CLAIMS

What is claimed is:

1. A method of monitoring cathodic protection of an item located underwater at a facility, the facility further including a processing means, comprising the steps of:

providing a pair of first and second electrodes, the first electrode being electrically connected to the item and the second electrode being in contact with water proximate the item;

measuring the potential between the first and second electrodes;

producing an electrical signal indicative of the cathodic protection level;

converting the signal into a communications format compatible with the processing means and passing it to the processing means; and

transmitting the converted signal from the processing means to a surface location.

2. A method according to claim 1, wherein the underwater facility comprises an underwater hydrocarbon extraction facility.

3. A method according to claim 2, wherein the converted signal is transmitted to a surface location along an umbilical cable.

4. A method according to claim 2, wherein the processing means comprises a subsea electronics module.

5. A method according to claim 1, wherein the communications format compatible with the processing means comprises CANbus.

6. A method according to claim 1, wherein the communications format compatible with the processing means comprises profibus.

7. A method according to claim 1, wherein the communications format compatible with the processing means comprises modbus.

8. A method according to claim 1, comprising the steps of:

providing at least one additional pair of first and second electrodes, the first electrode being electrically connected to an item at a different location the first electrode of the first pair and the second electrode being in contact with water proximate the item;

measuring the potential between the first and second electrodes of the additional pair;

producing an electrical signal indicative of the cathodic protection level;

converting the signal into a communications format compatible with the processing means and passing it to the processing means.

9. A method according to claim 8, wherein the signal is passed to the processing means on a network bus.

10. An underwater facility having an item requiring cathodic protection, comprising:

a pair of first and second electrodes, the first electrode being electrically connected to the item and the second electrode being in contact with water proximate the item;

means for measuring the potential between the first and second electrodes and producing an electrical signal indicative of the cathodic protection level;

a transducer for converting the signal into a communications format compatible with the processing means;

a processing means;

means for passing the converted signal to the processing means; and

transmission means for transmitting the converted signal from the processing means to a surface location.

11. An underwater hydrocarbon extraction facility according to claim 10.

12. An extraction facility according to claim 11, wherein the transmission means comprises an umbilical cable.

13. An extraction facility according to claim 11, wherein the processing means comprises a subsea electronics module.

14. An extraction facility according to claim 11, wherein the transducer converts the signal to a CANbus format.

15. An extraction facility according to claim 11, wherein the transducer converts the signal to a profibus format.

16. An extraction facility according to claim 11, wherein the transducer converts the signal to a modbus format.

17. An underwater facility according to claim 10, comprising at least one additional pair of first and second electrodes.

18. An underwater facility according to claim 17, comprising a network bus connecting each electrode pair and the processing means.

Claims

1. A method of monitoring cathodic protection of an item receiving cathodic protection located underwater at an underwater hydrocarbon extraction facility from a topside facility located onshore on a vessel or rig, the facility further including a subsea electronics control module, the method comprising the steps of:

providing a pair of first and second electrodes;

electrically connecting the first electrode to an item requiring cathodic protection located underwater at an underwater hydrocarbon extraction facility;

positioning the second electrode being in contact with water proximate the item;

producing an electrical signal indicative of a cathodic protection level of the item;

converting the signal into a communications format compatible with the subsea electronics control module;

passing the converted signal to the subsea electronics module;

transmitting the converted signal from the subsea electronics module to a surface location along a line within an umbilical cable; and

determining the cathodic protection level of the item responsive to the converted siginal.

2. A method according to claim 1, wherein the communications format compatible with the subsea electronics module comprises CANbus.

3. A method according to claim 1, wherein the communications format compatible with the subsea electronics module comprises profibus.

4. A method according to claim 1, wherein the communications format compatible with the subsea electronics module comprises modbus.

5. A method according to claim 1, wherein the pair of first and second electrodes comprises a first pair of first and second electrodes wherein the item requiring cathodic protection is a first item requiring cathodic protection, the method further comprising the steps of:

providing a second pair of electrodes, a first electrode of the second pair of electrodes being electrically connected to a second item requiring cathodic protection positioned at a different location than the first item, and a second electrode of the second pair of electrodes being in contact with water proximate the second item;

producing an electrical signal indicative of the cathodic protection level of the second item;

converting the respective signal into a communications format compatible with the subsea electronics module;

passing the converted signal indicative of the cathodic protection level of the second item to the subsea electronics module; and

determining the cathodic protection level of the second item responsive to the potential between electrodes of the second pair of electrodes.

6. A method according to claim 5, wherein the signal is passed to the subsea electronics module on a network bus.

7. A system for monitoring cathodic protection of an item receiving cathodic protection located underwater at an underwater hydrocarbon extraction facility from a topside facility located onshore or on a vessel or rig, the system comprising:

an underwater hydrocarbon extraction facility having an item requiring cathodic protection;

a pair of electrodes, a first electrode of the pair of electrodes being electrically connected to the item requiring cathodic protection and a second electrode being in contact with water proximate the item, the first and the second electrodes being operably positioned to produce a potential therebetween and an electrical signal indicative of a cathodic protection level;

a subsea electronics module;

a transducer for converting the signal into a communications format compatible with the subsea electronics module;

one or more cables operably coupled between the transducer and the subsea electronics module to pass the converted signal to the subsea electronics module;

an umbilical cord positioned to transmit the converted signal from the subsea electronics module to a surface location; and

a topside facility located at the surface location, configured to analyze the converted signal to thereby determine the cathodic protection level of the item requiring cathodic protection.

8. A system according to claim 7, wherein the transducer converts the signal to a CANbus format.

9. A system according to claim 7, wherein the transducer converts the signal to a profibus format.

10. A system according to claim 7, wherein the transducer converts the signal to a modbus format.

11. A system according to claim 7, wherein the pair of first and second electrodes is a first pair of first and second electrodes, the system comprising a second pair of electrodes, a first electrode of the second pair of electrodes being electrically connected to a second item requiring cathodic protection positioned at a different location than the first item, and a second electrode of the second pair of electrodes being in contact with water proximate the second item.

12. A system according to claim 11, comprising a network bus connecting each electrode pair and the subsea electronics module.

13. A method of monitoring cathodic protection of an item receiving cathodic protection located underwater at an underwater hydrocarbon extraction facility from a topside facility located onshore or on a vessel or rig, the method comprising the steps of:

providing a pair of first and second electrodes;

electrically connecting the first electrode to an item requiring cathodic protection located underwater at an underwater hydrocarbon extraction facility;

positioning the second electrode in contact with water proximate the item;

producing an electrical signal indicative of a cathodic protection level of the item;

converting the signal into a communications format compatible with the subsea electronics control module, the step of converting performed by a transducer;

passing the converted signal from the transducer to the subsea electronics control module;

transmitting the converted signal from the subsea electronics control module to a topside facility positioned at surface location via a line within an umbilical cable; and

determining the cathodic protection level responsive to the converted signal, the step of determining performed at the topside facility.

14. A method as defined in claim 13, wherein the topside facility is a master control station (MCS).