Title: DOWNHOLE EQUIPMENT SUSPENSION AND POWER SYSTEM

Abstract: A subsea production system (101) for a subsea well including a tubing hanger (104) to suspend production tubing (108) extending into the subsea well. Downhole equipment (130) is locatable inside the production tubing in the subsea well. The system includes an adaptor spool (124) including an internal bore. A suspension apparatus (106) is supportable above the tubing hanger and within the internal bore of the adaptor spool. A power penetrator (103) is laterally coupleable to the suspension apparatus. A suspension line (107) is extendable from the suspension apparatus to suspend the downhole equipment. A communication line (111) is extendable from the suspension apparatus to provide power to the downhole equipment.

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DOWNHOLE EQUIPMENT SUSPENSION AND POWER SYSTEM

BACKGROUND

[0001] Drilling and producing offshore oil and gas wells includes the use of offshore facilities for the exploitation of undersea petroleum and natural gas deposits. A typical subsea system for drilling and producing offshore oil and gas can include the installation of an electrical submersible pumping ("ESP") system that can be used to assist in production.

[0002] Normally, when ESPs are used with wells they are used during production to provide a relatively efficient form of "artificial lift" by pumping the production fluids from the wells. By decreasing the pressure at the bottom of the well bore below the pump, significantly more oil can be produced from the well when compared with natural production.

[0003] ESPs include both surface components housed in the production facility or on an oil platform, and sub-surface components located in the well. The surface components include the motor controller, which can be a variable speed controller, and surface cables and transformers. Subsurface components typically include the pump, motor, seal, and cables. Sometimes, a liquid/gas separator is also installed. The pump may include multiple stages, with the number of stages being determined by the operating requirements. Each stage includes a driven impeller and a diffuser that directs flow to the next stage of the pump. The power to run the ESP comes from a source connected with the ESP via cable from the surface. The power source could be alternating current or direct current. Typically, the cable is run from the surface vertically through the well, including through any components above the subsea production tree (e.g., intervention riser or blowout preventer stack).

[0004] An issue with existing methods for suspending downhole equipment, including ESPs, is suspending and providing power to the downhole equipment. In
general, power communication means (e.g., cables) must be run vertically through the top of the tree and tubing hanger and through the well. Accordingly, the blowout preventer ("BOP") stack must be removed prior to powering the ESP. Removing this equipment can be a very costly and potentially dangerous endeavor. Accordingly, a cost effective and safer alternative to adding downhole equipment to a well, namely an ESP, is desired.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0005] A better understanding of the various disclosed system and method embodiments can be obtained when the following detailed description is considered in conjunction with the drawings, in which:

[0006] FIG. 1 shows an embodiment of a production system with a downhole equipment suspension and power system including a tubing spool;

[0007] FIG. 2 shows another embodiment of a production system with a downhole equipment suspension and power system including a horizontal subsea production tree; and

[0008] FIG. 3 shows another embodiment of a production system with a downhole equipment suspension and power system including a vertical subsea production tree.

**DETAILED DESCRIPTION**

[0009] The following discussion is directed to various embodiments of the invention. The drawing figures are not necessarily to scale. Certain features of the embodiments may be shown exaggerated in scale or in somewhat schematic form and some details of conventional elements may not be shown in the interest of clarity and conciseness. Although one or more of these embodiments may be preferred, the embodiments disclosed should not be interpreted, or otherwise used, as limiting the scope of the disclosure, including the claims. It is to be fully
recognized that the different teachings of the embodiments discussed below may be employed separately or in any suitable combination to produce desired results. In addition, one skilled in the art will understand that the following description has broad application, and the discussion of any embodiment is meant only to be exemplary of that embodiment, and not intended to intimate that the scope of the disclosure, including the claims, is limited to that embodiment.

[0010] Certain terms are used throughout the following description and claims to refer to particular features or components. As one skilled in the art will appreciate, different persons may refer to the same feature or component by different names. This document does not intend to distinguish between components or features that differ in name but not function. Certain features and components herein may be shown exaggerated in scale or in somewhat schematic form and some details of conventional elements may not be shown in interest of clarity and conciseness.

[0011] In the following discussion and in the claims, the terms "including" and "comprising" are used in an open-ended fashion, and thus should be interpreted to mean "including, but not limited to." Also, the term "couple" or "couples" is intended to mean either an indirect or direct connection. Thus, if a first device couples to a second device, that connection may be through a direct connection, or through an indirect connection via other devices, components, and connections. In addition, as used herein, the terms "axial" and "axially" generally mean along or parallel to a central axis (e.g., central axis of a body or a port), while the terms "lateral" and "laterally" generally mean about perpendicular to the central axis. For instance, an axial distance refers to a distance measured along or parallel to the central axis, and a lateral distance means a distance measured perpendicular to the central axis.

[0012] Accordingly, disclosed herein is a downhole equipment suspension and power system for a well with a subsea production member. The subsea production
member may be a vertical, horizontal, or modular production tree, tubing spool, high pressure wellhead housing, or any equipment in which a tubing hanger could be landed. The suspension and power system may be used for connecting to any type of downhole equipment. For example, the downhole equipment may include an electric submersible pump system for pumping production fluids. Alternative embodiments of the suspension and power system are disclosed.

[0013] FIG. 1 is an illustrative embodiment of a subsea production system 101 including a subsea tubing spool 110. The production system 101 also includes a downhole equipment suspension and power system. In this embodiment, the subsea tubing spool 110 is attached above a wellhead 116. The tubing spool 110 could also be any type of subsea production tree, such as a horizontal or vertical production tree (e.g., a vertical monobore production tree).

[0014] A tubing hanger 104 is landed in the subsea tubing spool 110. The tubing hanger 104 supports a production tubing 108 which extends into the well. A production casing may surround the production tubing 108 in one embodiment of the invention, creating an annular space.

[0015] The downhole equipment suspension and power system includes a suspension apparatus 106 supported by an adaptor spool 124. The adaptor spool 124 is landed above the subsea production member 110, which can be a tubing spool with either a dual bore or concentric interface. The adaptor spool 124 can be installed prior to, during, or after the well is completed. As an example, the suspension apparatus 106 shown is a cable hanger which lands and locks into the adaptor spool 124 below environmental barrier 109. In the embodiment shown in FIG. 1, environmental barrier 109 is preferably a valve. In other embodiments, there may be more than one environmental barrier above the suspension apparatus. An intervention blowout preventer with a high pressure intervention riser 126 is located above the adaptor spool 124. The intervention riser 126 provides an
environmental barrier while allowing through-tubing intervention operations to be carried out. In other embodiments, other barrier equipment or only the intervention riser 126 may be used.

[0016] In other embodiments, the environmental barrier 109 could also be any pressure barrier, such as a plug. Pressure barriers other than valves can reduce the complexity of the adaptor spool 124 (e.g., size and configuration) because there is no requirement for a valve bonnet. Reducing the size and complexity of the adaptor spool 124 also provides additional room for the power penetrator apparatus 103, which is discussed in more detail below.

[0017] A running tool may be used to run, land, and lock the suspension apparatus 106 into the adaptor spool 124. The running tool may include an electrical connection to monitor continuity of power and signal electrical lines when running the suspension apparatus 106 and also may provide access to the hydraulic lines controlling an emergency disconnect feature.

[0018] The downhole equipment suspension and power system also includes downhole equipment 130 installed in the production tubing 108. The downhole equipment may be any type of equipment. For example, the downhole equipment 130 may include a pump operated by electrical power, hydraulic power, or both electrical and hydraulic power. The downhole equipment 130 may be installed with the production tubing 108 or after the production tubing 108 is installed. The downhole equipment may also be an internal completion system, including sliding sleeves, chokes, valves, and sensors (e.g., temperature, pressure, and flow).

[0019] The downhole equipment suspension and power system also includes a suspension line 107 that extends through the production bores of the tubing spool 110 and the tubing hanger 104 and suspends downhole equipment 130 from the suspension apparatus 106. The suspension line 107 may be any line
appropriate for load-bearing suspension of the downhole equipment 130, e.g.,
coiled tubing, tubing, pipe, etc. Included within or run with the suspension
line 107 may also be one or more communication lines 111 that may include one
or more of electrical conductors, hydraulic conduits, and/or fiber optic cables that
can be used to power and operate the downhole equipment 130. These
communication lines 111 may also be encapsulated inside the suspension line 107
for protection. The suspension line 107 may not require any internal pressure
compensation. There may also be an emergency disconnect function to disconnect
the suspension line 107 from the downhole equipment 130 in the event that the
downhole equipment 130 or suspension line 107 is stuck downhole and cannot be
retrieved during installation and retrieval. Alternative embodiments may comprise
more than one suspension line 107 and multiple communication lines 111.

[0020] Also in this embodiment, the tubing spool 110 includes an annulus
bypass 122 such that the annular space surrounding the production tubing 108 is in
fluid communication with the vertical bore of the adaptor spool 124 above the
tubing hanger 104. The annulus bypass 122 may optionally include one or more
valves 128.

[0021] The suspension and power system also includes at least one power
penetrator 103 laterally coupled to the suspension and power system. The power
penetrator 103 can be deployed by remotely operated vehicle. The power
penetrator 103 is used for connecting an external power source 132 with the
downhole equipment 130 in power communication through the communication
lines 111.

[0022] In the embodiment illustrated in FIG. 1, the power penetrator 103 is
shown penetrating the adaptor spool 124 perpendicular to the production bore in
order to access the suspension apparatus 106. However, the power penetrator 103
can be laterally coupled through subsea equipment other than the adaptor
spool 124 provided that the power penetrator 103 accesses the suspension apparatus 106 laterally. In the embodiment illustrated in FIG. 1, the power penetrator 103 is shown laterally coupled to the adaptor spool at about a 90° angle. However, the power penetrator 103 can be laterally coupled at any angle. In one embodiment, the power penetrator may comprise a single line including electrical, hydraulic, and fiber optic lines.

[0023] FIG. 4 illustrates an embodiment of the tree adaptor spool 424, comprising multiple power penetrators 403a, 403b, and 403c for the same or different types of communication. As an example only, the power penetrators 403a, 403b, and 403c may each comprise a different power phase or one penetrator may provide fiber optic communication while another provides hydraulic fluid. Like the embodiment shown in FIG. 1, the embodiment shown in FIG. 4 comprises an environmental barrier 409 located in the tree adaptor spool 424. In the embodiment shown in FIG. 4, environmental barrier 409 is preferably a valve. In other embodiments, the environmental barrier 409 could be a plug. In other embodiments, there may be more than one environmental barrier 409 above the suspension apparatus. The embodiment may further comprise a hydraulic fluid stab 446 and a dielectric flush line 448. Other embodiments of the invention can include any number of additional power penetrators. Although shown in the same plane, the power penetrators may be equally spaced around the adaptor spool body 424. Alternative embodiments allow for the power penetrator lines to be spaced around the wellhead equipment in any arrangement that allows for power to reach the downhole equipment. Other embodiments may include more than one lateral power penetrator, wherein each power penetrator comprises one or more lines.

[0024] As shown in FIG. 1, the power penetrator 103 couples to the suspension apparatus 106 through the adaptor spool 124. Seals can be provided above and below the point where the power penetrator 103 couples to the adaptor spool 124.
These seal the adaptor spool 124 and suspension apparatus to form a sealed enclosure through which the power penetrator 103 couples to the suspension apparatus 106. The suspension line 107 runs from the suspension apparatus 106 down the well through the production tubing 108. Various connections for the communication lines 111 may be used as known to those skilled in the art as appropriate.

[0025] In operation, produced fluids are pumped upward from the well inside of the production tubing and outside of the suspension line 107 and then out through the tree lateral production bore 113 below the suspension apparatus 106. The suspension system provides the necessary multiple environmental barriers, e.g., valves or plugs. Power is provided to the downhole equipment through the power penetrator 103 connection to the external power source 132, which may provide power as electrical, hydraulic, or both. Should the tubing spool 110 need to be removed for service, the suspension system, including the suspension line 107 and the downhole equipment 130 may be removed and appropriate barriers set in place. The adaptor spool 124 may then be removed while leaving tubing hanger 104 and production tubing 108 in place.

[0026] FIG. 2 is another illustrative embodiment of a subsea production system 201 including a subsea horizontal production tree 210 attached above a high pressure wellhead housing 216. The production system 201 also includes a downhole equipment suspension and power system. The production tree 210 could also be any other type of subsea production tree, such as a vertical production tree (e.g., a vertical monobore production tree). A tubing hanger 204 is landed in the subsea horizontal production tree 210 and supports production tubing 208 that extends into the well.

[0027] The downhole equipment suspension and power system includes a suspension apparatus 206 landed in the adaptor spool 224 above the tubing
hanger 204. The suspension apparatus 206 can be installed prior to, during, or after the well is completed. As an example, the suspension apparatus 206 shown is a cable hanger which lands and locks into the adaptor spool 224 above the tubing hanger 204 and below environmental barrier 209. In the embodiment shown in FIG. 2, environmental barrier 209 is a valve. In other embodiments, the environmental barrier 209 could also be any pressure barrier, such as a plug.

[0028] The downhole equipment suspension and power system also includes downhole equipment 230 installed in the production tubing 208. The downhole equipment may be any type of equipment. For example, the downhole equipment 230 may include a pump operated by electrical power, hydraulic power, or both electrical and hydraulic power, hydraulic supply, and fiber optics. The downhole equipment 230 may be installed with the production tubing 208 or after the production tubing 208 is installed.

[0029] The downhole equipment suspension and power system also includes a suspension line 207 that extends through the production bores of the production tree 210 and the tubing hanger 204 and suspends downhole equipment 230 from the suspension apparatus 206. The suspension line 207 may be any line appropriate for load-bearing suspension of the downhole equipment 230, e.g., coiled tubing, tubing, pipe, etc. Included within or run with the suspension line 207 may also be one or more communication lines 211 that may include one or more of electrical conductors, hydraulic conduits, and/or fiber optic cables that can be used to power and operate the downhole equipment 230. These communication lines 211 may also be encapsulated inside the suspension line 207 for protection. The suspension line 207 may not require any internal pressure compensation. There may also be an emergency disconnect function to disconnect the suspension line 207 from the downhole equipment 230 in the event that the downhole equipment 230 or suspension line 207 is stuck downhole and cannot be
retrieved during installation and retrieval. Alternative embodiments may comprise more than one suspension line 207 and multiple communication lines 211.

[0030] Also in this embodiment, the production tree 210 includes an annulus bypass 222 such that the annular area surrounding the production tubing 208 is in fluid communication with the vertical bore of the production tree 210 above the tubing hanger 204. The annulus bypass 222 may optionally include one or more valves 228.

[0031] The suspension and power system also includes at least one power penetrator 203 is laterally coupled to the suspension and power system. The power penetrator 203 can be deployed by remotely operated vehicle. The power penetrator 203 is used for connecting an external power source 232 with the downhole equipment 230 in power communication through the communication lines 211.

[0032] In the embodiment illustrated in FIG. 2, the power penetrator 203 is shown laterally coupling to the adaptor spool 224 at about a 90° angle with respect to the production bore. However, the power penetrator 203 can be laterally coupled to the equipment at any angle. As shown, the power penetrator 203 couples to the suspension apparatus 206 through the production tree 210. The suspension line 207 runs from the suspension apparatus 206 down the well through the production tubing 208. Various electrical connections for the communications lines 211 may be used as known to those skilled in the art as appropriate.

[0033] FIG. 3 is an illustrative embodiment of a subsea production system 301 including a subsea vertical production tree 310 attached above a high pressure wellhead housing 316. The production system 301 also includes a downhole equipment suspension and power system.
[0034] A tubing hanger 304 is landed in the high pressure wellhead housing 316. The tubing hanger 304 supports production tubing 308 which extends into the well. A production casing may surround the production tubing 308 in one embodiment of the invention, creating an annular space.

[0035] The downhole equipment suspension and power system includes a suspension apparatus 306 supported by an adaptor spool 324. The adaptor spool 324 is landed above the subsea production tree 310. The adaptor spool 324 can be installed prior to, during, or after the well is completed. As an example, the suspension apparatus 306 shown is a cable hanger which lands and locks into the adaptor spool 324 below an environmental barrier 309. An intervention blowout preventer and intervention riser 326 are located above the adaptor spool 324.

[0036] The downhole equipment suspension and power system also includes downhole equipment 330 installed in the production tubing 308. The downhole equipment may be any type of equipment. For example, the downhole equipment 330 may include a pump operated by electrical power, hydraulic power, or both electrical and hydraulic power. The downhole equipment 330 may be installed with the production tubing 308 or after the production tubing 308 is installed.

[0037] The downhole equipment suspension and power system also includes a suspension line 307 that extends through the production bores of the production tree 310 and the tubing hanger 304 and suspends downhole equipment 330 from the suspension apparatus 306. The suspension line 307 may be any line appropriate for load-bearing suspension of the downhole equipment 330, e.g., coiled tubing, tubing, pipe, etc. Included within or run with the suspension line 307 may also be one or more communication lines 311 that may include one or more of electrical conductors, hydraulic conduits, and/or fiber optic cables that can be used to power and operate the downhole equipment 330. These
communication lines 311 may also be encapsulated inside the suspension line 307 for protection. The suspension line 307 may not require any internal pressure compensation. There may also be an emergency disconnect function to disconnect the suspension line 307 from the downhole equipment 330 in the event that the downhole equipment 330 or suspension line 307 is stuck downhole and cannot be retrieved during installation and retrieval. Alternative embodiments may comprise more than one suspension line 307 and multiple communication lines 311.

[0038] Also in this embodiment, the subsea production tree 310 includes an annulus bypass 322, one or more valves 342 in the vertical run of the production bore and one or more valves 344 in the lateral production bore 327 of the tree.

[0039] The suspension and power system also includes at least one power penetrator 303 which is laterally coupled to the suspension and power system. The power penetrator 303 can be deployed by remotely operated vehicle. The power penetrator 303 is used for connecting an external power source 332 with the downhole equipment 330 in power communication through the communication lines 311.

[0040] In the embodiment illustrated in FIG. 3, the power penetrator 303 is shown penetrating the adaptor spool 324 perpendicular to the production bore in order to access the suspension apparatus 306. However, the power penetrator 303 can be laterally coupled through subsea equipment other than a adaptor spool provided that the power penetrator 303 accesses the suspension apparatus 306 laterally. In the embodiment illustrated in FIG. 3, the power penetrator 303 is shown laterally coupled to the adaptor spool at about a 90° angle. However, the power penetrator 303 can be laterally coupled at any angle.

[0041] As shown, the power penetrator 303 couples to the suspension apparatus 306 through the adaptor spool 324. Seals can be provided above and below the point where the power penetrator 303 couples to the adaptor spool 324. These seal
the adaptor spool 324 and suspension apparatus 306 together to form a sealed enclosure through which the power penetrator 303 couples to the suspension apparatus 306. The suspension line 307 runs from the suspension apparatus 306 down the well through the production tubing 308. Various electrical connections for the communication lines 311 as known to those skilled in the art as appropriate.

[0042] As shown as an example in FIG. 3, the subsea production tree 310 is installed directly to a high pressure wellhead housing 316. Alternatively, the subsea production tree 310 may be installed indirectly to the high pressure wellhead housing 316, e.g., by way of a tubing spool.

[0043] In operation, produced fluids are pumped upward from the well inside of the production tubing and outside of the coil tubing and then out through the tree lateral production bore 327 below the suspension apparatus 306. The suspension system provides the necessary multiple environmental barriers, e.g., valves or plugs. Power is provided to the downhole equipment through the power penetrator 303 connection to the external power source 330, which may provide power as electrical, hydraulic, or both through the communication lines 311. Should the production vertical tree 310 need to be removed for service, the suspension system, including the suspension line 307 and the downhole equipment 330 may be removed and appropriate barriers set in place. The production vertical tree 310 may then be removed while leaving tubing hanger 304 and production tubing 308 in place.

[0044] The various embodiments disclosed above may optionally include a means for providing fresh or recycled lubricants, such as oil or dielectric lubricant, to the downhole equipment. Traditionally, downhole pump motors are less reliable than conventional seabed pump motors and pumps because they are in harsher environments and have not previously been able to receive fresh or recycled
lubricating oil. Embodiments of the present invention may include means for providing fresh or recycled lubricating oil to the downhole equipment. For instance, embodiments of the present invention may include a hydraulic conduit 334 routed on a path from the adaptor spool 324, or the suspension apparatus 306, to the suspension line 307 and down to the downhole equipment 330. Fresh oil could travel this path by pressure and feed to the downhole equipment 330. The pressure pushes the oil through and out of the pump motor and pumps and into the production flow. Other embodiments could also include a closed loop oil recycling arrangement. The closed loop arrangement could be used to deliver oil to the pump motor and pumps, receive the oil back and circulate through an oil recycling process facility located on the adaptor spool 324.

[0045] Providing fresh or recycled lubricating oil to the downhole equipment extends the life of the downhole equipment, resulting in cost efficiencies. An apparatus for providing fresh and/or recycled lubricating oil to the downhole equipment may be incorporated in any embodiment of the disclosed invention. For instance, the apparatus for providing fresh and/or recycled lubricating oil may be incorporated in any embodiment of this disclosure, including those illustrated in FIGS. 1, 2, and 3, and any other combinations of the disclosure.

[0046] The present disclosure provides for flexibility in installation. As discussed above, there are various options for configuration and the use of multiple components. For instance, the tubing hanger can be landed in the production member (e.g., tree, high pressure wellhead housing, etc.) or in a spool or head. In addition, the suspension apparatus can be landed in the production trees or in a adaptor spool. Further, the power penetrator may be laterally coupled to the production member or to the adaptor spool.

[0047] The present disclosure allows for the addition of downhole equipment, e.g., an ESP, to an existing well without having to pull the tree or tubing hanger
and make modification. This provides a safe and cost-effective way to add the
downhole equipment when eventually needed due to one or more valves being
located above the suspension apparatus, e.g., cable hanger, and the fact that the
power can be turned on to the ESP with a barrier in place above the production
tree, such as an intervention riser or blowout preventer stack.

[0048] While specific embodiments have been shown and described,
modifications can be made by one skilled in the art without departing from the
spirit or teaching of this invention. The embodiments as described are exemplary
only and are not limiting. Many variations and modifications are possible and are
within the scope of the invention. Accordingly, the scope of protection is not
limited to the embodiments described, but is only limited by the claims that
follow, the scope of which shall include all equivalents of the subject matter of the
claims.
Claims

What is claimed is:

1. A subsea production system for a subsea well including:
   a tubing hanger configured to suspend production tubing extending into the subsea well;
   downhole equipment locatable inside the production tubing in the subsea well;
   an adaptor spool including an internal bore;
   a suspension apparatus supportable above the tubing hanger and within the internal bore of the adaptor spool;
   a power penetrator laterally coupleable to the suspension apparatus;
   a suspension line extendable from the suspension apparatus and configured to suspend the downhole equipment; and
   a communication line extendable from the suspension apparatus and configured to provide power to the downhole equipment.

2. The system of claim 1, further including a subsea production member and wherein the adaptor spool is connectable directly or indirectly to the subsea production member.

3. The system of claim 2, wherein the subsea production member is a subsea production tree.

4. The system of claim 3, wherein the subsea production tree is one of a vertical tree or a horizontal tree.

5. The system of claim 2, wherein the subsea production member is at least one of a spool and a head.
6. The system of claim 2, wherein the subsea production member is a high pressure wellhead housing.

7. The system of claim 2, further including:
   a power source external to the subsea production member; and
   wherein the power source is configured to communicate power through the power penetrator.

8. The system of claim 1, wherein the power penetrator is laterally coupleable to the suspension apparatus from outside the adaptor spool.

9. The system of claim 1, wherein the communication line includes at least one of an electrical conductor, a hydraulic conduit, and a fiber optic cable.

10. The system of claim 1, wherein the communication line is locatable within the suspension line.

11. The system of claim 1, further including multiple power penetrators.

12. The system of claim 1, wherein the downhole equipment includes a pump operable by at least one of electrical power and hydraulic power.

13. The system of claim 12, wherein the downhole equipment includes a lubricant circulating system and a lubricant recycle system.

14. The system of claim 1, further including an environmental barrier in the adaptor spool internal bore above the suspension apparatus.
15. The system of claim 14, wherein the environmental barrier includes at least one of a valve and a plug.

16. A downhole equipment suspension and power system for a subsea production system including a subsea production member, a tubing hanger, and a production tubing extending into a subsea well, the suspension and power system including:
   an adaptor spool including an internal bore and connectable with the subsea production system;
   a suspension apparatus supportable within the internal bore of the adaptor spool;
   an environmental barrier locatable in the adaptor spool internal bore above the suspension apparatus;
   a power penetrator laterally coupleable to the suspension apparatus;
   downhole equipment installable in the production tubing in the well;
   a suspension line extendable from the suspension apparatus and configured to suspend the downhole equipment; and
   a communication line extendable from the suspension apparatus and configured to provide power to the downhole equipment.

17. The system of claim 16 further including a power source configured to communicate power through the power penetrator.

18. The system of claim 16, wherein the power penetrator is laterally coupleable to the suspension apparatus from outside the adaptor spool.

19. The system of claim 16, wherein the communication line includes at least one of an electrical conductor, a hydraulic conduit, and a fiber optic cable.
20. The system of claim 16, wherein the communication line is locatable within the suspension line.

21. The system of claim 16, further including multiple power penetrators.

22. The system of claim 16, wherein the downhole equipment includes a pump operable by at least one of electrical power and hydraulic power.

23. The system of claim 22, wherein the downhole equipment includes a lubricant circulating system and a lubricant recycle system.
INTERNATIONAL SEARCH REPORT

PCT/EP2015/056000

A. CLASSIFICATION OF SUBJECT MATTER

INV. E21B33/035 E21B33/043 E21B43/12 E21B33/04

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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Date of the actual completion of the international search

18 August 2015

Date of mailing of the international search report

31/08/2015

Name and mailing address of the ISA

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Authorized officer

Brassart, P

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Further documents are listed in the continuation of Box C. See patent family annex.
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