An underwater well installation comprises: a storage facility 1 storing at least one treatment chemical for the installation, the facility 1 being on the bed of a body of water at or near the intended point of use of the or each chemical; and a control system 3 for controlling operation of the facility. The control system 3 may control a chemical injection valve of a Christmas tree.

Fig. 1
THE STORAGE OF TREATMENT CHEMICALS FOR AN UNDERWATER WELL

Field of the Invention

The present invention relates to the storage of treatment chemicals for an underwater well.

Background of the Invention

Treatment chemicals are used in subsea production control systems for subsea hydrocarbon wells to reduce the build up of substances in the production flowline as the product flows from the well to a topside production facility (e.g. corrosion inhibitors, scale inhibitors, paraffin inhibitors, hydrate inhibitors, demulsifiers, etc).

Currently these chemicals are stored on the topside facility and are transmitted to the subsea facility via hoses in an umbilical. This makes the umbilical complicated, cumbersome and expensive. There is also a risk of chemical leakage over such a long distance between the source and point of use (e.g. the wellhead).

Summary of the Invention

According to the invention from one aspect, there is provided an underwater well installation comprising: a storage facility storing at least one treatment chemical for the installation, the facility being on the bed of a body of water at or near the intended point of use of the or each chemical; and a control system for controlling operation of the facility.

The control system is preferably located on or near the bed of the body of water. In this case, the control system could comprise a production control system of the installation, for example a subsea control module such as one at a Christmas tree of the installation.

Said intended point of use is typically a wellhead of the installation.
The control system could be connected for controlling at least one chemical injection valve of the facility and/or at least one chemical injection valve of a Christmas tree.

According to the invention from another aspect, there is provided a method of providing at least one treatment chemical for an underwater well installation, comprising: providing on the bed of a body of water a storage facility containing at least one treatment chemical at or near the point of use of the or each chemical; and controlling the facility using a control system.

The method could include the step of supplying the facility with the or each treatment chemical from the surface of the body of water, for example via an umbilical from a surface vessel.

In the following embodiment, a treatment chemical storage facility is located on the seabed at or near to the intended point of use (e.g. the wellhead) and can be controlled via the production control system (e.g. a subsea control module). The storage facility is large enough to store an amount of at least one treatment chemical that would last for a convenient period of time (maybe 1 month for example) and can be periodically re-filled using a service vessel with a simple remotely operated vehicle (ROV) attached temporary umbilical.

**Brief Description of the Drawing**

Fig. 1 shows schematically one embodiment of the invention.

**Description of an Embodiment of the Invention**

As Illustrated in Fig 1, a treatment chemical storage facility (TCSF)1 is located on the seabed at or near to the intended point of use (namely, a wellhead Christmas tree 2 of a subsea hydrocarbon well) and is controlled via a production control system typically located in a subsea control module (SCM) 3 of the tree 2. The TCSF 1 is filled with the appropriate chemical(s) using a temporary umbilical 4, connected from a surface vessel 5. The SCM 3 controls chemical injection valves located on the TCSF 1 and/or the Christmas tree 2, and reads pressure/flow sensors to control the amount and rate of chemical injection into the wellhead. The TCSF 1 is large enough
to store an amount of fluid that would last for a convenient period of time (maybe 1 month for example) and would be periodically re-filled using a service vessel 5, with a simple ROV attached, temporary umbilical 4. This removes the need for chemical hoses in an umbilical 6 connecting services from a topside facility 7 to the subsea Christmas tree 2. There could be a plurality of such trees associated with the TCSF 1.

Advantages of using the Invention

The invention allows :-

- Smaller umbilical from the topside facility which is easier to handle
- Reduced manufacturing and installation costs for the umbilical from the topside facility
- Reduced distance for the chemicals to travel to point of use
- No need for a bulky topside storage facility, meaning that space requirements are reduced
CLAIMS:

1. An underwater well installation comprising: a storage facility storing at least one treatment chemical for the installation, the facility being on the bed of a body of water at or near the intended point of use of the or each chemical; and a control system for controlling operation of the facility.

2. An installation according to claim 1, wherein the control system is located on or near the bed of the body of water.

3. An installation according to claim 2, wherein the control system comprises a production control system of the installation.

4. An installation according to claim 3, wherein the production control system comprises a subsea control module.

5. An installation according to claim 4, wherein the subsea control module is at a Christmas tree of the installation.

6. An installation according to any preceding claim, wherein said intended point of use is a wellhead of the installation.

7. An installation according to any preceding claim, wherein the control system is connected for controlling at least one chemical injection valve of the facility.

8. An installation according to any preceding claim, wherein the control system is connected for controlling at least one chemical injection valve of a Christmas tree of the installation.

9. A method of providing at least one treatment chemical for an underwater well installation, comprising: providing on the bed of a body of water a storage facility containing at least one treatment chemical at or near the point of use of the or each chemical; and controlling the facility using a control system.
10. A method according to claim 9, including the step of supplying the facility with the or each treatment chemical from the surface of the body of water.

11. A method according to claim 10, wherein the or each treatment chemical is supplied via an umbilical from a surface vessel.

12. A method according to any of claims 9 to 11, wherein the control system is located on or near the bed of the body of water.

13. A method according to claim 12, wherein the control system comprises a production control system of the installation.

14. A method according to claim 13, wherein the production control system comprises a subsea control module.

15. A method according to claim 14, wherein the subsea control module is at a Christmas tree of the installation.

16. A method according to any of claims 9 to 15, wherein said intended point of use is a wellhead of the installation.

17. A method according to any of claims 9 to 16, wherein the control system is connected to control at least one chemical injection valve of the facility.

18. A method according to any of claims 9 to 16, wherein the control system is connected to control at least one chemical injection valve of a Christmas tree of the installation.
Application No: GB1007856.6
Claims searched: 1-18
Examiner: Dr Lyndon Ellis
Date of search: 14 June 2010

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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- **&** Member of the same patent family
- **A** Document indicating technological background and/or state of the art.
- **P** Document published on or after the declared priority date but before the filing date of this invention.
- **E** Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:
Search of GB, EP, WO & US patent documents classified in the following areas of the UKC:

Worldwide search of patent documents classified in the following areas of the IPC
B63G; E21B

The following online and other databases have been used in the preparation of this search report
EPODOC, WPI

International Classification:

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