of (I) In order to attain management commitment towards health and safety more visible leadership visits has to be arranged(ii) Leadership training has to be arranged for all the decision makers by using a third party professional leadership trainer (iii) Have a weekly schedule for top managers

site visit and the leadership visit log book has to be updated and the point discussed and the recommendations has to be followed up by the site safety engineer and the (iv) The top management has to consider all the requirements raised by the employees and ensure it has been added while reviewing the policies before the next audit. This strategy is being expected to be implemented in 2 weeks' time.

How the success is to be monitored:

The success of implementation and it can be monitored through the circulated memo, MOM and the follow ups been done in the leadership visit tracking sheet, routine site visits and the log register in weekly basis, also in the internal and external audits, by means of communicating with the office clerk at the rig sites about the leadership visits.

Improvement in the effective PTW system

This project suggest the following proposal of actions to be carried out to fill the gaps in the PTW system, (I) The QHSE trainer should conduct the training has for the crew periodically(ii) The site safety engineer has to ensure that the PTW system has been implemented by the crew while performing the non-routine activities and with the associated JSA, risk project and the pre job safety meeting if required(iii)The existing PTW system and procedure has to be reviewed (iv) The welders has to be strictly instructed by the manager that no hot work will be facilitated in the work site without ant hot work permits(v) The PTW system has to be reviewed in the next audit(v) 2 PTW coordinator should be appointed to monitor the implementation of the PTW system. The implementation of the above strategy in the work site is within a time scale of one week.

How the success is to be monitored:

The success of implementation can be monitored by means of the permit register and the permit auditing system should be in place in weekly basis by the rig site safety professional and in the other hand the success of the implementation of the PTW system

can be monitored through the successful PTW procedure, the PTW system survey, Internal audit and the External Audit.

Improvement in Trainings

The discrepancies or the negative indications with the existing training policy can be converted into positive aspects by implementing the following proposal of actions (I) an interview shall be conducted with the individual employee by the site manager to know where they lack in knowledge or information about the work activity. (ii) Review existing training schedules and responsibilities by the HR manager and HSE Manager (iii) An schedule has to be drafted and implemented by the manager to complete the training matrix by giving the training sessions for the 20% remaining crew (iv) The refresher training has to be conducted by the QHSE trainer in quarterly basis by re-gaining or remembering the safety aspects and (v) all the training records has to be recorded, the training attendance sheet and the training feedback sheets are to be collected from the crew and should be maintained by the site safety engineer to monitor the improvement of the positive safety culture in terms of the training, this proposal of action is been expected to be implemented in 3 months of time scale.

How the success is to be monitored:

The success of above recommendation can be monitored through TIDS- Training identification system, further review of the Training matrix and the other training related documents. Special attention to be paid during the incident/accident investigation to check whether adequate first aid and the rescue training has been provided to the drilling crew to react upon emergency situations.

Training for confined space Rescue with Rescue Tri-Pods

Risk Project

To convert the negative indicators to the positive indicator the following proposal of actions has been advised as a part of the project of the culture, (i) Since Risk project is the core function of planning, it is essential to have suitable and sufficient risk project against each activities performed at the rig site. (ii) The existing risk project technique and the methodology has to be reviewed by the HSE manager and the same shall be revised if necessary (iii) The Hazard identification program has to be initiated at the rig site by the site safety engineer and the identification of the hazards has to be done by the crew who involves in the respective work and the risk has to be assessed with respect to the identified hazards, (iv) In order to have higher level of quality assurance, it

is advisable to take the assistance of an external risk project expert and the action shall be completed with 07 working days. Since the risk project can foresee the possibilities of accident at workplace, a strategic approach is required in terms of risk project, the risk project documents has to be recorded and documented by the site safety engineer and has to be re checked every weekly basis as a part of the monitoring strategy. One month of time scale has been suggested to implement this strategy to enhance the positive safety culture of the organization.

How the success to be monitored:

The success of above proposals with respect to the risk project can be effectively monitored through various occasions which include, during the issuances of the PTW, preparation of JSA and method statement, during the incident investigation, during HAZID and Hazard Hunt exercised, internal audits and the external audits. Review of the risk projects and the workers' involvements in that should be included as the agenda of the program during the internal and the external audits and the subject matter can have reviewed during quarterly Management review meetings and the follow ups of the MOM.

Improvement of HSE Audit system

The organization's growth and performance is being evaluated by means of the audit system, the gap found in the actual HSE audit system described in the HSE plan and the implementation can be rectified by following strategy (I) The quarter wise internal auditing system has to be strictly followed by the safety superintendent and QHSE manager has to monitor the internal audit system and review the audit system in yearly basis for the continual improvement (ii) The external audit has to be conducted (iii)The recommendations of the previous year external audit report has to be added in the for coming audit report and the cumulative follow-ups has to be taken care by the site safety officer and the (iv) The site safety engineer has to document all the audit reports and update the actions against the recommendations in the audit reports on weekly basis in

the corrective register and the points has to be closed with the assistance of the safety department .This strategy is suggested to be implemented in one month of time.

How the success to be monitored:

The success of above proposals with respect to the HSE audits can be effectively monitored through the monitoring tools like the audit schedules, WIP audit report, internal audit report, and external audit report, Corrective active register which contains the status of all the recommendations expressed in the audit reports, audit closure report and the performance reports.

Provision of Personal Protective Equipment's

According to the project and the observation found in the drilling site, the outcome is inviting the proposal of actions to be suggested to implement to enhance the positive safety culture, (i) Ensure the availability of the PPE's and train the crew about the usage of PPE'S. (ii) The personal safety gears has to be procured by the purchase department and the top management has to facilitate the crew with the periodic supply of the appropriate PPEs with respect to the PPE policy. (iii) The PPE issuance register has to be maintained by the site safety engineer and (iv) A periodic checks of the damaged PPE have to monitored by the HSE officer in weekly basis and the provision of the changing the damaged PPEs has to be initiated by the QHSE department, the project suggests the organization to implement this strategy within 3 months of time.

How the success to be monitored:

The success of above proposals with respect to the PPE'S can be effectively monitored through and the monitoring tools like the PPE register, weekly PPE inspection register and the site observations in the safety tour, usage of appropriate PPE's for the respective jobs and minimized negligence of the usage of PPE's by the crew.

Incident and investigation reporting system

The following proposal of actions has been suggested by the project to get rid of the negative indicators associated with the existing Incident and the investigation reporting system of the Burgan drilling company, (I) The reporting of injuries, diseases and the dangerous occurrence regulation 2013(RIDDOR) reporting system has been recommended to enhance the reporting system (ii) the safety engineer should be dedicated in the reporting, documentation, analysis of the cause of the incident and communicate the lesson learnt to the crew, (iii) The near miss reports has to be drafted by the safety officer, it helps to find the cause of the reoccurrence of the incidents and the potential hazards at the site and (iv) The medical treatment register has to be maintained by the Medic at the site and the MTC incident report also has to be recorded and documented, The strategy is suggested to be implemented within 2 months of time period.

How the success to be monitored:

The success of above proposals with respect to the incident and the investigation reporting system can be effectively monitored through the monitoring tools like the Incident and investigation report, investigation methodologies, capture of supporting documents, findings of the immediate cause, underlying cause and the root cause, circulation of the safety alert and the internal/external audits.

Employee Grievance System

The negative indicators being observed with respect to the employee grievance system can be converted into the positive indicators of the health and safety culture by means of following suggested proposal of actions, (I) The top management has to be involved in the employee grievance reporting system, the quick response has to be given by the management and the solutions has to be found within 1 week time frame, implement and it has to be circulated among the crew for pertaining the employer-employee relationship. (ii) The HR department has to involve in the employee grievance analysis

and has to look forward in the advice to top management for review the policy, go ahead with the disciplinary actions with respect to the guilt and (iii) the employed grievance report has to be filled, documented and discussed among the crew by the site safety engineer. The strategy is suggested to be implemented within 1 month of time period.

How the success is to be monitored:

The success of above proposals with respect to the Employee grievance can be effectively monitored through and the monitoring tools like monthly wise the employee grievance register, incident report, violence report, illness report, absence records, first aid records, medical records and the follow ups has to be monitored by the site health and safety professional. It can be monitored through the technique of the management's participation and the consultation.

Improvement in Health surveillance

It is the responsibility of every employer to protect their employees / people from any harmful exposure in workplace. During the primary and secondary data analysis, it was evident that the Burgan organization is lacking its management commitment provision of and implementation of health surveillance programs among the employees. Especially people deal with hazardous materials like asbestos and radioactive materials possibility of acute and chronic health effect is very high and effective measures should be there in place to protect people from such adverse effect.

With immediate effect company medical officer in association with HSE Manager should plan for a system for premedical examination, treatment, training and monitoring of further health condition of the people dealing with hazardous materials at workplace. A schedule should be planned for biological monitoring of the exposed population. People should be made aware of the intention of the health surveillance program before introducing the same. In order to implement the recommendation existing health monitoring arrangements to be verified to check the adequacy of the arrangements in place. Due care should be given to analyze previous exposure occupational illness history

while planning the health surveillance program. The above action shall be completed within 20 working days.

How the success to be monitored:

The success of the above recommendation can be verified through analyzing the KPI Records, occupational illnesses records, first-aid records, medical records, and sickness and absenteeism records. Effectiveness can also be monitored through consultation.

APPENDICES

SAFETY CULTURE QUESTIONNAIRE

Management Commitment - HSE POLICY and Resource

Date Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/all	Yes	No	Remarks
1	Whether the Organization has a written formal HSE Policy?	All	99%	1%	Some workers were unaware
2	Does the HSE Policy comply with the Applicable legal requirements?	Managers	100%		
3	Are the Policy signed by the senior Most officer?	Managers	100%		
4	Are the Policy displayed in all relevant work area?	All	100%		
5	Is the Policy available in local languages like (Hindi, Arabic)?	All	0%	100%	
6	Are the Policy Reviewed Periodically?	Managers	52%	48%	Policy not reviewed Since 2015
7	Does the Policy communicated to you?	All	95%	5%	Some participants opinioned that they don't remember
8	Do you think that existing Policy reflects Management Commitment towards Health safety and Environment?	Managers and supervisors	98%	2%	2% opinioned that management commitment lacking at implementation level
9	Do you think that organizations policy is appropriate to the nature and scale of organizations OHS risk?	Managers and supervisors	94%	6%	Some of the supervisors were not clear with the meaning of the question

	Survey Criteria	Applicable to Managers/ Supervisors/all	Yes	No	Remarks
10	Does the policy reflect the OHS objectives and targets?	Managers and supervisors	95%	5%	Some of the supervisors were not clear with the meaning of the question
11	Whether the Policy is available to interested parties including Subcontractors?	Managers and supervisors	98%	2%	Some managers of the subcontractor were unaware of the Policy

PERMIT WORK SYSTEM

Date Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors /all	Yes	No	Remarks/Surveyors notes
1	Do you follow a PTW system for Hot Work?	All	100%		
2	Des the PTW system comply with applicable legal requirements?	Managers	100%		
3	Do you think that time taken for PTW execution is justifiable?	All	5%	95%	Negative indicator 95% employees they don't support PTW system
4	Does PTW forms available in local languages?	All	100%		Available only in English
5	Have you got PTW coordinator Training?	Supervisors	23%	77%	Negative indicator
6	Is the PTW training available in Local languages or do you have an interpreter during training?	All	7%	93%	

	Survey Criteria	Applicable to Managers/ Supervisors /all	Yes	No	Remarks/Surveyors notes
7	Do you think that the monitoring arrangement is sufficient?	Managers &Supervisors	95%	5%	Only 95% participants replied

Consultation

Date of Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/ All	Yes	No	Remarks/Surveyors notes
1	Have you ever involved in health and safety consultation such as risk Assessment Review?	All	52%	48%	
2	Does your organization have an arrangement in place to take external expert advice on specific HSE matters?	Managers &Supervisors	1%	100%	
3	Have you ever shared your views in terms of workplace controls?	All	10%	90%	
4	Are you involved in pre job TSTI?	All	0%	100%	
5	Does your organization have a system in place for identifying hazards by all involving employees?	All	0%	100%	
6	Are you free to contact your labor inspector?	All	92%	8%	
7	Does your supervisor consult with you when there is a change in work processes?	All	80%	20%	

Communication

Date of Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/ All	Yes	No	Remarks
1	Do you know to whom you have to report your workplace incidents?	All	42%	58%	
2	Do you have access to your senior manager regarding health and safety matter?	All	32%	68%	
3	Does your organization have arrangement in place to inform you're the recent learning point's incidents?	All	10%	90%	
4	Does you accommodation has emergency exit plan and route map?	All	10%	90%	
5	Do you maintain an accident record book?	All	10%	90%	
6	Whether your notice boards contains emergency evacuation and fire procedures	All			
7	Whether your workplace having adequate health and safety posters?	All			
8	Do you know your dep't health and safety targets?	All			
9	Does your supervisor communicates the confined space entry procedure with your before entering into the confined space?	All	100%		

Co operation

Date of Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/all	Yes	No	Remarks
1	Do you think that cooperation between production team and safety dep't is adequate?	All	92%	8%	
2	Do you think that your management cooperate with you if you suggest any safety development program?	All			
3	Do you believe in team work especially for safety matters?	All			
4	Do you have a weekly housekeeping campaign?	All			
5	Do you believe that safety is more important than production	All	92%	8%	

Leadership

Date of survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/all	Yes	No	Remarks
1	Do you involve in weekly safety tour	Managers& Supervisors	92%	8%	
2	Does your immediate supervisor personally involve in Safety tour?	All			

	Survey Criteria	Applicable to Managers/ Supervisors/all	Yes	No	Remarks
3	Is your leaders action is inspirable?	All	95%	5%	
4	Do you know your organizations over all objectives - whether your leaders conveyed that or not?	All	95%	5%	
5	Do you believe that safety is a line management responsibility?	All			
6	Does your departmental heads take ownership for the accidents and incidents	All			
7	Does your dep't have a set target for safety	Supervisor & Manager			
8	Does your senior management insist for internal and external audits timely				

Visitor Management

Date of Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/All	Yes	No	Remarks
1	Do you have system for registering visitors detail	All	□		
2	Do you provide induction training to visitors when they visit your site	All	10%	90%	
3	Do you a have system for visitor security check	All	1%		
4	Do you have a zero tolerance policy against visitors	Managers			
5	Do you have arrangements in place to monitor the movements of the visitor within your workplace	Managers	10%	90%	

Provision of Information instruction training &

Date of Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/All	Yes	No	Remarks
1	Have you received induction training during joining?	All			
2	Do you receive training in your mother tongue?	All	50%	50%	
3	Does your company provide you refresher training?	All	50%	50%	
4	Do you have a provision for training need analysis?	Manager	42%	58%	
5	Does your organization allow hiring of external trainers for specific training?	Manager			
6	Does your organization maintain a system for HSE passport?	All	50%	50%	
7	Do you have TBT program?	All	98%	2%	
8	Do you have DO'S &DON'TS in your workplace?	All	50%	50%	
9	Do you know where the assembly point is?	All	50%	50%	
10	Do you have a system for collecting and interpreting latest changes in legislation?	Managers	92%	8%	

Accident Prevention

Date of Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/All	Yes	No	Remarks
1	Does your organization have an accident prevention policy?	Managers	100%		
2	Does your organization have an arrangement in place to report accidents incident and near misses?	All	100%		
3	Do you think that incident investigation is done to punish the employee?	All	50%	50%	
4	Do you report all even minor incidents at workplace?	All	50%	50%	
5	Do you think that your organization conducting suitable and sufficient risk assessments against each activity?	Manager	91%	9%	
6	Do you think that workplace control measures are adequate in terms of confined space entry and NDT operation?	Manager	93%	7%	
7	Do you follow safe system of work strictly	Manager & Supervisor	90%	10%	

PPE - Legal Compliance

Date Survey:

Auditor Name:

	Survey Criteria	Applicable to Managers/ Supervisors/All	Yes	No	Remarks
1	Does the organization provides Specific PPE to employees with respect to their activity	All			

	Survey Criteria	Applicable to Managers/ Supervisors/All	Yes	No	Remarks
2	Does your company have an arrangement in place to change the PPE if found damage	All	69%	31%	
3	Is adequate first aid provision available within the organization	All	73%	27%	
4	Does your organization conduct air monitoring time to time	All	10%	90%	
5	Does your organization conduct mock drills regularly	All	10%	90%	
6	Does your organization maintain employer liability insurance	Manager	100%		

Auditor Direct Observation

1. Are you a member of policy review committee?
2. What is your latest HSE TARGET?
3. Have you updated your HSE qualification recently?
4. What is your share of participation in system implementation?
5. How often you involve yourself into safety tours?
6. Do you consider Health & Safety more important during conflict management?

Interview questionnaire to the supervisor

1. Do you translate and communicate HSE Policy to you subordinates?
2. Do you conduct tool box talks regularly?
3. Do you train your subordinates on regular basis?
4. Do you believe that through following safe system of work continual improvement can be achieved?
5. Do you believe that your management will not hesitate when you project any safety recommendation?
6. Do you take active participation in safety tours?
7. Do you believe that your workers can be made safe through regular training and practices?
8. Do you represent yourself to the management when there is a health and safety issue?
9. Do you feel that that the resources allocated against safety is adequate?
10. Do you believe that safety cultural development would be possible through training?

BURGAN HSE POLICY

Burgan Company recognizes its responsibilities and is totally committed to the health and safety of its employees and to the protection of the environment.

In the context, Burgan Company will conduct its activities so as to ensure:

- The health and safety of all workers, wherever they may be working.
- The protection of the environment from pollution and damage.
- The prevention of personal injury and property damage to third parties.

Burgan Company expects its employees to make every possible effort to protect their own and fellow workers health and safety and to participate in, and contribute to the establishment and observance of safe working practices and procedures. Whilst at their place of work they will use the equipment provided in a safe and correct manner, obey all practical instruction as issued by their supervisors, and comply with the policies and procedures published and approved by the Company with the aim of protecting the health and safety of all individuals at the work site and the local environment in general.

Burgan Company believes that all incidents can be prevented.

The Company will be guided and influence by the following HSE Values:

- The promotion of Health, Safety Environmental protection is an integral part of our Burgan Company Business Plan.
- Health, Safety and Environmental Protection is a Line Management responsibility. We accept the responsibility for leadership of HSE program, for its effectiveness and improvement, and for providing for the safeguard required to ensure safe, environmentally responsible conditions
- Supervisors are responsible for developing the proper attitudes toward Health, Safety and Environment in themselves, as well as directing those whom they supervise towards this goal.
- All employees are responsible to wholehearted, genuine cooperation with every aspect of the Health, Safety and Environment

RIG CREW TRAINING MATRIX

Rig Crew Training Matrix		Rig No. 133															
NAME	MAN #	POSITION	Rig Site Induction	PTW,LOTO, Confined Space Entry Training	Rigging & Slinging Training	PPE Training	Hands and Fingers Safety	Manual Handling	HAZCOM	HAZ IDENTIFICATION	Fall Protection Training	H2S Training	Basic Fire Fighting Training	First Aid (HSE or Equivalent)	Mechanics Level I	Safety Leadership Training	Defensive Driving
SR #			Once	Once	Once	Once	2 Years	Once	Once	Once	Once	2 years	2 Year	3Years	Once	Once	Once

PPE POLICY

The following is Burgan Company's PPE usage policy:

PPE will be required to be worn as the specific task requires and Burgan Company will provide PPE where necessary. However, if an employee's use of PPE is greater than the minimum allotment shown in the table below, and no evidence of wear and tear is observed, a charge (payroll deduction) shall be made for the additional items provided. PPE displaying evidence of normal wear and tear must be returned (same size as issued) for replacement.

PPE ITEM	Replacement Frequency
Hard Hat	1 per year
Safety Glasses (non-prescription)	6 per year
Safety Glasses (prescription)	1 per year
Coveralls	4 per year
Cloth Gloves	4 pairs per week
Safety Footwear	2 pairs per year

Refer to HSE-012, Personnel Protective Equipment.

5.7 **Management of Change (MOC)**

The Burgan Company MOC procedure provides a systematic method of introducing change into the company in a controlled manner. The process ensures that changes are evaluated, approved and documented prior to implementation. From an HSE perspective, this process will ensure that any potential new hazards resulting from the change(s) are identified and addressed.

(Refer to QM-009, Management of Change, located in the Quality Manual)

5.8 **Risk Assessment**

Risk management is an essential component of every HSE Management System and must be conducted in a systematic format in order to be effective. Performing a risk assessment involves a series of steps as follows:

1. Identification of associated risks/hazards of an operation/task and analysis
2. Assessing the potential risk rating of the hazard/operation
3. Eliminating the risk or controlling the risk(s)

A key element of effect risk management is a systematic approach for identifying and assessing the potential risks of each operation, in order to assist in the decision making process for risk-reduction measures. For each operation that Burgan Company undertakes, all aspects of the activities related to the operation, that have the potential to cause harm to people and/or equipment should be identified. Both routine and non-routine activities must be considered.

Once the risks are identified they must be analyzed to determine whether the risk possess significant risk and/or require management. The acceptability of the risk must be evaluated based upon the Burgan Company Risk Assessment Matrix Card (detailed in HSE 007 Incident Management). The Risk Assessment Matrix is a systematic means of evaluating risk taking into consideration both the severity of impact of potential consecuences and the likelihood of the severe consequences being realized.

Based on the risk assessment, additional control measures may be required to reduce the risk. The general hierarchy to control and/or mitigate risks are:

DOCUMENT NUMBER	REVISION NUMBER	DATE	PAGE NUMBER
HSE-003	3	August 2015	23 of 110

INCIDENT REPORT FORM

LAST NAME:	FIRST NAME:	MID. Initial:	INJURED'S PHONE #:	SSN/SIN/EE#:
PRESENT RESIDENCE ADDRESS:		EMERGENCY CONTACT NAME & PHONE #		

CITY:	STATE/PROVINCE:	ZIP:	COUNTRY:	COUNTY/PARISH	NATIONALITY:
DATE OF BIRTH:	DATE OF HIRE:	MARITAL STATUS:	Yrs. Experience	Time In Current Position:	

THIRD PARTY	EMPLOYERS NAME:	EMPLOYERS PHONE #	3RD PARTY SUPERVISOR

DESCRIPTION OF INCIDENT:
Events leading up to and thorough description of the incident (What, When, Where, Who, How)

IMMEDIATE CORRECTIVE ACTION

DESCRIBE INJURY (E.G. BRUISED ARM, CUT FINGER, ETC., IF ANY):

DESCRIBE IMMEDIATE FIRST AID TREATMENT (IF ANY):

PHYSICIAN AND/OR NAME OF MEDICAL FACILITY (IF APPLICABLE):

WITNESSES (PLEASE PRINT NAME)

	WITNESS NAMES:	EMPLOYER:	ADDRESS:	PHONE:
1)				
2)				
3)				

ACKNOWLEDGEMENT	NAME	SIGNATURE	DATE
Reported By			
Immediate			
Rig Manager			

Rig

QHSE

Operations

General

INCIDENT POTENTIAL MATRIX

CONSEQUENCE				PROBABILITY				
				Measure of Exposure				
Injury to People	Asset Damage	Environ Impact	Rating	A Very Unlikely	B Unlikely	C Possible	D Likely	E Very Likely
First Aid	< $5k	Slight	1				√	
MTO/ RWC	$5k - $50k	Minor	2					
LTI	$50k - $250k	Localized	3					
PPD/ PTD	$250k - 500k	Major	4					
FTL	>$500k	Massive	5					

MATRIX FINDINGS (MARK N/A IF UNRELATED i.e NO ASSETS AFFECTED)

INJURY TO PEOPLE		ASSET DAMAGE		ENVIRONMENTAL IMPACT		INVESTIGATION LEVEL
Actual	Potential	Actual	Potential	Actual	Potential	Based on Potential

MINIMUM INVESTIGATION TOOL (May go to next level at the discretion of Management)

F1006 Supervisors First report of Illness orIncident	F1009 Incident Investigation Report	Taproot Investigation

LEVEL OF INVESTIGATION PARTICIPATION

Rig Management	☐ Field Management	☐ Area Management

Appointed Investigator or Investigation Team Leader:

IADC INCIDENT CLASSIFICATIONS

(1) INCIDENT TYPE (check only ONE):

1	☒ Medical Treatment Only (MTO)	7	☐ First Aid Only (FSA)
2	☐ Restricted Work Case (RWC)	8	☐ First Aid by Physician (FAP)
3	☐ Lost Time Incident (LTI)	9	☐ Job Related Illness (ILL)
4	☐ Fatality (FTL)	10	☐ Third Party (TPA)
5	☐ Information Only (IFO)		
6	☐ Alleged (ALL)		

(2) DATE OF INCIDENT / INJURY:

1 Month: 2 Year:

(3) THIS INCIDENT OCCURRED ON:

1	☒ **Burgan**
2	☐ Abdally
3	☐ Wafra
4	☐ Others, Specify

(4) OCCUPATION (check only ONE):

1	☐ Roustabout / Leasehand	9	☐ Crane Operator
2	☐ Floorman	10	☐ Superintendent / Other Supervisor
3	☐ Motorman	11	☐ Truck Driver
4	☐ Derrickman	12	☐ Rig Helper
5	☒ Driller / Assistant Driller	13	☐ Truck Helper
6	☐ Rig Manager / Toolpush / Asst. TP	14	☐ Welder

(8) OPERATION AT TIME OF INCIDENT (check only ONE: major activity):

1	☐ Tripping in / out	9	☐ BOP installation / maintenance
2	☐ Making a connection	10	☐ Rig repairs / maintenance
3	☐ Routine drilling operations	11	☐ Mud mixing / pumping
4	☐ Running casing	12	☐ Cementing
5	☐ Laying down / picking up tubulars	13	☐ Non-routine ops. (testing etc.)
6	☐ Material handling: Manual	14	☐ Walking
7	☐ Material handling: Crane/Forklift	15	☐ Training
8	☐ Rigging up / down	16	☒ Other:

(9) PRIMARY LOCATION AT TIME OF INCIDENT (check only ONE):

1	☐ Rig floor	10	☐ SCR electrical room
2	☐ Pipe rack	11	☐ Stairs / Ladder
3	☐ Catwalk / V-door	12	☐ Rig lease / Rig decks (general)
4	☐ Mast / Derrick	13	☐ Change/Parts/Dog house etc.
5	☐ B.O.P.'s	14	☐ Living/Camp areas/Quarters
6	☐ Mud pump / Mixing room	15	☐ Cellar / Substructure
7	☐ Shale shaker	16	☐ Truck
8	☐ Mud Pits / Tanks	17	☒ Other:
9	☐ Motor house / Machinery room		

(10) SHIFT WORKED AT TIME OF INCIDENT (check only ONE):

1 ☒ 12 hour 3 ☐ Double tour

7	☐ Electrician	15	☐ Other:
8	☐ Mechanic		

(5) PART OF BODY INJURED (check only ONE: major injury):

1	☐ Eyes	7	☐ Fingers
2	☐ Head / Neck	8	☐ Legs
3	☐ Back	9	☒ Feet / Ankles
4	☐ Trunk / Torso	10	☐ Toes
5	☐ Arms		
6	☐ Hands / Wrist		

(6) INCIDENT TYPE (check only ONE: major injury):

1	☒ Struck by	9	☐ Flame/Heat/Steam (contact exp)
2	☐ Struck against	10	☐ Debris
3	☐ Caught between / in	11	☐ Cut
4	☐ Slip / Fall: same level	12	☐ Exposure to Weather
5	☐ Slip / Fall: different level	13	☐ Jump
6	☐ Strain / Overexertion	14	☐ Vehicle
7	☐ Contact with Chemicals / Fluids	15	☐ Exposure to Gas
8	☐ Electrical Shock	16	☐ Other:

(7) EQUIPMENT TYPE (check only ONE: major item):

1	☐ Tongs	11	☐ Hand tools: Power
2	☐ Elevators	12	☐ Motors / Pumps / Machinery
3	☐ Slips	13	☐ Vehicles / Transportation
4	☐ Spinning chain	14	☐ Kelly Bushing
5	☐ Iron Roughneck / Pipe Spinner	15	☐ Stairs / Ladders / Decks
6	☐ Rotary Table	16	☐ B.O.P.'s
7	☐ Pipes / Collars / Tubulars	17	☒ Material
8	☐ Drawworks / Catheads	18	☐ Pressure hoses / Lines
9	☐ Ropes / Cables / Chains / Slings	19	☐ Crane
10	☐ Hand tools: Manual	20	☐ Other:

2	☐ 8 hour		

(11) # OF DRILL CREW / CRANE CREW MEMBERS (check only ONE):

1	☐ Four	4	☐ Seven
2	☐ Five	5	☐ Eight
3	☐ Six	6	☒ Nine or more

(12) EXPERIENCE OF INJURED WORKER (check only ONE):

1	☐ Less than 3 months	5	☐ 6 - 10 years
2	☐ Between 3 - 6 months	6	☐ 11 - 15 years
3	☐ Between 6 - 12 months	7	☐ 16 - 20 years
4	☐ 1 -5 years	8	☐ More than 20 years

(13) # OF HOURS WORKED WHEN INJURED (check only ONE):

1	☐ 0 - 2 hours	5	☐ 8 - 10 hours
2	☐ 2 - 4 hours	6	☐ 10 - 12 hours
3	☐ 4 - 6 hours	7	☐ Greater than 12 hours
4	☐ 6 - 8 hours		

(14) # OF DAYS WORKED INTO HITCH WHEN INJURED (check only ONE):

1	☐ First day	10	☐ Tenth day
2	☐ Second day	11	☐ Eleventh day
3	☐ Third day	12	☐ Twelfth day
4	☐ Fourth day	13	☐ Thirteenth day
5	☐ Fifth day	14	☐ Fourteenth day
6	☒ Sixth day	15	☐ Between 2 - 3 weeks
7	☐ Seventh day	16	☐ Between 3 - 4 weeks
8	☐ Eighth day	17	☐ Between 4 - 5 weeks
9	☐ Ninth day	18	☐ Over 5 weeks

This report needs to be completed within 24 hours of the incident and needs to be sent to the QHSE Department. Refer Incident Reporting Flowchart for Reporting Guidelines

Job Risk Analysis

Sample 1 :

HSE References	SELECTED ORGANISATION JOB RISK PROJECT	Rig JRA Number	How to use the form:
101.02	Casing Operations	KHD 106	1. Crew performing task review ALL generic JRA considerations.
101.04	Power Tongs		2. Review previous JRA update(s) for useful information, which will help THIS task.
101.09	Elevators		3. Create new JRA update with generic from and ALL considerations for this task.
			4. Carry out task per plan. If any conditions change, STOP and RE-ASSESS!
			5. Keep 2 copies of JRA update for future reference. Update generic JRA as needed.

Location/Rig:	Rig Floor / Selected Organisation	Crew:	Drill	Original Issue Date:	23-03-09
				Date Last Revised:	16-08-12
Activity:	Casing Operation	Dept Head Approval:		Last Revised By:	

Step	Task	Hazard	L	S	R	Risk Reduction Measure	Residual Risk L	Residual Risk S	Residual Risk R	Acceptable? Tolerable? Unacceptable?
1	Hold pre job meeting and review JRA	Miscommunications. Personnel not attending the meeting unaware of the hazards.	2	3	6	Ensure everyone attends the meeting and fully understand the task. ASK QUESTIONS IF UN SURE.	1	3	3	Tolerable
2	Obtain required initial **Cold Work Permit**	Permits being signed without visual inspection of work site.	2	3	6	Ensure that issuing authorities on all Permits and Certificates visually inspect the work site as specified on permit and certificate.	1	3	3	Tolerable
3	Tail Shoe Joint in to 'V' Door.	Equipment failure, personnel struck by joint.	2	3	6	All personnel clear the 'V' Door, use tag lines, man signaling the crane to use banksmans vest.	1	3	3	Tolerable
4	Attach Pick-up Elevators and Air Hoist	Pinch points, elevators not latched.	2	3	6	Continualy check hand positioning when latching elevators. Inspect all equipment before starting, during and after running casing.	1	3	3	Tolerable

5	Pick-up joint, run in to rotary and set slips.	Derrickman imbalance and**fall from height,** Tailing rope breaks joint swings in to drill floor striking personnel. Elevators not latched correctly. Pinch points.	3 of			Fall protection (Arrestor) in place. Do not stand between joint being picked up and 3 9 the rotary table. Check condition tailing rope. Check hand position and posture when setting slips.	1	3	3	Tolerable
6	Install Safety Clamp.	Pinch points, joint slips in slips.		3	6	Use handles when handling the safety clamp, keep feet and other parts of the 2 body out from under the clamp. Do not unlatch the elevators untill safety clamp has been secured.	1	3	3	Tolerable
7	Latch Pick-up Elevators on to next joint.	Pinch points, elevators not latched.	2	3	6	Continually check hand positioning when latching elevators. Inspect all equipment before starting, during and after running casing.	1	3	3	Tolerable
8	Pick-up and suspend above joint in rotary table.	Equipment failure, pinch points between tool joints.	2	3	6	Lower joint as close to tool joint as is practical. Keep hands away from tool joint.	1	3	3	Tolerable
9	Bakerlock and make-up tool joint. // Secure stab master to the joint	Equipment failure, pinch points; tool joints and power tongs.	3	3	9	Keep hands away from tool joint. Keep hands away from jaws of power tongs, only competent personnel to operate the power tongs. If power tongs are set down, turn power off and bleed any residue power.	1	3	3	Tolerable
10	Remove safety clamp.	Pinch points, joint slips in slips.		3	6	Use handles when handling the safety clamp, keep feet and other parts of the 2 body out from under the clamp. Do not unlatch the elevators untill safety clamp has been secured.	1	3	3	Tolerable
11	**Run in hole and set slips**	Derrickman imbalance and**fall from height,** Person injured from dropped object, pinch points, strain injuries. Man falling from stabing board	3	3	9	Fall protection (Arrestor) in place. Driller to maintain communication with stabber, man on stabing board to use safety harness and inertia reel. Check hand position and posture when setting slips.	1	3	3	Tolerable
12	Install Safety Clamp.	Pinch points, joint slips in slips.		3	6	Use handles when handling the safety clamp, keep feet and other parts of the 2 body out from under the clamp. Do not unlatch the elevators untill safety clamp has been secured.	1	3	3	Tolerable

JRA Number	Job Risk Project (JRA)	Work Permit Type/No.	0035467
		Coshh/Hazcom No.	
KHD 106	Job Planning Outline	Isolation Certificate #	
		Entry Certificate #	

TASK EQUIPMENT

No	Equipment Name/Type	Cerification Confirmed?	Who Inspects?
1	4 x 10' x 5/8" slings	Yes	Asst. Driller
2	Correct size elevators	Yes	Asst. Driller
3	4 x 3T Bolt type shackles with safety pins.	Yes	Asst. Driller
4	Swivel of adequate size.	Yes	Asst. Driller
5	Rope of adequate size for tailing casing.	Yes	Asst. Driller
6	Safety Harness and inertia reel	No	Asst. Driller
7	Power tongs	Yes	Asst. Driller

TASK PARTICIPANTS

No	Name (Confidential)	Position	Task Performed before?
1	Mr. A	Tool Pusher	Yes
2	Mr. B	Asst. Driller	Yes
3	Mr. C	Roustabout	Yes
4	Mr. D	Floorman 1	No
5	Mr. E	Floorman 2	Yes
6	Mr. F	Floorman 3	Yes

TASK PROCEDURE

Step	Task Detail	Who Performs?	Who Supervises?
1	Hold pre job meeting and review JRA	Tool Pusher	Safety Officer
2	Obtain required initial **Cold Work Permit**	Asst. Driller	Tool Pusher
3	Tail Shoe Joint in to 'V' Door.	Roustabout	Asst. Driller

4	Attach Pick-up Elevators and Air Hoist	Floorman 1	Asst. Driller
5	Pick-up joint, run in to rotary and set slips.	Floorman 2	Asst. Driller
6	Install Safety Clamp.	Floorman 3	Asst. Driller
7	Latch Pick-up Elevators on to next joint.	Floorman 2	Asst. Driller
8	Pick-up and suspend above joint in rotary table.	Floorman 1	Asst. Driller
9	Bakerlock and make-up tool joint. // Secure stab master to the joint	Floorman 2 & 3	Asst. Driller
10	Remove safety clamp.	Floorman 3	Asst. Driller
11	**Run in hole and set slips**	Floorman 2 & 3	Asst. Driller
12	Install Safety Clamp.	Floorman 3	Asst. Driller
Environmental Precautions			
Step	**Task Detail**	**Who Performs?**	**Who Supervises?**

Sample 2

HSE References	SELECTED ORGANISATION JOB RISK PROJECT	Rig JRA Number	How to use the form:
100.04	Respiratory Protection	KHD 250	1. Crew performing task review ALL generic JRA considerations.
100.05	Eye Protection		2. Review previous JRA update(s) for useful information, which will help THIS task.
105.05	Hazardous Material Handling		3. Create new JRA update with generic from and ALL considerations for this task.
			4. Carry out task per plan. If any conditions change, STOP and RE-ASSESS!
			5. Keep 2 copies of JRA update for future reference. Update generic JRA as needed.

L - LIKELIHOOD	
CATEGORY	DEFINITION
LOW (1)	Remote
MED (2)	Possible
HIGH (3)	Probable

S - SEVERITY			
CATEGORY	DEFINITIONS		
LOW (1)	No Injury	No Damage	No Pollution
MED (2)	First Aid Injury	Minor Damage	Minor Pollution
HIGH (3)	Lost Time Injury	Major Damage	Major Pollution

IS THERE A SAFER WAY TO COMPLETE THE JOB? ARE THERE ALTERNATIVES WITH LESS RISK?

R - Rating			
H	3	6	9
M	2	4	6
L	1	2	3
	L	M	H

LIKELIHOOD

RESULT	
	Unacceptable
	Tolerable
	Acceptable
JRA Policy Reference	
HSE 100.20	

Location/Rig:	Selected Company	Crew:	Drill	Original Issue Date:	14-10-07
				Date Last Revised:	12-08-12
Activity:	Mix Dry Caustic Soda Dowell Mixing Tank	Dept Head Approval:	ToolPusher	Last Revised By:	

Step	Task	Hazard	L	S	R	Risk Reduction Measure	Residual Risk L	S	R	Acceptable? Tolerable? Unacceptable?
1	Prepare caustic cans to dowell mixing tanks	Trips on ladders. Burns due to damage cans.	2	3	6	Extra help in transporting caustic cans. Full PPE must be used.	1	3	3	Tolerable
2	Taking up cans to top of mixing tanks	Falls. Dropped objects.	2	3	6	Use rope to pick up cans. Use extra help.	1	3	3	Tolerable
3	Pouring caustic to mix hooper.	Hand burns. Pinch points when opening cans. Spills on mixing area.	2	3	6	Rubber gloves, apron, face shield to be worn. Water hose ready on area. Portable eye wash on mixing area.	1	3	3	Tolerable
4	Disposal of empty cans back to container.	Skin burns due to caustic dust in	2	3	6	Each empty container must be put into empty can and resealed before taking	1	3	3	Tolerable

		clothing.				back into container.					
5	House keeping after job.	body injury due to trip hazards caused by poor housekeeping.	2	3	6	Any mixing accessories must be ready before mixing. In absence of emergency shower, water hose must be in place. Extra care in handling containers.	1	3	3	Tolerable

JRA Number	**Job Risk Project (JRA)**	**Work Permit Type/No.**	**00038974**
		Coshh/Hazcom No.	
KHD 250	**Job Planning Outline**	**Isolation Certificate #**	
		Entry Certificate #	

TASK EQUIPMENT

No	Equipment Name/Type	Cerification Confirmed?	Who Inspects?
1.	Drum Lifter	Yes	Derrickman
2.	Drums	Yes	Derrickman
3.	Bags	Yes	Derrickman

TASK PARTICIPANTS

No	Name (Confidential)	Position	Task Performed before?
1	Mr. A	Roustabout 1	Yes
2	Mr. B	Roustabout 2	No
3	Mr. C	Roustabout 3	Yes
4	Mr. D	Derrickman	Yes
5	Mr. E	Mud Engineer	Yes

TASK PROCEDURE

Step	Task Detail	Who Performs?	Who Supervises?
1	Prepare caustic cans to dowell mixing tanks	Roustabout 1	Derrickman
2	Taking up cans to top of mixing tanks	Roustabout 2	Derrickman
3	Pouring caustic to mix hooper.	Roustabout 3	Mud Engineer
4	Disposal of empty cans back to container.	Roustabout 2	Derrickman
5	House keeping after job.	Roustabout 1	Derrickman

Environmental Precautions

Step	Task Detail	Who Performs?	Who Supervises?
6	Spill of Chemical from the drum / bag	Roustabout 2	Derrickman

Sample 3:

HSE References	SELECTED ORGANISATION JOB RISK PROJECT	Rig JRA Number	How to use the form:
101.03	Transferring loads with cranes	KHD138	1. Crew performing task review ALL generic JRA considerations.
105.04	Manual lifting ops		2. Review previous JRA update(s) for useful information, which will help THIS task.
105.05	Hazardous materials		3. Create new JRA update with generic from and ALL considerations for this task.
			4. Carry out task per plan. If any conditions change, STOP and RE-ASSESS!
			5. Keep 2 copies of JRA update for future reference. Update generic JRA as needed.

L - LIKELIHOOD	
CATEGORY	DEFINITION
LOW (1)	Remote
MED (2)	Possible
HIGH (3)	Probable

S - SEVERITY			
CATEGORY	DEFINITIONS		
LOW (1)	No Injury	No Damage	No Pollution
MED (2)	First Aid Injury	Minor Damage	Minor Pollution
HIGH (3)	Lost Time Injury	Major Damage	Major Pollution

IS THERE A SAFER WAY TO COMPLETE THE JOB? ARE THERE ALTERNATIVES WITH LESS RISK?

R - Rating			
H	3	6	9
M	2	4	6
L	1	2	3
	L	M	H

LIKELIHOOD

RESULT	
	Unacceptable
	Tolerable
	Acceptable
JRA Policy Reference	
HSE 100.20	

Location/Rig:	Rig Floor / Selected Organisation	Crew:	Drill	Original Issue Date:	10-06-07
				Date Last Revised:	19-08-12
Activity:	Radioactive Source Use	Dept Head Approval:		Last Revised By:	

Step	Task	Hazard	L	S	R	Risk Reduction Measure	Residual Risk L	Residual Risk S	Residual Risk R	Acceptable? Tolerable? Unacceptable?
1	Clear set down area	Trip hazards. Back injuries. Pinch points	2	2	4	Correct manual handling. Good housekeeping techniques.	1	2	2	Acceptable
2	Unload radiocative source from truck to rig.	Dropped objects. Exposure	2	3	6	Inspect all lifting equipment. Monitor	1	3	3	Tolerable
3	Storage of radioactive material before operation commences	**Exposure**	2	3	6	Agree safe storage area away from work areas. Monitor regularly.	1	3	3	Tolerable

4	Crane to lift / position source container on catwalk	Equipment failure.	2	3	6	Inspect all lifting equiment. Banksman (green vest). Clear area.	1	3	3	Tolerable
5	Crane to lift storage cabin containing the radioactive source to rig floor	**Exposure**. Dropped object.	2	3	6	Minimum personnel to be in area. Service co. to be on hand. PA announcement. Check equipment	1	3	3	Tolerable
6	Prepare tools for load source. Loading source .	**Exposure.** Pinch points with tool. Lifting injuries.	2	3	6	Trained personnel. Constant monitoring of area for radiation. Correct manual handling. Careful hand placement. Remove personnel not involved from rig floor. PA announcement. Same when finished.	1	3	3	Tolerable
7	Lower tool through rotary table and RIH	**Exposure** and pinch points	2	3	6	As above for radiation. Careful hand and foot placement. Driller has clear view.	1	3	3	Tolerable
8	Remove radio active source contain off rig floor	Back strain. Dropping on to feet.	2	3	6	Get assistance. Correct hand and feet placement.	1	3	3	Tolerable

JRA Number	Job Risk Project (JRA)	Work Permit Type/No.	00037459
		Coshh/Hazcom No.	
KHD138	Job Planning Outline	Isolation Certificate #	
		Entry Certificate #	

TASK EQUIPMENT

No	Equipment Name/Type	Cerification Confirmed?	Who Inspects?
1	Radioactive source	Yes	Service Co.
2	MWD tool	Yes	Service Co.
3	Crane	Yes	Crane Op
4	Slings and shackles	Yes	Deck crew

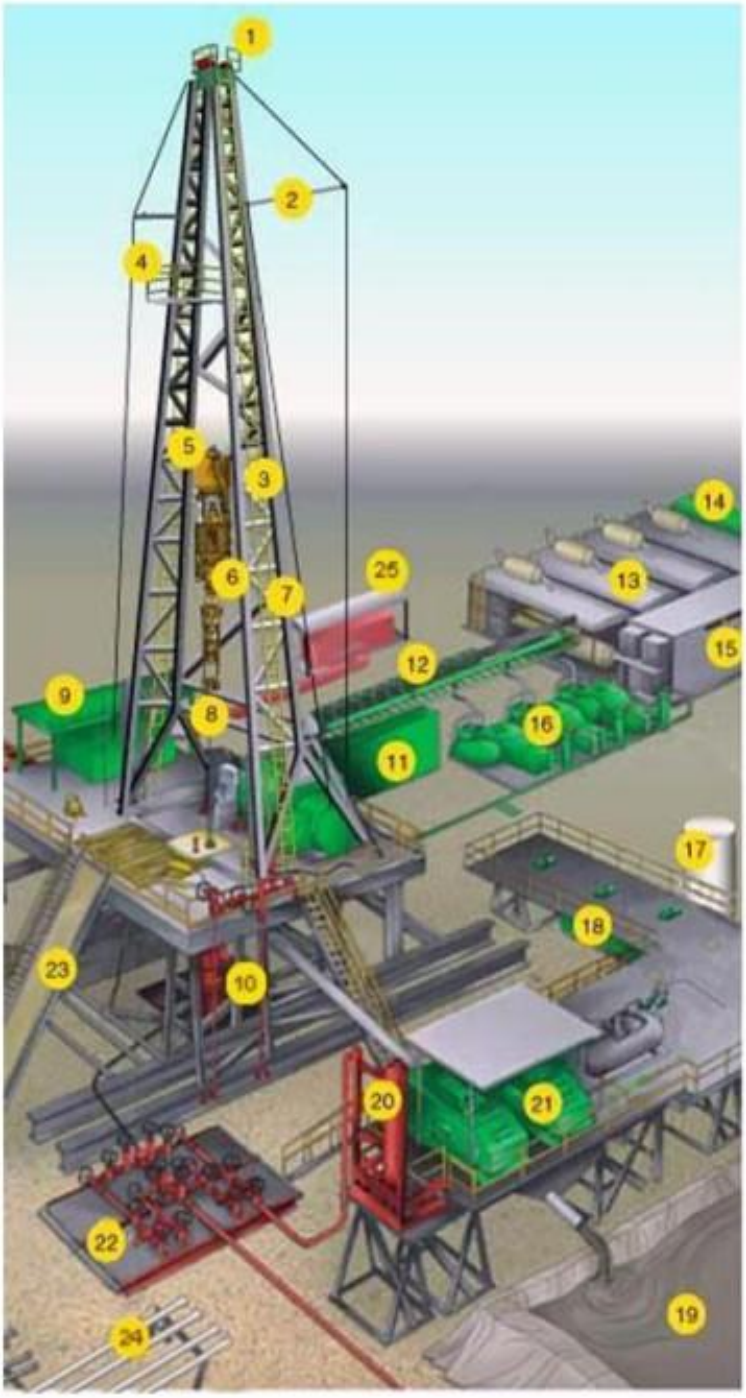
TASK PARTICIPANTS

No	Name (Confidentiality)	Position	Task Performed before?
1	Mr. A	Tool Pusher	Yes
2	Mr. B	Operator 1	No
3	Mr. C	Operator 2	Yes
4	Mr. D	Operator 3	Yes
5	Mr. E	Crane Operator	Yes
6	Mr. F	Safety Officer	Yes
7	Mr. G	Radiation Safety Officer	Yes

TASK PROCEDURE			
Step	**Task Detail**	**Who Performs?**	**Who Supervises?**
1	Safety Meeting JRA - TOFS	Tool Pusher	Safety Officer
2	Clear set down area	Operator 1	Radiation Safety Officer
3	Unload radioactive source from Truck to rig	Operator 2	Radiation Safety Officer
4	Safe storage of radioactive material before operation	Operator 3	Radiation Safety Officer
5	Crane to lift / position source container on catwalk	Crane Operator	Radiation Safety Officer
6	Crane to lift cabin containing the radioactive source	Crane Operator	Radiation Safety Officer
7	Prepare tools for loading source	Operator 2	Radiation Safety Officer
8	Lower tool through rotary table and RIH	Operator 3	Radiation Safety Officer
9	Remove radioactive container off rig floor	Operator 1	Radiation Safety Officer
Environmental Precautions			
Step	**Task Detail**	**Who Performs?**	**Who Supervises?**

RIG COMPONENTS

1- Crown Block and Water Table
2- Cat line Boom and Hoist Line
3- Drilling Line
4- Monkey board
5- Traveling Block
6- Top Drive
7- Mast
8- Drill Pipe
9- Doghouse
10- Blowout Preventer
11- Water Tank
12- Electric Cable Tray
13- Engine Generator Sets
14- Fuel Tank
15- Electrical Control House
16- Mud Pumps
17- Bulk Mud Component Tanks
18-Mud Tanks (Pits)
19- Reserve Pit
20- Mud-Gas Separator
21- Shale Shakers
22- Choke Manifold
23- Pipe Ramp
24- Pipe Racks
25- Accumulator



Source:http://www.osha.gov/SLTC/etools/oilandgas/illustrated_glossary.html

Conclusions

- The selected company, proved highly suitable for this assignment with an identifiable management system which permitted a sufficiently disparate legal environment to be determined.
- Review of the management system was successfully performed
- Also, the hazards present in the Company have been identified and prioritised for action to improve control.

Review of the Management System

Following the review of the Health and Management system the following conclusions were reached:

- The Health and Safety policy is a clear and easily understood document which sets The objectives and direction for the Health and Safety Management of the site.
- The Company has a very clear and well defined and organized Health and Safety Management system.
- There is no provision in the annual review process to assess employees health and safety performance
- One safety officer is been assigned to two or three rigs which gives him less time to close out weekly inspections on all rigs.
- The planning and implementation of the Health and Safety management system is very comprehensive and effective.
- The recording and measurement of both active and reactive performance is undertaken in a very efficient way, with the results being available to the whole company
- Rig Site to submit monthly KPI, HSE and Waste report to Head office for verification and providing documented system for monitoring their internal objectives
- The internal Audits are of a very high standard.

The ultimate goal of this assignment is as mentioned in the introduction part, the systematic analysis of the effectiveness and efficiency review on the HSE management system performance of Burgan Company's drilling rig 133 situated at H-231 in Kuwait to provide justification, The business case of this project states by following the :

(i)The policy review

(ii) Improvement in leadership commitment

(iii) Enhancement of the PTW system

(iv) The PPE management and the damaged gears replacements

(v) Implementation of the proper scheduled auditing system

(vi) Implementation strategy for the proper training matrix and the required training on right way.

(vii) Improvements in the incident and the investigation reports,

(viii) Improvement in the risk project and

(ix) Improvement in the employee grievance system etc.

Also suggested that the organization has manifested a positive approach towards BS OHSAS 18001:2007 a standard model and to comply by its requirements in common and comply with the regulations like health and safety at work act 1974, KEPA regulations and Management of Health and Safety at Work regulations 1999. Hope the recommendations will help in the management will implement the strategies to shape the organization's health and safety culture with perfection, and I thank the Burgan

management for giving the kind opportunity to do the project the Health and safety culture in their concern.

In conclusion, the oil is important in our life and to our nation growth. The idea of this project is to serve all oil field employees and the entry level employee to get introduced to the importance of oil and to have an over view of the big picture of the oil industry.

I hope this project meets the need of readers, and add valuable information to readers knowledge.

In closing of this project, I am thankful for all the support and encouragement that I received to achieve the completion of this project.

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7)http://www.riskprojectservices.co.uk/HazCom/Hydrogen%20Sulphide.pdf

8) The U.S. National Institutes of Health at its Medline Plus website

9) OSHA standards

10)http://www.kuwaitlaborlaw.com/wp-content/uploads/2012/01/Kuwait-Labor-Law-2010-Detailed.pdf.

11)NFPA standards

12)Burgan Company Health and safety management system

13)Burgan company Brochure

14)Appendix- B4 contractual agreement from the client

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