WIRE LINE OPERATIONS

Prepared By:

COMMITTEE ON WIRE LINE OPERATIONS

OIL INDUSTRY SAFETY DIRECTORATE
Government of India
Ministry of Petroleum & Natural Gas

8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)
Website: www.oisd.gov.in
Tele: 0120-2593800, Fax: 0120-2593802
Preamble

Indian petroleum industry is the energy lifeline of the nation and its continuous performance is essential for sovereignty and prosperity of the country. As the industry essentially deals with inherently inflammable substances throughout its value chain – upstream, midstream and downstream – Safety is of paramount importance to this industry as only safe performance at all times can ensure optimum ROI of these national assets and resources including sustainability.

While statutory organizations were in place all along to oversee safety aspects of Indian petroleum industry, Oil Industry Safety Directorate (OISD) was set up in 1986 Ministry of Petroleum and Natural Gas, Government of India as a knowledge centre for formulation of constantly updated world-scale standards for design, layout and operation of various equipment, facility and activities involved in this industry. Moreover, OISD was also given responsibility of monitoring implementation status of these standards through safety audits.

In more than 25 years of its existence, OISD has developed a rigorous, multi-layer, iterative and participative process of development of standards – starting with research by in-house experts and iterating through seeking & validating inputs from all stake-holders – operators, designers, national level knowledge authorities and public at large – with a feedback loop of constant updation based on ground level experience obtained through audits, incident analysis and environment scanning.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry culminating in a safer environment in the industry. OISD – except in the Upstream Petroleum Sector – is still a regulatory (and not a statutory) body but that has not affected implementation of the OISD standards. It also goes to prove the old adage that self-regulation is the best regulation. The quality and relevance of OISD standards had been further endorsed by their adoption in various statutory rules of the land.

Petroleum industry in India is significantly globalized at present in terms of technology content requiring its operation to keep pace with the relevant world scale standards & practices. This matches the OISD philosophy of continuous improvement keeping pace with the global developments in its target environment. To this end, OISD keeps track of changes through participation as member in large number of International and national level Knowledge Organizations – both in the field of standard development and implementation & monitoring in addition to updation of internal knowledge base through continuous research and application surveillance, thereby ensuring that this OISD Standard, along with all other extant ones, remains relevant, updated and effective on a real time basis in the applicable areas.

Together we strive to achieve NIL incidents in the entire Hydrocarbon Value Chain. This, besides other issues, calls for total engagement from all levels of the stake holder organizations, which we, at OISD, fervently look forward to.

Jai Hind!!!

Executive Director

Oil Industry Safety Directorate
FOREWORD

This standard has been compiled to give information to all the users about safety precautions to be observed while carrying out various wireline jobs. This standard should be used as a guide for safe wireline operations.

The standard also deals with the wireline job specific safety precautions which will help to reduce chances of accident while executing such jobs. With the advancement in well completion technology, wireline operation is also becoming a complicated activity.

In the absence of concrete safe operation and maintenance procedures in wireline operation, a comprehensive document on this subject matter is the need of the hour. Accordingly, OISD formed a functional committee to make this document (OISD standard-185 ) on safe practices in “Wireline operations”. This document is based on the knowledge & experience of industry members and information on national & international recommended practices. This document is to be used as a reference only and not as a replacement of existing recommended and accepted practices and codes available on the subject. The contents of this document, when followed, will go a long way to improve safety and reduce accidents in Oil & Gas industry. Suggestions for from the users of this standard shall highly be appreciated, to improve the document further.Suggestions for improvement to this standard should be addressed to:

The Coordinator,
Committee on “ Wireline operations “
OIL INDUSTRY SAFETY DIRECTORATE
8th Floor, OIDB Bhavan, Plot No. 2, Sector – 73, Noida – 201301 (U.P.)
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These documents are intended only to supplement and not to replace the statutory requirements.
<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
<th>Position in Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shri D. Kumar</td>
<td>ONGC</td>
<td>Leader</td>
</tr>
<tr>
<td>2. Shri B. Das</td>
<td>OIL</td>
<td>Member</td>
</tr>
<tr>
<td>3. Shri G.K. Prabhu</td>
<td>ONGC</td>
<td>Member</td>
</tr>
<tr>
<td>4. Shri V.M. Ghildyal</td>
<td>ONGC</td>
<td>Member</td>
</tr>
<tr>
<td>5. Shri P. Saikia</td>
<td>OIL</td>
<td>Member</td>
</tr>
<tr>
<td>6. Shri A.K. Mathur</td>
<td>ONGC</td>
<td>Member</td>
</tr>
<tr>
<td>7. Shri Tarjit Singh</td>
<td>OISD</td>
<td>Member - Coordinator</td>
</tr>
</tbody>
</table>

COMMITTEE ON WIRE LINE OPERATIONS
## CONTENTS

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Description</th>
<th>Page no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Scope</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Description of Wireline Equipment /Tools</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3.1 Surface Equipment</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3.2 Wireline tools</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>Recommended safe Handling and Maintenance practices for wireline</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>equipment</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Different types of wireline operations</td>
<td>15</td>
</tr>
<tr>
<td>6.</td>
<td>Recommended safe procedures and practices for operations</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>6.1 Safety Consideration</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>6.2 Recommended onshore operational Procedure</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>6.3 Recommended Offshore operational Procedure</td>
<td>24</td>
</tr>
<tr>
<td>7.</td>
<td>Job specific safe practices</td>
<td>26</td>
</tr>
<tr>
<td>8.</td>
<td>References</td>
<td>30</td>
</tr>
<tr>
<td>9.</td>
<td>Wireline operation Checklist</td>
<td>31</td>
</tr>
</tbody>
</table>
WIRE LINE OPERATIONS

1.0 INTRODUCTION:

Wireline operations are in practice since the inception of oil & gas production. The surface equipment and related tools for wireline operations have also developed along with the advancements in well completions & work over operations. Wireline is used for several purposes like hole probing, paraffin scrapping, to set, retrieve and manipulate chokes, Sliding-sleeves/ Sliding side door, Standing valves, Side pocket mandrel, Safety and Gas lift valves.

With the advancement of oil production technology, wireline operations also grew in complexity. The wireline operations now can be carried out in deeper & corrosive wells, deviated holes and deep- water offshore wells.

With varied requirement of wireline operations the mobility aspect of wireline equipment has become essential. Trucks with wireline winches, skid mounted equipment are nowadays used for wireline works. For onland operations truck mounted winches are extensively used. For specific locations such as offshore field & desert operations specially designed skids or carriers are used to transport the wireline winches for wireline operations.

As wireline operations are becoming an integral part of well completions & work over operations, the safe practices followed will help to reduce chances of accidents in oil industry while carrying out wireline operation.

2.0 SCOPE:

This standard covers the safe practices to be followed in wireline (Piano & Stranded wire ) operations in on-land and off shore oil & gas production activities. It also covers the recommended maintenance practices of wireline equipment like winches, tools including handling tools and BOP etc.

The standard specifies the job specific safe practices in wireline operations. It also specifies the frequency of periodic checks, maintenance schedules, rejection & acceptance criteria for wireline, hydraulic testing of the equipment, where-ever applicable, used in wireline operations.

3.0 DESCRIPTION OF EQUIPMENT AND TOOLS

3.1 SURFACE EQUIPMENT

The surface equipment required to perform wireline operations depends largely on the well pressure and tubing size. The following list corresponds to the various surface equipment required to carry out the wireline operation.

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3.1.1 Wireline
Solid or Stranded wire is used for Wireline operations. The common diameter sizes of wire lines in use are 0.066”, 0.072”, 0.082”, 0.092”, 0.105” and 0.108”. Larger diameter wires such as 0.125 inch are being used to some degree in wells with tubing strings larger than 2.5 inch ID. Wire lines are available from the mills in one piece in standard lengths of 10,000, 15,000 and 20,000 feet. The most popular material, for normal service, because of its high ultimate tensile strength, good ductility and relatively low cost improved plow steel is used. For sour service alloyed stainless steel is used because of its resistance to hydrogen embrittlement.
Cold drawn improved plow steel measuring line has an ultimate tensile strength of approximately 230,000 to 240,000 psi. API specification 9A contains a section on well measuring wire specifications.
Stranded line is commonly used to replace solid line when line size is larger than 0.108 inch and added strength is required. This line is available in 1/8”, 5/32” and 3/16 inch sizes. Grease injection head is required when stranded line is used.

3.1.2 Measuring device:
A special reel for solid wireline used to take depth measurement in a well. A calibrated wheel, roller assembly and counter, measures the footage of wireline as it is lowered into the well. It is also used to measure the footage of wireline as it is pulled out from the well.

3.1.3 Weight indicators:
An instrument that shows the weight suspended from wireline or hook. In a heavy duty wireline operations when it is necessary to load the wireline to its maximum safe load the use of some type of weight indicating device is necessary. Various types commonly used are Mechanical, Hydraulic and Electronic.

3.1.4 Reel systems (Winch)
A circular drum and assorted mechanical equipment used to spool wireline. Present day reels have provision for different types of power source. On the larger reels where slow or constant speeds are desired, transmission or hydraulic brakes are used to lower the tool(s) into the well. Other necessary components on the reel assembly are reel drum brake, clutch for disconnecting from the power source, power source start and stop controls and speed controls where applicable. When a wide range of operating speeds is required, multi-speed mechanical transmissions are sometimes used.
On most current offshore wire-line jobs, double drum units (two reels) are used. One reel is for routine wire-line work, and has approximately 20,000 feet of 0.082-inch diameter solid line. On the other reel is approximately 20,000 feet of 3/16 inch stranded line which is used for

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heavy pulling, such as swabbing or fishing operations. The reels and hydraulic controls are mounted on a separate skid from the power unit.

3.1.5 Floor blocks and pulleys

When the wire-line is routed from the reel to the stuffing-box sheave, conditions may require changing the direction of the line several times. These are an arrangement for routing or directing the wireline into the well.

3.1.6 Wireline stuffing box

This is used when it is necessary to perform work on a well under pressure. The stuffing box consists of a packing chamber with an external adjustable nut. In most cases the stuffing box provides a swivel bracket and sheave which guides the measuring line down into the packing gland. Heavier stuffing boxes can be equipped with a bleed-off assembly and a place for installing a Blowout Preventer (not a wireline BOP). The purpose of a Blowout Preventor is to shut-off the well flow through the stuffing box in the event the packing is cut, blown out or the wire breaks. When stranded line is used in wells under pressure, the multiple lays in the construction of the line make it difficult to seal off the well. For this reason a stuffing box was designed with a grease seal. The grease is pumped in to the stuffing box under pressure, forming a barrier against the flow of wellhead fluids or gases. This completely seals the flow and lubricates the line. This grease-seal stuffing box is used by all wire-line companies (including electric line) whenever stranded line is required.

3.1.7 Lubricator

A lubricator may be described as a number of tubular sections of pipe assembled together with a stuffing box to pack-off the wire-line top. The tubular sections are assembled on the ground or platform and held together with quick unions. The entire assembly is then raised to a vertical position above the wire-line valve. The lubricator is generally standard in length, just high enough to handle the longest string of tools between the wire-line valve and the stuffing box and is easily transported to and from location. For offshore wireline operations, the lubricator may be as long as twenty feet without union connections. Specially designed lubricators are used when problematic situations arise, such as exposure to sour gas (H₂S) or CO₂. The lubricator is generally constructed of low alloy steel, heat treated and softened to comply with NACE Standard MR-01-75, 1978, Section 11.95 or latest update.
3.1.8 Quick unions:

As a safety feature, one half of the union slips inside the other half union and is screwed by a large nut which is screwed to the female half. Quick unions are connectors which are screwed or welded on each end of all lubricator sections, and are designed with an O-ring type seal to hold the well pressure.

3.1.9 Line wipers

When retrieving the wire-line from a well, the fluid clinging to the line drips or is thrown off the floor blocks and pulleys, creating a possible safety, maintenance and house keeping problem. Line wipers of various types generally do a very effective job of cleaning the line at or near the well-head. One form of line wiper is a housing with an internal split neoprene rubber plug. This plug has a threaded bolt adjustment that compresses the rubber plug until it envelopes the line and strips it of the fluid. This line wiper has a hinge pin to anchor it to the floor block or pulley frame for alignment on the line. Other types are built on the same principle as the stuffing box, containing packing and an adjustable gland for cleaning the line. Oil from the wiper should be collected in a suitable container.

3.1.10 Wireline Blow Out Preventor (BOP)

The wire-line BOP is a ram equipped device used on the wellhead to prevent or control blowouts. In addition to providing positive protection against blowouts, the wire-line BOP is a means of isolating the well pressure from the lubricator without cutting or damaging the wire-line. This is often necessary during wire-line fishing operations. It is accomplished by manually or hydraulically pressing together a set of rams made of resilient packing to form a seal. Once the BOP is closed, the lubricator can be bled off. This is done by opening a special equalizing valve on the side of the wire-line BOP. It allows the well pressure to be routed around the closed rams into the lubricator. Then the rams can be easily opened without damaging the tool string or lubricator. Regulation governing offshore wire-line operations require the use of at-least one wire-line BOP.

3.1.11 Gin poles Or Masts

During wire-line operations when it is necessary to use tall high-pressure lubricators and heavy tool strings, removing and replacing the heavy loaded lubricator off and on the wellhead becomes a problem. A stiff leg, with a block and tackle, electric hoist or mast type structure mounted on a truck is sometimes used to handle the lubricator. When the work is performed on a rig, an air hoist or cat line can be used. Wire-line boats have a special mast or crane to do the job. On offshore platforms, a platform crane, or an AA-frame type structure over the well is used. However, it is recommended that a gin-pole and a block and tackle be available as a backup, in the event other means of lifting is not available.
3.2 WIRELINE TOOLS

3.2.1 Bailier:

A long cylindrical container, fitted with a valve at its lower end, used to remove water, sand, mud or oil from a well.

3.2.2 Blanking Plug:

Blanking plug is retrievable device and is set in the landing nipple, pump seating nipple and on tubing ID locking devices. In the basic construction principle, plug is equipped with spring loaded plug bean assembly and sealing section which plugs the tubing pressure from above, below or in both direction.

3.2.3 Blind Box:

It is a service tool used when heavy downward jarring is required. This tool is flat on the bottom and hardened so as not to damage easily.

3.2.4 Cutter Bar:

A cutter is a stem with box attached to the bottom. It is used to cut off the line at wireline socket.

3.2.5 Fish:

Any object left in the well-bore during drilling, workover and well servicing operations.

3.2.6 Fishing Neck:

A groove in the top of wireline tools to allow other tools to clamp the tool and remove it from the well.

3.2.7 Fishing Tool:

A tool to recover object(s) left in the well.

3.2.8 Go-Devil:

A slotted stem with fishing neck is used when tool string is entangled in or below wireline, this device is dropped or pumped down the well.

3.2.9 Impression Block:

A block with lead or another relatively soft material on the bottom. The impression block made up on wireline tool string and allowed to rest on a tool or other object that has been left in the

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hole. On retrieval to the surface, an idea of size, shape & position of the fish is obtained from examining the impression block.

3.2.10 Kickover Tool:

A tool used to selectively locate mandrels that house gas lift valve.

3.2.11 Knuckle Joint:

A deflection tool placed in the work string that has a ball and socket arrangement for purpose of providing flexibility in the work string, enabling it to pass through deviated wells or crooked tubing.

3.2.12 Paraffin Cutter or Tubing gauge:

A tool used to clear the tubing and assure the operator that the tubing is unobstructed.

3.2.13 Pulling tool:

Tools required for retrieval of flow control devices.

3.2.14 Running tool:

Tools required for installation of flow control devices.

3.2.15 Scraper:

Any device that is used to remove deposits (as scale, paraffin) from tubing.

3.2.16 Shifting tool:

The shifting tool is used to open or close sliding slide door or sliding sleeve.

3.2.17 Standing Valves:

Are normally used in low producer intermittent gas lift or sucker rod pumping wells to contain the well fluid inside the tubing string during the fluid fall back. Standing valve is set in the landing nipple, pump-seating nipple and on tubing ID locking devices. In the basic construction principle, a standing valve is equipped with a sealing section and a ball and seat or valve and seat type configuration allowing only upward flow of fluid and checking or preventing downward flow.

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3.2.18 Swab Assembly:

A rubber faced hollow cylinder mounted on a hollow mandrel with a pin joint on the upper end to connect to the swab line. A Check valve (upward open) installed on the lower end of the swab is used to unload from a ceased well.

3.2.19 Wireline cutter:

A special device used to cut stuck wireline at the rope socket by simply attaching the slotted assembly around the wireline and dropping it into the tubing.

3.2.20 Wireline Jars:

Percussion tool that operates on mechanical or hydraulic principle and is designed to deliver a striking force/ heavy hammer blow to objects in the hole to which it is attached. Jars are used for such purpose as freeing stuck objects/fish or releasing installation/removal tools. The striking force can either be up or down. Stroke jars, tubular jars and hydraulic jars are most common.

3.2.21 Wireline Overshot:

A fishing tool attached to wireline tool string to catch the fish from outside for retrieval.

3.2.22 Wireline Rope Socket:

Rope socket fastens the wire to the tool string through a knot. Spring in the socket acts as a shock absorber to prevent the knot from failing under impact during jarring operations. The spring support centers the disc and the load so that the force applied is a straight pull.

3.2.23 Wireline Spear or Grab:

A special fishing tool fitted with one two or three prongs with pointed barbs welded to the inner side, to catch and recover wireline that has been broken and left in a well.

3.2.24 Wireline Stem:

Part of working tool string that provides the weight to pull the wireline string into the well. It also adds needed weight for jarring operation or sheering pins which release the running or pulling tools.

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4.0 RECOMMENDED SAFE HANDLING AND MAINTENANCE PRACTICES FOR WIRELINE EQUIPMENT

4.1 Wireline winch and engine:

Due to fire hazards on locations, the use of sparking power sources and actuating devices have been restricted. Diesel wireline units are required to be equipped with spark arrestor mufflers and shut down devices on the air intakes. The following shut down devices are required on power packs for safe working:

- Air inlet slam shut valve
- Engine over speed shut down
- Oil pressure safety shut down
- Water temperature safety shut down
- Exhaust gas cooler (Integral)
- Exhaust gas flame arrestor
- Anti-static fan belts
- Plastic pusher fan

4.1.1 Lubrication:

Check periodically all grease points and oil ends.

- Engine oil
- Gear box oil
- Hydraulic oil
- Reel shaft pillow block bearings
- Flange bearings of sprockets assembly
- Reel drive and level wind drive chains
- All other moving joints and connectors
- Before starting the engine and hydraulic pump, drain out the water and contaminants from the bottom of hydraulic tank and diesel tank.

4.1.2 Filters:

- The engine oil filter should be changed whenever change of engine oil is done.
- In hydraulic system:

  - The suction strainer should be cleaned as per manufacturer's recommendations.
  - The inline filter in the return line should be replaced as per manufacturer's recommendations.
  - The magnet if provided in the hydraulic tank drain plug should be cleaned as per manufacturer's recommendations.

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• All filters should be cleaned periodically once in two months or as per manufacturer’s recommendations.

4.1.3 Oil Changes:

• The gear box oil and transfer case oil, engine oil is to be changed as recommended by the manufacturer.
• The hydraulic oil should be changed as per the manufacturer’s recommendations. If the oil in chamber becomes heavy from high temperature operation, it should be changed. The tank should be cleaned and filters are to be changed immediately. Water contamination make oil milky or cloudy, it should be cleaned and filters should be cleaned/ replaced immediately.

4.1.4 SAFETY PRECAUTIONS WHILE OPERATING WINCH ENGINE:

• Do not smoke when fuel in the tank is being filled.
• Clean away any fuel which has fallen and move material which has fuel contamination to a safe place.
• Do not put fuel in the tank during engine operation.
• Never clean, lubricate or adjust the engine during operation.
• Do not make any adjustments one does not understand.
• Ensure the engine is not in a condition to cause concentration of toxic emissions.
• Persons in the area must be kept clear during engine and equipment or vehicle operation.
• Do not permit loose clothing or long hair near moving parts.
• Keep away from moving parts during operation. Note that fans can not be seen clearly when the engine runs.
• Do not run the engine with safety guards removed.
• Do not remove the radiator cap while the engine is hot and the coolant is under pressure as dangerous hot coolant can be discharged.
• Do not use salt water in the cooling system or any other coolant which may cause corrosion.
• Keep sparks or fire away from batteries (especially while during charge) or combustion can occur. The battery fluid can burn and is also dangerous to the skin and especially to the eyes.
• Disconnect the battery terminals before one makes a repair to the electrical system.
• Only one person must be in control of the engine.
• Ensure that the engine is only operated from the control panel or operator’s position.
• If one’s skin comes in contact with high pressure fuel, get medical assistance immediately.
• Diesel fuel can cause skin damage to some persons. Use protection on the hands (gloves or special skin protection solution).
• Do not move equipment unless the brakes are in good condition.
• Ensure that the transmission drive control is in “out of drive” position before the engine is started.

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• Fit only recommended parts.
• Do not attempt lubrication or service while the unit is in operation.
• Keep work area clean and clear of obstruction and other objects and tools.
• Follow operating and maintenance manual thoroughly.

4.1.5 Initial Checks and Precautions:
The engine oil level and oil in the hydraulic and diesel tanks are to be checked prior to starting. To start the engine, there are two following ways:
• Hand Crank Start.
• Self Start.
After starting the engine required R.P.M. to be set with the help of accelerator.

4.1.6 Engine and Equipment Check:
Before starting the operation, ensure the following:
Step 1.
Check all the control in Neutral positions on the operator Console (i.e. Gear lever, direction control valve, hand brake release).
Step 2.
Open remote control valve and two way valve fully on the operator console.
Step 3.
Accelerator knob should be in off position i.e. away from operator.
Step 4.
Set relief valve provided near the pump to least pressure setting.
Step 5.
All the hose pipe of the unit should be properly connected.
Step 6.
Ensure all the guards are in place.

During the operation, ensure the following:
Step 7.
Start the engine and engage the gear box lever in 1st to 4th or top gear depending on the line speed and jarring required. Generally, line speed and jarring is obtained in 4th / top gear.

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Step 8.

The RPM of engine should be controlled by winch operator only. The accelerator knob assembly is provided on the control panel of the winch.

Step 9.

Floor control valve of the oil cooler should not be fully closed (i.e. tighten as per requirement).

4.2 WIRELINE

The service life of a wire line is dependent on the correct choice of steel grade for the well conditions. However, mechanical damage caused by improper handling can drastically reduce the life time. In order to realize good service and maximum life from wire line, it is necessary to take certain precautions in its handling and usage:

- Properly transferring the measuring line from the shipping spool to the reel is very important for extending the performance and service life of the line. The recommended method of re-spooling or transferring the measuring line is shown as below:

Spooling the line on to the service reel shall be done in the direction of its natural curvature. The spooling tension must not be too low nor too high; too low causes loose turns, tangling and loops, too high tension pulls the wire down between adjacent turns causing locking.

- Do not damage the supply reel, it can cause surface defects in the wire during spooling to the service reel.

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A tension of 400-500 lbf is often used with good result. A three step procedure is recommended i.e. first step 200 lbf, second 350 lbf and finally 450 lbf. 

Avoid gripping the line with tools, such as pliers or hardened jaws. Scratching or notching of the surface of the wire can cause failure when the line is subjected to tensile and bending stresses. 

Uncontrolled slack and resultant kinks must be avoided. 

While retrieving the line from the well, clean the line of well fluids and give it a protective coat of oil as it is reeled on to the drum. 

Do not pull a line beyond its elastic limit. 

Before beginning a job at frequent intervals during extended work periods, cut 15 to 20 feet of line off the spool and tie another knot. 

The elastic properties of stainless steels in general differ from those of carbon steels (plough steels) in that the former stretch more at a given load compared to plough steels. 

Heavy jarring can cause shock loads with peaks, which do not always register on monitoring instruments due to the more elastic behavior of stainless steels. If the peaks exceed the design load the life time of the wireline will be impaired. 

Too small pulley diameters cause fatigue due to high stresses, especially in the wire surface. The top pulley (sheave) is of particular importance in this respect. 

The following figures indicate the minimum pulley diameter: 

<table>
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<tr>
<th>Wireline Dia.</th>
<th>Min pulley Dia, inches</th>
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<td>inch</td>
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<tr>
<td>0.072</td>
<td>13</td>
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<td>0.082</td>
<td>15</td>
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<tr>
<td>0.092</td>
<td>17</td>
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<td>0.105</td>
<td>19</td>
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<tr>
<td>0.108</td>
<td>20</td>
</tr>
<tr>
<td>0.125</td>
<td>23</td>
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For better accuracy the following formulas can be used: 

\[
D = \frac{35 \times d}{R_m} \times 10^6 \quad \text{or} \\
D = \frac{27.5 \times d^3}{P} \times 10^6 
\]

Where

- \(D\) = pulley diameter, inches
- \(d\) = wire diameter, inch

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Whenever the top pulley is being exchanged for a bigger one, make sure that the axle is strong enough to support the pulley (avoid any wobbling). Wobbling can cause surface damage to the line or cause it to jump out of the pulley groove.

Any rubbing between the line and ground or reel side must be avoided. The abrasion will impair the wire surface and reduce the strength of the line.

Ensure that the grooves in the pulleys are wide enough for the line, otherwise the line will be damaged and its cross sectional area reduced. Make sure that the line doesn’t jump out of the pulley grooves causing rubbing against the pulley axle.

A worn out rubber seal in the stuffing box will make the line rub against metal, which will inevitably reduce the life time.

When attaching instruments and tools to the end of the line it is recommended to use a rope socket instead of making a knot.

Cumulative damage to the line can be minimised by cutting back 50 ft between each run.

Avoid abrupt braking when lowering instruments and tools down into the well. It causes extra tension which can reach high magnitudes and reduce the cross sectional area and thus the breaking load of the line.

A wireline may need replacement (whole or part) because of continuous use, damage or lack of care. Following checks shall be performed to detect a bad wireline:

- When a line is laid out on the ground and does not form a coil or loop as on the drum, indicates the line has exceeded its elastic limit and is considered a “dead” line and needs full replacement.
- When kinks will not straighten out, this indicates the line has been subjected to excessive tensions or stress, needs full replacement.
- When tying a knot if the wireline breaks easily, remove bad portion of the wireline and tie a new knot.

4.3 MEASURING DEVICES

Care should also be taken to avoid over tightening the pressure wheels, which would result in the flattening of the wire and reduced life of the wireline. Under tightening of the pressure wheels or worn counter wheels will give false readings.

During extended jarring operations it is recommended the wire be temporarily removed from the measuring wheel assembly. This will prevent the stress associated with the repeated bending / straightening of the wire around the measuring wheel.

The counter wheels are wire size specific and are not inter-changeable. For larger sizes of wire the counter wheel and stuffing box sheave diameter must be increased to prevent over-stressing the line, which would cause hardening.

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When the measuring wheel is worn, the counter will give false readings and the wheel should be replaced. If not replaced, damage could occur by shaving of the wire from the grooves cut into the measuring wheel.

4.4 WEIGHT INDICATORS

A hydraulic weight indicator should be calibrated at regular intervals (After every ten jobs)

4.5 REEL SYSTEMS

The single-reel type hydraulic unit, (a compact system with the power section built on the same skid,) having low weight, should always be properly secured to prevent movement and possible damage.

4.6 FLOOR BLOCKS OR PULLEYS

- Floor blocks or pulleys with sheaves should be properly sized to prevent over-stress in wireline (refer para 4.2)
- For accurate weight indicator operation, the angle the wire makes around the pulley should be 90 degrees. Also position the pulley as close as possible to the lubricator to prevent side loading on lubricator assembly.
- Snatch-block type pulleys should preferably be installed on the line to keep from having to thread the end through the pulley supports.

4.7 STUFFING BOXES

- The external adjustable nut of the Stuffing box should be properly tightened to prevent leakage around the line resulting from well pressure.
- The radius & groove of the stuffing box sheave must be in accordance with size of the wireline

4.8 LUBRICATORS

- The size and length of the assembly must accommodate the work over tools, any “fish” that might possibly be recovered and have a working pressure rating equal to or higher than the string of pipe through which the tools are lowered.
- In wireline operations, the lubricator should be as long as twenty feet without the union connectors.
- Test the lubricator to maximum anticipated well pressure, but do not exceed the manufacturer’s recommended working pressure.

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4.9 QUICK UNIONS

- It should not be disconnected while there is pressure on the lubricator.
- Non-sparking tools should be used for opening / tightening of the unions.
- Rubber seals / O-rings should be checked prior to making-up of the assembly.

4.10 WIRELINE BOP
The BOP should be pressure tested before beginning any job. Test the wireline BOP to the maximum anticipated well pressure, but do not exceed manufacturers recommended working pressure.

4.11 Check list provided at Annexure-1 shall be filled before starting the job.

5.0 DIFFERENT TYPE OF WIRELINE OPERATIONS:
For any sub-surface wireline operation it is imperative that the tubing hole must be clear enough to enable to pass through it any wireline tool up to the desired depth. If it is determined that the tubing is tapered at a particular depth due to some reason, a tubing swage tool can be run with the wireline and repeated jarring up and down through the tapered portion can be made until it falls through safely.

5.1 Removal of paraffin deposition inside tubing by scraping
In certain crude oil and condensate producer wells due to the presence of wax, asphaltic, resin compounds and reduction of pressure and temperature causes paraffin/wax deposition inside the tubing. If the accumulated wax inside the tubing wall is not cleared from time to time, wax deposition may eventually plug the tubing.

5.2 Sliding side door / sliding sleeve operation
To open or close the sliding sleeve with the help of shifting tool to establish/stop communication between tubing and casing.

5.3 Blanking plug operations
Installation and retrieval of Blanking plugs from landing nipples (part of completion string) to shut-off / resume production.

5.4 Gas-lift valves operation
Installation /retrieval of gas lift valve from side pocket mandrel to put the wells on gas lift.

5.5 Installation / retrieval of sub-surface safety valve (SSSV)
Basic design principle of subsurface safety valve is to automatically shut-in the flow of the well in case surface wellhead (Christmas tree) gets damaged or surface well control system at wellhead fails. Depending on location of control, the safety valve is classified as surface controlled or subsurface controlled safety valve.

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The Surface Controlled Subsurface Safety Valve (SCSSV) is activated to shut-off the well flow consequent upon receipt of necessary manual or automatic alarm signal from a surface device. Subsurface Controlled Subsurface Safety Valve (SSCSV) gets activated from the signal received at the installed valve depth to shut-off the well flow.

5.6 Various hole probing operations
A probing operation is used to assure the operator that the tubing is unobstructed.

5.7 Fishing operations
An operation to recover object(s) left in the well.

5.8 Bottom hole pressure surveys (BHP)
To obtain various sub-surface well information e.g., static and flowing bottom hole pressures, bottom hole temperature, fluid level etc. the above surveys are carried out in the oil and gas wells.

5.9 Tubing-end Locator operations
Tubing end locator is run on wireline to locate the end of the tubing.

5.10 Pack-off assembly
Pack off assembly is used to seal off a tubing leak.

5.11 Sand bailing
Sand bailers are used to remove the sand deposited in the tubing.

5.12 Tubing swaging operation
Tubing swage is used to straightening damaged or collapsed tubing in a well.
6.0 RECOMMENDED SAFE PROCEDURES & PRACTICES

6.1. General Safety Consideration:

The most important part of any wireline operation is the practice of safe work habits. Following points should be adopted:

a) Use of appropriate tools and equipment for the specified jobs along with ensuring the safe and clean working area / plinth. Safety of personnel, environment and equipment should be the prime consideration.

b) Before beginning any wireline operation, the wireline operator must familiarize himself with all posted facility and safety regulations. He should also ensure that his co-workers have full knowledge of their designated jobs.

c) Normally, work should be planned to be completed during day-light hours. If work is required to be continued beyond day light hours adequate lighting arrangements should be provided.

d) Place the wireline unit upwind from the wellhead.

e) Advise process control room at platform / GGS before entering and departing the location / well platform.

f) During the operations, one of the crew members should be assigned the responsibility of observing for any unusual occurrences which he should report to the operator immediately.

g) Make sure all personnel understand the actions to be taken in an emergency, especially in case evacuation is required. Hold a meeting before the job starts.

h) For sour service alloyed stainless steel wireline shall be used because of its resistance to hydrogen embrittlement.

6.1.1 General Information Required:

Before starting a wireline operation, the wireline operator shall be furnished with the following information:

- Location [Well No./identifications and direction etc.]
- All pertinent well parameters [including THP, CHP, BHP, TUBING ID, OD, Drift diameter etc.]
- Previous wireline reports and known recorded restrictions or obstructions.
- Wellhead top connections and maximum anticipated shut in tubing and casing pressures.
- Objective of the wireline job to be performed including deployment of necessary special equipment e.g. wireline tools material, lubricator material, stuffing box etc.
- Whether hole is straight or deviated.
- A copy of the current well bore sketch showing tubing restrictions (if any), gas lift valve positions, packer depth and bore, perforation range etc.

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6.1.2 General Operating Practices:

For any wireline operation the following factors should be taken into consideration prior to start of a job:

a) Bottom hole pressure survey:
   - A dummy wireline operation should be made upto the planned operating depth with a suitable dummy to ensure absence of any restriction.
   - In case of gas lift wells injection of gas to the well bore should be avoided during running in of BHP survey tool.

b) Wellhead pressure:

   All wireline tools/equipment should be rated to handle maximum anticipated well head pressure.

   c) Support facilities:

   Appropriate crane service or suitable and properly anchored gin pole should be made available at site for erecting and dismantling the lubricator assembly.

   d) Timing for wireline operation:

   Wireline operations should be planned in such a way that it shall be completed in daylight itself. However, if it is to be continued beyond day light hours sufficient illumination facilities should be ensured at operating areas.

   e) Logistics and considerations:

   In remote location [i.e., in offshore/desert locations] provision for additional or back up equipment/tools should be made as these may be difficult to obtain/or reach at operation site in time.

   - Status & Record of sub-surface completion:
   - Drift diameter of tubing string.
   - Drift diameter through packer bore, christmas tree assembly, hanger flange and through other sub-surface completion equipment (if any).

   f) Sand production history:

   Due care should be taken prior to performing any wireline jobs in severe sand producer wells.

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g) Vertical or deviated wells:
   In a deviated well provision of knuckle joint or similar flexible joints should be made to provide flexibility in the string of wireline tools to facilitate smooth running-in/pulling out operation inside the tubing string.

h) Wireline unit, Equipment and Tools:
   - Wireline unit must be securely anchored before starting operations.
   - Wireline equipment and tools must be checked to ensure that the following items are included:
     - Necessary fishing tools to recover any tools that may be lost in the hole during operation.
     - Wireline blow-out preventer [BOP]
     - Adequate length of lubricator assembly to accommodate all tools (including fishing tools) on a trip, and of adequate pressure rating to withstand maximum anticipated well pressure.
     - Stuffing box.
     - Weight indicator.
     - Odometer [depth counter]
     - Jars
     - Appropriate knuckle joints to ensure flexibility of the work string in deviated holes.

J) Before starting of the job and during operations, following points should be taken into consideration
   - After installing wireline valve [at the top of christmas tree top valve] and lubricator, testing of the lubricator should be done to the maximum anticipated well pressure.
   - In case the well pressure is not available at well head, (in case of a plug tubing or subdued well conditions) testing of lubricator and BOP assembly should be done upto anticipated wellhead pressure by external means.
   - Wireline valve, blow-out preventor, lubricator, stuffing box, depthometer and weight indicator must be in good operating condition at all times. Failure of any item that could adversely affect the operations should be corrected before proceeding with down hole wireline job.
   - Wireline should not be left in the hole unattended. If the wireline need to be kept in the hole overnight during BHP surveys etc., it should be ensured to shut wireline B.O.P. ram with close surveillance for any leakage through stuffing box, glands or elsewhere in which case immediate remedial measures should be taken.

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The wireline or swab valve should be closed immediately after the wireline tools are pulled inside the lubricator. When lubricator is to be dismantled or removed, the master valve also should be closed along with the top valve.

The rope socket knot should be closely monitored for any possible damage and should be remade if required.

On every run into the well, check drag on tools at least every 1000 ft (305 m). More frequent checks may be necessary on initial runs in tubing of unknown condition.

While coming out of hole, the speed should be reduced to safe limits when approaching any restriction in the tubing string and when within 500 ft of the surface. Once the tools are in the lubricator, the swab/wireline valve/top valve should be closed. All pressure trapped in the lubricator must be bled-off before attempting to remove tools. The person engaged in this operation should position himself away from the direction of the flow.

Pressure should be equalized before performing any operations that may result in blowing the wireline tools up the hole, e.g., paraffin scraping operations, fish recovery operations, sand bailing, retrieving/re-installation of standing valve/sub-surface safety valve etc.

On the wells with pressure exceeding 10,000 PSI it is recommended that the stuffing box be re-packed before each trip into the hole. Also, a crown or swab valve should be included with the blow-out preventor and wireline valve.

In special situations where unusual pressures or safety requirement exist the following should be considered-

- Dual wireline blow-out preventor for an added degree of safety while performing wireline operations.

- A wireline valve between the wireline BOP’s and the wellhead swab valve can be used for added safety during wireline operations.

- If a braided wireline is used, proper greasing of the wireline should be ensured.

- Do not loosen any hydraulic connection or part before assuring that the unit is not pressured with hydraulic oil.

- Do not operate without protective equipment and if visibility is obstructed.

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To operate the winch the following points are to be followed:

- Direction control valve should be in the "Neutral" position.
- Set the engine to recommended R.P.M.
- Shift the gear lever according to speed and torque required.
- Release the mechanical brake.
- The reel skid direction control valve shall be positioned in "up" and "down" direction as required.
- Control the speed in reverse forward direction with the help of remote control valve and selection of transmission gear.
- Adjust the tension on wireline with pressure control valve. When wireline is fed into the hole this pressure is set at a low pressure the pressure control valve works as an effective brake system and the operator can slowly increase the system pressure setting as more force feeds into the hole.
- Engine oil pressure and temperature gauges should be monitored periodically.
- Periodically the hydraulic oil tank, temp. should also be checked, which should not exceed the recommended range.

k) Before closing the operation ensure the following:

- Check all controls are in neutral positions on the operators console (Gear lever, Direction control valve, the hand brake release).
- Open remote control valve & two way valve fully.

6.1.3 WIRELINE JOB RECORDS

Upon completion of the wireline operation, a report signed by a qualified person [wireline operator/production engineer] must be submitted to the operating departmental in-charge. The report should include:

i) Date
ii) Well identification
iii) Chronology of operation performed including depth, pressures and equipment involved.

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iv) Sub-surface equipment removed, installed or replaced etc.

v) Any equipment lost/ left in the hole or any restriction not previously reported.

vi) Information required to complete failure analysis reports.

6.2 RECOMMENDED ONSHORE OPERATIONAL PROCEDURES

In addition to the general safety guidelines as mentioned in 6.1 the following should be followed.

1. Make sure that the area around the wellhead is cleared.

2. Record Shut-in-well pressure. It should be ensured that the surface equipment on location is of sufficient working pressure to withstand the maximum anticipated wellhead pressure.

3. Check the x-mas tree top valve connection. Make sure the proper matching connection is available. Be sure to inspect the condition of the thread connection.

4. The wireline unit shall be positioned at a convenient safe location (at a minimum of 50 ft from wellhead).

5. Before rigging up the surface equipment, the truck should be securely anchored.

6. Count the number of turns the wheel or handle makes to fully close the crown valve. Always use the crown valve as the working valve and save any valve(s) below as a master for emergency use only.

7. Remove the top-cap and install the necessary adapter if required to fit the bottom connection of the wireline Blow out preventer (BOP).

8. If a portable gin pole is used, it should be secured to the wellhead with a 5/16 inch or larger steel chain and tightened with a ratchet type chain binder. It should be as near vertical as possible.

9. Pick up the wireline BOP and install it on the wellhead. Never attempt to install it manually.

10. Inspect the stuffing box and repack it if necessary. Insert the wireline through the stuffing box and through the rope socket and tie the knot.

11. Assemble the lubricator sections and the wireline tool string, which may consist of the proper length of stem/weight bar, jars and knuckle joints. Insert all but 12 inches of the tool string into the lubricator.

12. While carrying the stuffing box with the rope socket and wireline from the unit to the wellhead, every precaution should be taken not to kink the line. Make up the rope socket to the wireline stem and make it up tight with two 24-inches pipe wrenches.

13. Push the wireline tool string into the lubricator and make up the stuffing box union on to the top of the lubricator. Guide the wireline over the stuffing box sheave and pull it to

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the bottom end of the lubricator and place it in the wireline clamp. This clamp keeps the tools from falling out as the lubricator is raised.

14. Guide the lubricator during pick-up to prevent hitting any wellhead fittings.

15. When the bottom of the lubricator is about at level with the union on the top of the wireline BOP, tie the pull rope to the flow line or other piece of heavy equipment of the wellhead.

16. Secure the hay pulley, with weight indicator/converter attached, to the wellhead with a ¼ in. steel chain or steel cable. Care should be taken in positioning the assembly such that it will not cause unwanted side-loading on the lubricator. Place the wireline in the hay pulley and pull up the slack line with the unit. The hay pulley should be mounted with the head of the latch pin on the up side.

17. When all of the slack line has been taken up, the wireline clamp can be released and removed from the lubricator. The wireline should make a 90 degree angle around the hay pulley for proper weight indicator operation.

18. Lower the wireline tool string until the bottom protrudes from the lubricator at a convenient working level. The remainder of the wireline tool is then made up onto the upper portion.

19. With the bottom of the tool string as near the tubing hanger as possible, set the depthmeter counter assembly at zero. This point should be used as zero point for all subsequent trips of the wireline tool string.

20. Pull the tool string back up into the lubricator, and set the lubricator on the BOP. Make-up the lubricator onto the BOP and close the bleeder valve. Pressure testing of the lubricator assembly to be done at the anticipated maximum surface pressure that it is likely to be encountered.

21. Crack open the crown valve on the X-mas tree until the pressure has equalized into the lubricator. Check carefully for any leaks then open the valve fully.

22. At this point, the tool-string should be lowered in to the well so as to bring the wireline against BOP rams. Close the rams of the BOP and release the pressure from the lubricator through the bled-off valve. There should be no leaks through the BOP rams.

23. Close the bleeder valve and again equalize the lubricator by opening the BOP equalizer valve. Open the BOP rams and lower the wireline tool string into the tubing.

24. When the trip with the tools has been completed and the bottom of the wireline tools are above the top Crown valve X-mas tree, close the Crown valve then release the pressure from the lubricator through the bleeder valve.

25. Open the lubricator union and pick up the lubricator. One of the crew members then tilt the lubricator to one side and the wireline operating personnel will slack off on the tool string to a convenient working level to change tools.

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26. When wireline operations have been completed, lower the tool string out of the lubricator. Close the jars. Cut the line approximately 6 in. from the rope socket, holding onto the cut end of the line until the wireline operating personnel has pulled it up into the lubricator. Then step back to a safe position until the end has been pulled clear of the hay pulley. The six inches of line left on the rope socket must be bent 180° with the end resting as close to the remaining line as possible.

27. Install back the wellhead connection and pressure gauge. The Crown valve should be opened to check for any leaks in the connections. When all tools have been reloaded on the wireline unit, the wellhead must be wiped clean and the surrounding area cleaned of any trash or debris that might have accumulated during wireline operations.

6.3 RECOMMENDED OFFSHORE OPERATIONAL PROCEDURES

1. Make sure that the area around the wellhead is cleared.

2. Record the Shut-in-well pressure confirm the maximum shut-in pressure of the well. Be sure that the surface equipment on location is of sufficient working pressure to withstand the maximum anticipated wellhead pressure.

3. Check the x-mas tree top connection, make sure proper matching connection is available. Inspect the condition of the thread connection.

4. Insure that the crane is adequate and secure, to handle anticipated lifting needs. In order to support the lubricator, use a sling of sufficient length to allow for temporary disconnecting without having to climb the lubricator.

5. Secure and ground the wireline unit to the structure members using 5/16 in. or larger chain or cable.

6. Close the Crown valve of the x-mas tree counting the number of rounds the wheel or handle makes to fully close the valve. Always use the crown valve as the working valve and save any valve(s) below as a master for emergency use only.

7. Remove the top connection and install the necessary adapter to fit the bottom connection of the wireline Blow out preventer (BOP).

8. Pick up the wireline BOP using the crane and install it on the adaptor. Never attempt to manhandle the valve.

9. At this time, inspect the stuffing box and repack it if necessary. Insert the wireline through the stuffing box and through the rope socket and tie the knot.

10. Assemble the lubricator sections and the wireline tool string, which may consist of the proper length of stem, jars and knuckle joints. Insert all but 12 in. of the tool string into the lubricator.

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11. Carry the stuffing box with the rope socket and wireline from the unit to the wellhead, using every precaution not to kink the line. Screw the rope socket to the wireline stem and make it up tight with two 24-in pipe wrenches.

12. Push the wireline tool string into the lubricator and make up the stuffing box union on to the top of the lubricator. Guide the wireline over the stuffing box sheave and pull it to the bottom end of the lubricator and place it in the wireline clamp. This clamp keeps the tools from falling out as the lubricator is raised.


14. When the bottom of the lubricator is about even with the union on the top of the wireline BOP, tie off the pull-rope to the flow line or other piece of heavy equipment of the wellhead/x-mas tree.

15. Secure the hay pulley, with weight indicator, to the wellhead with a ¼ in. steel chain or steel cable. Care should be taken in position the assembly such that it will not cause interference with the operation of X-mas tree valves or cause unwanted side loading on the lubricator. Place the wireline in the hay pulley and pull up the slack line with the unit. The hay pulley should be mounted with the head of the latch pin on the up side.

16. When all of the slack line has been taken up, the wireline clamp can be released and removed from the lubricator.

17. Lower the wireline tool string from the lubricator to a convenient working level. The remainder of the wireline tool string is then made up onto the upper portion.

18. Ensure that SCSSV is in fully open condition and adequate hydraulic fluid pressure exists in the control line.

19. With the bottom of the tool string as near the tubing hanger as possible, set the depthmeter counter assembly at zero. This point should be used as zero point for all subsequent trips of the wireline tool string.

20. Pull the tool string back up into the lubricator, and set the lubricator on the BOP. Make-up the lubricator onto the BOP and close the bleeder valve. Pressure testing of the lubricator assembly to be done at 1.5 times the anticipated maximum surface pressure.

21. Open the crown valve on the X-MAS tree very slowly until the pressure has equalized into the lubricator. Check carefully for any leaks then open the valve fully.

22. At this point, the BOP should be tested. Close the rams of the BOP and release the pressure from the lubricator through the bleed-off valve. There should be no leaks through the BOP rams.

23. Close the bleeder valve and again equalize the lubricator. When the pressure has been equalized in the lubricator open the BOP rams and lower the wireline tool string into the tubing.

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24. When the trip with the tools has been completed and the bottom of the wireline tools are above the top Crown valve X-MAS tree, close the Crown valve then release the pressure from the lubricator through the bleeder valve.

25. On all offshore location ensure that all well fluids bled from the lubricator are contained and not allowed to contaminate the surrounding environment.

26. Unscrew the lubricator union and pick up the lubricator, one of the crew members will swing the lubricator to one side and the wireline operating personnel will slack off on the tool string to a convenient working level to change tools.

27. When wireline operations have been completed, lower the tool string out of the lubricator. Close the jars. Cut the line approximately 6 in. from the rope socket, holding onto the cut end of the line until the wireline operating personnel has pulled it up into the lubricator, them step back in the clear until the end has been pulled clear of the hay pulley. The six inches of line left on the rope socket must be bent 180° with the end resting as close to the remaining line as possible.

28. Replace the X-MAS tree top connection and pressure gage. The Crown valve should be opened to check for any leaks in the connections. When all tools have been reloaded on the wireline unit, the wellhead must be wiped clean and the surrounding area cleaned of any trash or debris that might have accumulated during wireline operations.

7.0 WIRELINE JOB SPECIFIC SAFE PRACTICES:

7.1 Scraping for paraffin / wax:
Wax / paraffin scraping, where severe choking (with little conduit for flow) due to wax is expected, should be done very carefully as voluminous flow from below the wax plug may be encountered. While under taking such wireline operations, extra precautions may be taken to avoid blowing the tool string up the hole/ball-ing-up of the wireline due to sudden gush of gas/fluid in the tubing from below. For this following steps should be taken.

1. Scrape the well slowly and in stages, starting with smallest size of wax cutter.

2. Allow the well to flow continuously to have efficient removal of cuttings.

3. Provide sufficient weight bars in the wireline tool string to counter up-thrust due to sudden flow from below.

Consequences:
Non-observance of precautions mentioned above against each job specific wireline operations, may lead to situations where it may lead to other complications like wireline fishing due to breaking of wire; non-operative wireline BOP or X-mass tree valves etc. due to entangled wireline getting stuck against the BOP ram and / or X-mas tree valves.

7.2 Sliding Sleeve / Sliding Side Door Operations:

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Similar differential pressure conditions, as in case of Gas lift valves, may also exist across the sliding sleeve/sliding side door. While opening the sliding sleeve for various purposes, pressure across its communication ports should always be equalized to avoid blowing up of the shifting tool leading to complicated fishing operations and other complications. For this the following steps should be taken.

1. Carefully assess the fluid level in the tubing up to sliding sleeve to be operated.
2. In case pressure is anticipated from annulus, pressure balance between tubing and annulus should be done.

7.3 Installation and retrieving of Blanking Plug

Safe procedures as applicable for normal wireline operation should be followed for Installation and retrieving of standing valves:

7.4 Installation and retrieving of tubing Shut off and standing valves:

Safe procedures as applicable for normal wireline operation should be followed for Installation and retrieving of standing valves:

7.5 Gas lift valve retrieval :

Generally, pressure differential may exist across the gas lift valve, installed in the mandrel. While retrieving gas lift valve from its mandrel, pressure equalization across the valve i.e. in the tubing and annulus must be ensured before hand, to avoid blowing the tool string up the hole/balling -up of the wireline due to sudden gush of gas in the tubing from annulus, in case pressure is anticipated from annulus. For this the following steps should be taken:

1. Gas injection for the operation of gas lift valves to be cut by closing the supply line valve.
2. Pressure in the annulus along with the portion of line between isolation valve and casing valve to be bled off.

7.6 Installation and retrieval of subsurface safety valves by wireline:

Following precautionary measures shall be taken for the retrievable of wireline SCSSVs valves:

1. General safety considerations for safety of personnel, environment & equipment.
2. Work shall be planned to complete during day hours unless sufficient lighting is available at work site.
3. Before starting of any operation the wireline operator shall be furnished with the following information:
   a) Detail well status viz. tubing I.D., drift dia., landing nipple depth, hole condition etc.
   b) Wellhead connection and maximum anticipated well pressures.

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c) Jobs to be performed including necessary special equipment e.g., wireline material, lubricator material, stuffing box, tools, etc. type wireline unit required and whether hole is straight or deviated.

4. Operating Practices during running in of SCSSVs:
   a) Test lubricator and wireline valve to maximum anticipated pressure, following proper safety procedures.
   b) Ascertain that all tools and connections are properly assembled and made up with new rope socket tie. On initial installation, and subsequent operations where the tubing condition is questionable, a full size gauge shall be run through the safety valve landing nipple before attempting to install the safety valve.
   c) For SCSSVs, the operation of the equalizing sub should be checked on the surface with proper prong. For SCSSVs, check shall be made to ensure that any lock-open device shall not damage the sealing surfaces.
   d) The SCSSVs shall normally be run in open condition into the well. Specific operating instructions shall be followed from individual manufacturer’s operating manual for particular locking device in use to set the SCSSVs in the safety valve mandrel.
   e) Check shall be made to ascertain that the SCSSV is properly seated and the locking device is completely locked.
   f) Valve opening and closing shall be checked by flowing the well.
   g) Retrieve running tools and close wireline valve and master valve. Pressure must be bled off from the lubricator prior to tool removal.

5. Retrieving procedure for SCSSVs:
   a) Follow the steps as mentioned at 4a and 4b.
   b) Pressures shall be equalized across closed SCSSV.
   c) Specific manufacturer’s operating manual shall be followed for unlocking and retrieving the SSSV.
   d) Follow the steps as mentioned in above 4g.

7.7 Wireline fishing:
In case of stuck wireline tool string inside tubing, pressure differential may exist below stuck point. While undertaking any such wireline fishing operations, pressures must either be assessed before hand or necessary steps should be taken to balance the pressures, if required, or extra precautions may be taken so as to avoid blowing the fish up the hole/ balling-up of the wireline due to sudden gush of gas / fluid in the tubing from below. For this following steps should be taken.
1. Carefully assess whether stuck point has caused a plug in the tubing or not.
2. Assess for any anticipated pressures below stuck point, if condition mentioned at Sl. no. 1 is prevailing.
3. Take suitable steps for pressure equalization, if required.
4. Always use combination of tubular and hydraulic / spring jars.

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7.8 **Bottom Hole Pressure Survey:**
Following step-wise procedures shall be adopted for safe and smooth Bottom hole survey operation:

a) A thorough physical inspection shall be made for all equipment and materials for their soundness.
b) Before starting of any job, all operational details shall be known by the operator e.g., well pressure, survey details (different depths for survey, no. of stops to be made, previous survey records), sub-surface landing details, well status, any sand or formation water production history, hole condition etc.
c) Prior to running in of bottom hole survey tool, if there is any sub-surface control equipment in the hole, the same shall be retrieved out of the hole and a hole probing operation shall always be made at least to the survey depth with appropriate tool to ascertain the tubing hole integrity etc.
d) A knuckle jar is recommended for all bottom hole surveys. There should be no sudden stops or jarring of the wireline.
e) The BHP tool shall always be run at a reasonable and consistent speed.
f) For a prolonged BHP surveys, a hanger tool is recommended.

7.9 **Sand bailing:**

Sand bailing is one such job where formation pressures below the sand plug is anticipated. While undertaking any such wireline operations, pressures must be assessed before hand and extra precautions may be taken so as to avoid blowing the tool string up the hole/bailing -up of the wireline due to sudden gush of gas/liquid in the tubing from below. For this following steps should be taken.

1. Carefully assess the length of the sand plug in the tubing.
2. Assess for any anticipated pressures below plugged tubing.
3. Maximum precautions need to be observed while bailing the last length of the sand plug.

**Consequences:**

Non-observance of above precautions mentioned above against each job specific wireline operations, may lead to situations where it may lead to other complications like wireline fishing due to breaking of wire; non-operative wireline BOP or X-mass tree valves etc. due to entangled wireline getting stuck against the BOP ram and / or X-mass tree valves.

7.10 **Reaming operation:**

Care shall be taken for all applicable recommended safe practices in wireline operation as explained elsewhere in this standard code.

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8.0 References:

2. API Recommended Practice 14B, Fourth Edition, July 1, 1994
3. API RP-9B, Recommended Practice on Application, Care & Use of Wire Rope For Oil Field Service
# Wireline Operation Check List

*(Refer Section 4.0 for details)*

<table>
<thead>
<tr>
<th>S.NO</th>
<th>ITEMS</th>
<th>YES / NO</th>
<th>SATISFACTORY / UNSATISFACTORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>GENERAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Work area cleanliness</td>
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<td>2.</td>
<td>Personnel Protective Equipment</td>
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<td>3.</td>
<td>Portable Fire Extinguisher</td>
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<td>4.</td>
<td>First –Aid Box</td>
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<td>5.</td>
<td>Well Record Sheet</td>
<td></td>
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<tr>
<td>B</td>
<td>WINCH &amp; ENGINE</td>
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<tr>
<td>6.</td>
<td>Air inlet slam shut valve</td>
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<tr>
<td>7.</td>
<td>Engine over speed shut down</td>
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<td>8.</td>
<td>Oil pressure safety shut down</td>
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<td>9.</td>
<td>Water temperature safety shut down</td>
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<tr>
<td>10.</td>
<td>Exhaust gas cooler (Integral)</td>
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<td>11.</td>
<td>Exhaust gas flame arrestor</td>
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<td>12.</td>
<td>Anti-static fan belts</td>
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<tr>
<td>13.</td>
<td>Engine oil</td>
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<tr>
<td>14.</td>
<td>Gear box oil</td>
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<td>15.</td>
<td>Hydraulic oil</td>
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<td>16.</td>
<td>Diesel /Petrol</td>
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<td>17.</td>
<td>Coolant</td>
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<td>18.</td>
<td>Reel shaft pillow block bearings</td>
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<td>19.</td>
<td>All other moving joints and connectors</td>
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<td>20.</td>
<td>Reel drive and level wind drive chains</td>
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<tr>
<td>21.</td>
<td>Flange bearings of sprockets assembly</td>
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<tr>
<td>22.</td>
<td>Brake Condition</td>
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<tr>
<td>23.</td>
<td>Safety Guard of moving parts</td>
<td></td>
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<td>24.</td>
<td>Battery terminal connections</td>
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<td>25.</td>
<td>Starter / Dynamo cover in place</td>
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<td>26.</td>
<td>Leakages in hydraulic / fuel system</td>
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<tr>
<td>27.</td>
<td>All controls in position (Gear lever, direction valve, hand brake release, accelerator knob, remote control valve, floor control valve of oil cooler)</td>
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<tr>
<td>28.</td>
<td>Relief valve setting pressure</td>
<td></td>
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<tr>
<td>C</td>
<td>WIRE LINE &amp; TOOLS</td>
<td></td>
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<tr>
<td>29.</td>
<td>Condition of pulley / sheave groove</td>
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<td>30.</td>
<td>Size of pulley w.r.t. wire line</td>
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<td>31.</td>
<td>Condition of Rubber seals of Stuffing box</td>
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<tr>
<td>32.</td>
<td>Measuring device condition</td>
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<tbody>
<tr>
<td>33.</td>
<td>Weight indicator condition</td>
</tr>
<tr>
<td>34.</td>
<td>Pressure test of lubricator to maximum of well pressure</td>
</tr>
<tr>
<td>35.</td>
<td>Pressure test of wireline BOP</td>
</tr>
<tr>
<td>36.</td>
<td>Wireline work string adequacy and condition</td>
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</tbody>
</table>

Checked By  (Name/Designation) ___________________________ Signature ____________

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