[0005] The life of a chemical-injection management system may be limited by its mechanical components, such as gearboxes, motors, and valves that can wear out. Further, sensors and actuators used to control flow rate can drift over time, and, as a result, the accuracy of the chemical-injection management system can decline. These problems may be particularly acute in sub-sea applications, where the chemical-injection management system may be difficult and/or expensive to access. Replacing a worn out or inaccurate chemical-injection management system can significantly add to the cost of operating a well, for instance.

SUMMARY

[0005A] According to a first aspect of the present invention, there is provided a system, comprising: a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises: a housing having an interior; a first interface coupled to the housing, wherein the first interface comprises a mechanical connector, a power connector, and at least one fluid connector; a chemical injection control assembly disposed within the interior of the housing, wherein the chemical injection control assembly is configured to control a parameter of fluid flow through a fluid path and the chemical injection control assembly comprises a valve; and a protective fluid disposed within the interior of the housing; and a pressure equalizer coupled to the housing, wherein the pressure equalizer is disposed between the protective fluid and an exterior of the chemical-injection management unit.

[0005B] According to a second aspect of the present invention, there is provided a system, comprising: a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises: a housing; a chemical flow path through the housing from an inlet to an outlet; a positive displacement flow meter disposed along the chemical flow path in the housing; a needle valve disposed along the chemical flow path in the housing; an electric actuator coupled to the needle valve; a controller coupled to the electric actuator, wherein the controller is configured to control the needle valve based on feedback from the positive displacement flow meter without any valve position feedback relating to the needle valve.

[0005C] According to a third aspect of the present invention, there is provided a system, comprising: a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises: a housing having an interior; a tree interface coupled to the housing, wherein the tree interface is configured to mount the housing to a tree of the wellhead; a remotely operated vehicle (ROV) interface coupled to the housing, wherein the ROV interface is configured to couple

the housing with a remotely operated vehicle (ROV); a chemical injection control assembly disposed within the interior of the housing, wherein the chemical injection control assembly is configured to control a parameter of fluid flow through a fluid path, wherein the tree interface comprises a mechanical connector, a power connector, and at least one fluid connector.

[0005D] According to a fourth aspect of the present invention, there is provided a system, comprising: a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises: a housing having an interior; a tree interface coupled to the housing, wherein the tree interface is configured to mount the housing to a tree of the wellhead; a remotely operated vehicle (ROV) interface coupled to the housing, wherein the ROV interface is configured to couple the housing with a remotely operated vehicle (ROV); a chemical injection control assembly disposed within the interior of the housing, wherein the chemical injection control assembly is configured to control a parameter of fluid flow through a fluid path, wherein the ROV interface comprises a torque tool interface configured to transfer torque to a drive shaft extending through the housing, and the drive shaft is configured to move the tree interface between a secured position and a released position relative to the tree.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description of certain exemplary embodiments is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0007] FIG. 1 is a perspective view of an exemplary resource extraction system in accordance with an embodiment of the present technique;

[0008] FIG. 2 is a partial perspective view of the resource extraction system of FIG.1 that depicts an exemplary chemical-injection management system and a valve receptacle in accordance with an embodiment of the present technique;

[0009] FIG. 3 is a rear-perspective view of the chemical-injection management system of FIG. 2;

[0010] FIG. 4 is a perspective view of the valve receptacle of FIG. 2;

[0011] FIG. 5 is a cutaway view of the chemical-injection management system of FIG. 2;

[0012] FIG. 6 is a side-view of an exemplary flow regulator in accordance with an embodiment of the present technique;

[0013] FIG. 7 is a cross-sectional view of an exemplary valve in accordance with an embodiment of the present technique;

CLAIMS

1. A system, comprising:

a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises:

a housing having an interior;

a first interface coupled to the housing, wherein the first interface comprises a mechanical connector, a power connector, and at least one fluid connector;

a chemical injection control assembly disposed within the interior of the housing, wherein the chemical injection control assembly is configured to control a parameter of fluid flow through a fluid path and the chemical injection control assembly comprises a valve; and

a protective fluid disposed within the interior of the housing; and

a pressure equalizer coupled to the housing, wherein the pressure equalizer is disposed between the protective fluid and an exterior of the chemical-injection management unit.

2. The system of claim 1, wherein the chemical injection control assembly comprises a meter and an actuator.

3. The system of claim 2, wherein the meter comprises a flow meter, and the actuator comprises a motor.

4. The system of claim 2, wherein the chemical injection control assembly comprises a controller configured to control the valve based on sensor feedback from the meter without any position feedback from the valve.

5. The system of claim 1, wherein the chemical injection control assembly comprises a positive displacement flow meter.

6. The system of claim 1, wherein the valve comprises a needle valve.

7. The system of claim 1, wherein the protective fluid comprises oil.

8. The system of claim 1, wherein the pressure equalizer comprises a resilient bladder.

9. The system of claim 1, wherein the first interface is configured to couple to a tree of the wellhead.

10. The system of claim 9, comprising the tree coupled to the chemical-injection management unit.

11. The system of claim 1, comprising a second interface coupled to the housing, wherein the first interface comprises a tree interface, and the second interface comprises a remotely operated vehicle (ROV) interface.

12. A system, comprising:

a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises:

a housing;

a chemical flow path through the housing from an inlet to an outlet;

a positive displacement flow meter disposed along the chemical flow path in the housing;

a needle valve disposed along the chemical flow path in the housing;

an electric actuator coupled to the needle valve;

a controller coupled to the electric actuator, wherein the controller is configured to control the needle valve based on feedback from the positive displacement flow meter without any valve position feedback relating to the needle valve.

13. A system, comprising:

a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises:

a housing having an interior;

a tree interface coupled to the housing, wherein the tree interface is configured to mount the housing to a tree of the wellhead;

a remotely operated vehicle (ROV) interface coupled to the housing, wherein the ROV interface is configured to couple the housing with a remotely operated vehicle (ROV);

a chemical injection control assembly disposed within the interior of the housing, wherein the chemical injection control assembly is configured to control a parameter of fluid flow through a fluid path, wherein the tree interface comprises a mechanical connector, a power connector, and at least one fluid connector.

14. The system of claim 13, comprising a protective fluid disposed within the interior of the housing, and a pressure equalizer coupled to the housing, wherein the pressure equalizer is disposed between the protective fluid and an exterior of the chemical-injection management unit.

15. The system of claim 14, wherein the pressure equalizer comprises a resilient bladder.

16. The system of claim 13, wherein the chemical injection control assembly comprises a meter, a valve, and an actuator.

17. The system of claim 16, wherein the meter comprises a positive displacement flow meter, and the valve comprises a needle valve.

18. The system of claim 16, wherein the chemical injection control assembly comprises a controller configured to control the valve based on sensor feedback from the meter without any position feedback from the valve.

19. A system, comprising:

a chemical-injection management unit configured to regulate a fluid flow of a chemical into a wellhead, wherein the chemical-injection management unit comprises:

a housing having an interior;

a tree interface coupled to the housing, wherein the tree interface is configured to mount the housing to a tree of the wellhead;

a remotely operated vehicle (ROV) interface coupled to the housing, wherein the ROV interface is configured to couple the housing with a remotely operated vehicle (ROV);

a chemical injection control assembly disposed within the interior of the housing, wherein the chemical injection control assembly is configured to control a parameter of fluid flow through a fluid path, wherein the ROV interface comprises a torque tool interface configured to transfer torque to a drive shaft extending through the housing, and the drive shaft is configured to move the tree interface between a secured position and a released position relative to the tree.

20. The system of claim 19, comprising a protective fluid disposed within the interior of the housing, and a pressure equalizer coupled to the housing, wherein the pressure equalizer is disposed between the protective fluid and an exterior of the chemical-injection management unit.

21. The system of claim 20, wherein the pressure equalizer comprises a resilient bladder.

22. The system of claim 19, wherein the chemical injection control assembly comprises a meter, a valve, and an actuator.

23. The system of claim 22, wherein the meter comprises a positive displacement flow meter, and the valve comprises a needle valve.

24. The system of claim 22, wherein the chemical injection control assembly comprises a controller configured to control the valve based on sensor feedback from the meter without any position feedback from the valve.