CLAIMS

1. A subsea tree assembly mountable to a subsea tree and a subsea production flowline, the subsea tree including a production line, comprising:

a module comprising a production line connector and a production flowline connector operable for connection and fluid communication with said subsea tree and with said production flow line, respectfully, said module defining a fluid flow passageway therein, whereby said subsea tree is in fluid communication with said production flowline through said module only after said module is connected to said subsea tree and said production flowline.

2. The subsea tree assembly of claim 1, wherein the module provides access to the subsea tree.

3. The subsea tree assembly of claim 1, wherein the module includes a chemical injection device.

4. The subsea tree assembly of claim 1 further including a choke for controlling fluids flowing through said fluid flow passageway.

5. The subsea tree assembly of claim 1 wherein said module includes a flow measuring device.

6. The subsea tree assembly of claim 1 wherein said module includes a processing apparatus.

7. The subsea tree assembly of claim 6 wherein the processing device comprises a pump, a process fluid turbine, an injection apparatus for injecting gas or steam, a materials injection apparatus, a chemical injection apparatus, a chemical reaction vessel, a pressure regulation apparatus, a fluid riser, a measurement apparatus, a temperature measurement apparatus, a flow rate measurement apparatus, a constitution measurement apparatus, a consistency measurement

~~apparatus, a gas separation apparatus, a water separation apparatus, a solids separation apparatus,~~ a hydrocarbon separation apparatus, or a combination thereof.

8. A module to provide the only fluid communication between a subsea installation comprising a subsea tree and a production flowline, said module comprising a first connector for connecting to said subsea installation and a second connector for connecting to said production flowline, said module, when installed, forming a fluid flow passageway which connects between said subsea tree and said production flowline.

9. The module of claim 8 further comprising access to the subsea tree.

10. The module of claim 8 wherein the module includes a chemical injection apparatus.

11. The module of claim 8 wherein a choke controls fluids flowing within said fluid flow passageway.

12. The module of claim 8 wherein said module includes a flow measuring device.

13. The module of claim 8 wherein said module includes a processing apparatus.

14. The module of claim 13 wherein the processing device includes at least one of the group consisting of a pump, a process fluid turbine, an injection apparatus for injecting gas or steam, a chemical injection apparatus, a material injection apparatus, a chemical reaction vessel, a pressure regulation apparatus, a fluid riser, a measurement apparatus, a temperature measurement apparatus, a flow rate measurement apparatus, a constitution measurement apparatus, a consistency measurement apparatus, a gas separation apparatus, a water separation apparatus, a solids separation apparatus, a hydrocarbon separation apparatus, or a combination thereof.

15. A module for fluidly connecting a production line in a subsea tree and a production flowline, said module comprising at least two connectors one for connecting to said production

line in said subsea tree and another for connecting to said production flowline, said module, when installed, defining a fluid flow passageway which connects between said production line and said production flowline, and a choke to control fluid flow through said fluid flow passageway.

16. The module of claim 15 further comprising access to the subsea tree.

17. The module of claim 15 wherein the processing device includes at least one of the group consisting of a pump, a process fluid turbine, an injection apparatus for injecting gas or steam, a chemical injection apparatus, a materials injection apparatus, a chemical reaction vessel, a pressure regulation apparatus, a fluid riser, a measurement apparatus, a temperature measurement apparatus, a flow rate measurement apparatus, a constitution measurement apparatus, a consistency measurement apparatus, a gas separation apparatus, a water separation apparatus, a solids separation apparatus, a hydrocarbon separation apparatus, or a combination thereof.

18. The module of claim 15 wherein the subsea tree and flowline have hubs for connecting to said two connectors.

19. The module of claim 15 wherein a choke controls fluids flowing within said fluid flow passageway and the module includes a flow measuring device.

CLAIMS

1. An assembly mountable to a subsea tree and a subsea production flowline, the subsea tree including a production line, comprising:

a module comprising a production line connector and a production flowline connector, the production line connector being disposed on a lateral branch of the subsea tree, operable for connection and fluid communication with said subsea tree and with said production flow line, respectfully, said module defining a fluid flow passageway therein, whereby said subsea tree is in fluid communication with said production flowline only through said module and only after said module is connected to said subsea tree and said production flowline.

2. The assembly of claim 1, wherein the module provides access to the subsea tree by a member not disposed on the module.

3. The assembly of claim 1, wherein the module includes a chemical injection device.

4. The assembly of claim 1 further including a choke on the production flowline for controlling fluids flowing through said fluid flow passageway.

5. An assembly mountable to a subsea tree and a subsea production flowline, the subsea tree including a production line, comprising:

a module comprising a production line connector and a production flowline connector, the production line connector being disposed on a lateral branch of the subsea tree, operable for connection and fluid communication with said subsea tree and with said production flow line, respectfully, said module defining a fluid flow passageway therein, whereby said subsea tree is in fluid communication with said production flowline only through said module and only after said module is connected to said subsea tree and said production flowline;

wherein said module includes a flow measuring device without a production wing valve on the module.

6. The assembly of claim 1 wherein said module includes a processing apparatus.

7. The assembly of claim 6 wherein the processing device comprises a pump, a process fluid turbine, an injection apparatus for injecting gas or steam a material injection apparatus, a chemical reaction vessel, a pressure regulation apparatus, a fluid riser, a measurement apparatus, a temperature measurement apparatus, a flow rate measurement apparatus, a constitution measurement apparatus, a consistency measurement apparatus, a gas separation apparatus, a water separation apparatus, a solids separation apparatus, a hydrocarbon separation apparatus, or a combination thereof.

8. A module to provide the only fluid communication between a subsea installation comprising a subsea tree and a production flowline, said module comprising a first connector for connecting to said subsea installation and a second connector for connecting to said production flowline, said module, when installed, forming a fluid flow passageway which connects between said subsea tree and said production flowline, wherein said first connector is disposed on a lateral branch of said subsea tree.

9. The module of claim 8 further comprising access to the subsea tree by a member not disposed on the module.

10. The module of claim 9 wherein the module includes a chemical injection apparatus.

11. The module of claim 8 wherein a choke on the production flowline controls fluids flowing within said fluid flow passageway.

12. A module to provide the only fluid communication between a subsea installation comprising a subsea tree and a production flowline, said module comprising a first connector for connecting to said subsea installation and a second connector for connecting to said production flowline, said module, when installed, forming a fluid flow passageway which connects between said subsea tree and said production flowline, wherein said first connector is disposed on a lateral branch of said subsea tree;

wherein said module includes a flow measuring device without a production wing valve on the module.

13. The module of claim 12 wherein said module includes a processing apparatus.

14. The module of claim 13 wherein the processing device includes at least one of the group consisting of a pump, a process fluid turbine, an injection apparatus for injecting gas or steam, a material injection apparatus, a chemical reaction vessel, a pressure regulation apparatus, a fluid riser, a measurement apparatus, a temperature measurement apparatus, a flow rate measurement apparatus, a constitution measurement apparatus, a consistency measurement apparatus, a gas separation apparatus, a water separation apparatus, a solids separation apparatus, a hydrocarbon separation apparatus, or a combination thereof.

15. A module for fluidly connecting a production line in a subsea tree and a production flowline to a processing device, said module comprising at least two connectors one for connecting to said production line in said subsea tree and another for connecting to said production flowline, said module, when installed, defining a fluid flow passageway which connects between said production line and said production flowline, and a choke to control fluid flow through said fluid flow passageway, wherein said choke and a production wing valve are disposed on the subsea tree.

16. A module for fluidly connecting a production line in a subsea tree and a production flowline to a processing device, said module comprising at least two connectors one for connecting to said production line in said subsea tree and another for connection to said production flowline, said module, when installed, defining a fluid flow passageway which connects between said production line and said production flowline, and a choke to control fluid flow through said fluid flow passageway, wherein said choke and a production wing valve are disposed on the subsea tree;

wherein the module accesses another module.

17. The module of claim 15 wherein the processing device includes at least one of the group consisting of a pump, a process fluid turbine, an injection apparatus for injecting gas or steam, a materials injection apparatus, a chemical reaction vessel, a pressure regulation apparatus, a fluid riser, a measurement apparatus, a temperature measurement apparatus, a flow rate measurement apparatus, a constitution measurement apparatus, a consistency measurement apparatus, a gas separation apparatus, a water separation apparatus, a solids separation apparatus, a hydrocarbon separation apparatus, or a combination thereof.

18. The module of claim 15 wherein the subsea tree and flowline have hubs for connecting to said two connectors.

19. A module for fluidly connecting a production line in a subsea tree and a production flowline to a processing device, said module comprising at least two connectors one for connecting to said production line in said subsea tree and another for connecting to said production flowline, said module, when installed, defining a fluid flow passageway which connects between said production line and said production flowline, and a choke to control fluid flow through said fluid flow passageway, wherein said choke and a production wing valve are disposed on the subsea tree;

wherein a choke controls fluids flowing within said fluid flow passageway and the module includes a flow measuring apparatus without a production wing valve on the module.

20. The assembly of claim 3, wherein chemicals are injected either through the production flow line or injected from the chemical injection device.

21. A subsea tree assembly mountable adjacent to a subsea production flowline, comprising:

a subsea tree with a production line therein, said subsea tree comprising an upper end;

a retrievable module comprising a production line connector and a production flowline connector operable for connection and fluid communication with said upper end of said subsea tree and with an upwardly directed end of said production flow line, respectfully, said retrievable module defining a fluid flow passageway therein, whereby said production line of said subsea tree is in fluid communication with said production flowline only through said retrievable module and only after said retrievable module is connected to said subsea tree and said production flowline;

an annulus connection between said retrievable module and an annulus line of said subsea tree, said annulus connection being the only annulus line fluid connection between said retrievable module and said annulus line of said subsea tree, and

an annulus access valve for access to said annulus line located in said subsea tree, an annulus master valve for said annulus line located in said subsea tree, and an annulus line to production line crossover valve located in said subsea tree to provide a valve between said annulus line and subsea tree production line within said subsea tree.

22. The subsea tree assembly of claim 21, further comprising an intervention access passageway and an intervention package connection at an upper end thereof operable for connection to an intervention package.

23. The subsea tree assembly of claim 22, further comprising a valve within said intervention access passageway.

24. The subsea tree assembly of claim 21 wherein said retrievable module defines therein a choke within said fluid flow passageway.

25. The subsea tree assembly of claim 21 wherein said retrievable module comprises a subsea control module, said subsea control module comprising a plurality of electronic sensors.

26. The subsea tree assembly of claim 21 wherein said retrievable module comprises a flowmeter.

27. The subsea tree assembly of claim 21 wherein said retrievable module comprises an injection choke.

28. A retrievable module to provide the only fluid communication available between a subsea installation comprising a subsea tree and a production flowline, said retrievable module comprising:

a first connector for connecting to said subsea tree and a second connector for connection to said production flowline, said retrievable module, when installed, defining a fluid flow passageway which connects between said subsea tree and said production flowline; and

an intervention access passageway and an intervention package connection positioned at an upper end of said retrievable module operable for connection to an intervention package.

29. The retrievable module of claim 28 further comprising a valve within said intervention access passageway.

30. The retrievable module of claim 28 wherein said retrievable module defines therein a choke within said fluid flow passageway.

31. The retrievable module of claim 28 wherein said retrievable module comprises a subsea control module, said subsea control module comprising a plurality of electronic sensors.

32. The retrievable module of claim 28 wherein said retrievable module comprises a flowmeter.

33. The retrievable module of claim 28 wherein said retrievable module comprises an injection choke.

34. A retrievable module for fluidly connecting between a production line in a subsea tree and a production flowline, said subsea tree and said retrievable module comprising:

at least two connections in said retrievable module for connection to said production line in a top of said subsea tree and an upwardly extending top of said production flowline, said retrievable module, when installed, defining a fluid flow passageway which connects between said production line and said production flowline, and a choke to control fluid flow through said fluid flow passageway;

an annulus connection between said retrievable module and an annulus line of said subsea tree, said annulus connection being the only annulus line fluid connection between said retrievable module and said annulus line of said subsea tree, and

an annulus access valve for access to said annulus line located in said subsea tree, an annulus master valve for said annulus line located in said subsea tree, and

an annulus line to production line crossover valve located in said subsea tree to provide a valve between said annulus line and a subsea tree production line within said subsea tree.

35. The retrievable module of claim 34 further comprising a subsea control module comprising electronic sensors.

36. The retrievable module of claim 34 further comprising a flow meter.

37. The retrievable module of claim 34 further comprising an intervention access passageway and an intervention package connection positioned at an upper end of said retrievable module operable for connection to an intervention package.

38. The retrievable module of claim 37 further comprising a valve within said intervention access passageway.