corresponding upper pipes **716**. In some embodiments, the upper pipes **716** are parallel to the lower pipes **714**.

Embodiments

[0061] Embodiments of the invention may include any combinations of the methods and systems shown in the following numbered paragraphs. This is not to be considered a complete listing of all possible embodiments, as any number of variations can be envisioned from the description above.

1. A multiphase separation system, including:

an inlet line configured to feed a multiphase fluid into a circular distribution header within the multiphase separation system, wherein the circular distribution header is coupled to a number of upper lines and a number of lower lines;

each upper line configured to feed gases into a circular gas header, wherein the circular gas header is in a second plane that is above a plane of the circular distribution header;

each lower line configured to feed liquids into a circular liquid header, wherein the circular liquid header is in a third plane that is below the plane of the circular distribution header;

a gas outlet line that is coupled to the circular gas header and is configured to flow the gases out of the multiphase separation system; and

a liquid outlet line that is coupled to the circular liquid header and is configured to flow the liquids out of the multiphase separation system;

wherein the gas outlet line and the liquid outlet line are coupled via a downcomer configured to allow entrained liquids to flow from the gas outlet line to the liquid outlet line.

2. The multiphase separation system of paragraph 1, wherein the number of upper lines and the number of lower lines are perpendicular to the circular distribution header.

3. The multiphase separation system of any of paragraphs 1 or 2, wherein the circular gas header includes a droplet separation section configured to remove entrained liquids from the gases.

4. The multiphase separation system of any of paragraphs 1-3, wherein the circular liquid header includes a liquid degassing section configured to remove entrained gases from the liquids.

5. The multiphase separation system of any of paragraphs 1-4, wherein the multiphase separation system is implemented within a subsea environment.

6. The multiphase separation system of any of paragraphs 1-5, wherein the circular distribution header includes a stratification section configured to separate gases from liquids within the multiphase fluid.

7. The multiphase separation system of any of paragraphs 1-6, wherein the multiphase separation system includes a slug catcher.

8. The multiphase separation system of any of paragraphs 1-7, wherein the second plane and the third plane are parallel to the plane of the distribution header.

9. The multiphase separation system of any of paragraphs 1-8, wherein the downcomer is configured to allow entrained gases to flow from the liquid outlet line to the gas outlet line.

10. The multiphase separation system of any of paragraphs 1-9, wherein the multiphase fluid includes production fluids from a subsea well.

11. The multiphase separation system of any of paragraphs 1-10, wherein a desander is located upstream of the inlet line.

12. The multiphase separation system of any of paragraphs 1-11, wherein a desander is located downstream of the liquid outlet line.

13. The multiphase separation system of any of paragraphs 1-12, including;

an oil/water separation section that is coupled to the circular liquid header and is configured to separate the liquids into oil and water;

an oil outlet line that is coupled to the oil/water separation section and is configured to flow the oil out of the multiphase separation system; and

a water outlet line that is coupled to the oil/water separation section and is configured to flow the water out of the multiphase separation system.

14. The multiphase separation system of paragraph 13, wherein the oil/water separation section is coupled to the circular distribution header via a sealing downcomer.

15. The multiphase separation system of any of paragraphs 1-13, wherein the gas outlet line and the liquid outlet line are not coupled via the downcomer.

16. A method for separation of liquids and gases within a multiphase fluid, including:

flowing a multiphase fluid into a circular distribution header of a multiphase separation system;

separating the multiphase fluid into gases and liquids within the circular distribution header;

flowing the gases into a circular gas header that is above a plane of the circular distribution header;

flowing the liquids into a circular liquid header that is below the plane of the circular distribution header;

flowing the gases out of the multiphase separation system via a gas outlet line; and

flowing the liquids out of the multiphase separation system via a liquid outlet line;

wherein entrained liquids within the gas outlet line are flowed to the liquid outlet line via a downcomer.

17. The method of any of paragraph 16, including flowing the gases into the circular gas header via a number of upper lines that are perpendicular the circular distribution header.

18. The method of paragraph 17, including lowering a velocity and a pressure of the gases by splitting the gases among the number of upper lines.

19. The method of any of paragraphs 16 or 17, including flowing the liquids into the circular liquid header via a number of lower lines that are perpendicular the circular distribution header.

20. The method of paragraph 19, including lowering a velocity and a pressure of the liquids by splitting the liquids among the number of lower lines.

21. The method of any of paragraphs 16, 17, or 19, including flowing entrained gases within the liquid outlet line to the gas outlet line via the downcomer.

22. The method of any of paragraphs 16, 17, 19, or 21, wherein the multiphase separation system is implemented within a subsea environment.

23. The method of any of paragraphs 16, 17, 19, 21, or 22, wherein the multiphase separation system is a slug catcher.

24. The method of any of paragraphs 16, 17, 19, or 21-23, including separating the multiphase fluid into the gases and the liquids within a stratification section of the circular distribution header.

25. The method of any of paragraphs 16, 17, 19, or 21-24, including:

flowing the gases from the multiphase separation system to downstream liquid processing equipment or a gas export line; and

flowing the liquids from the multiphase separation system to downstream gas processing equipment or a liquid export line.

26. The method of any of paragraphs 16, 17, 19, or 21-25, wherein the liquids include residual solid particulates.

27. The method of any of paragraphs 16, 17, 19, or 21-26, including:

separating the liquids into oil and water;

flowing the oil out of the multiphase separation system via an oil outlet line; and

flowing the water out of the multiphase separation system via a water outlet line.

[0062] While the present techniques may be susceptible to various modifications and alternative forms, the embodiments discussed above have been shown only by way of example. However, it should again be understood that the techniques is not intended to be limited to the particular embodiments disclosed herein. Indeed, the present techniques include all alternatives, modifications, and equivalents falling within the true spirit and scope of the appended claims.

CLAIMS

What is claimed is:

1. A multiphase separation system, comprising:

an inlet line configured to feed a multiphase fluid into a circular distribution header within the multiphase separation system, wherein the circular distribution header is coupled to a plurality of upper lines and a plurality of lower lines;

each upper line configured to feed gases into a circular gas header, wherein the circular gas header is in a second plane that is above a plane of the circular distribution header;

each lower line configured to feed liquids into a circular liquid header, wherein the circular liquid header is in a third plane that is below the plane of the circular distribution header;

a gas outlet line that is coupled to the circular gas header and is configured to flow the gases out of the multiphase separation system; and

a liquid outlet line that is coupled to the circular liquid header and is configured to flow the liquids out of the multiphase separation system;

wherein the gas outlet line and the liquid outlet line are coupled via a downcomer configured to allow entrained liquids to flow from the gas outlet line to the liquid outlet line.

2. The multiphase separation system of claim 1, wherein the plurality of upper lines and the plurality of lower lines are perpendicular to the circular distribution header.

3. The multiphase separation system of claim 1, wherein the circular gas header comprises a droplet separation section configured to remove entrained liquids from the gases.

4. The multiphase separation system of claim 1, wherein the circular liquid header comprises a liquid degassing section configured to remove entrained gases from the liquids.

5. The multiphase separation system of claim 1, wherein the multiphase separation system is implemented within a subsea environment.

6. The multiphase separation system of claim 1, wherein the circular distribution header comprises a stratification section configured to separate gases from liquids within the multiphase fluid.

7. The multiphase separation system of claim 1, wherein the multiphase separation system comprises a slug catcher.

8. The multiphase separation system of claim 1, wherein the second plane and the third plane are parallel to the plane of the distribution header.

9. The multiphase separation system of claim 1, wherein the downcomer is configured to allow entrained gases to flow from the liquid outlet line to the gas outlet line.

10. The multiphase separation system of claim 1, wherein the multiphase fluid comprises production fluids from a subsea well.

11. The multiphase separation system of claim 1, wherein a desander is located upstream of the inlet line.

12. The multiphase separation system of claim 1, wherein a desander is located downstream of the liquid outlet line.

13. The multiphase separation system of claim 1, comprising;

an oil/water separation section that is coupled to the circular liquid header and is configured to separate the liquids into oil and water;

an oil outlet line that is coupled to the oil/water separation section and is configured to flow the oil out of the multiphase separation system; and

a water outlet line that is coupled to the oil/water separation section and is configured to flow the water out of the multiphase separation system.

14. The multiphase separation system of claim 13, wherein the oil/water separation section is coupled to the circular distribution header via a sealing downcomer.

15. The multiphase separation system of claim 1, wherein the gas outlet line and the liquid outlet line are not coupled via the downcomer.

16. A method for separation of liquids and gases within a multiphase fluid, comprising:

flowing a multiphase fluid into a circular distribution header of a multiphase separation system;

separating the multiphase fluid into gases and liquids within the circular distribution header;

flowing the gases into a circular gas header that is above a plane of the circular distribution header;

flowing the liquids into a circular liquid header that is below the plane of the circular distribution header;

flowing the gases out of the multiphase separation system via a gas outlet line; and

flowing the liquids out of the multiphase separation system via a liquid outlet line;

wherein entrained liquids within the gas outlet line are flowed to the liquid outlet line via a downcomer.

17. The method of claim 16, comprising flowing the gases into the circular gas header via a plurality of upper lines that are perpendicular the circular distribution header.

18. The method of claim 17, comprising lowering a velocity and a pressure of the gases by splitting the gases among the plurality of upper lines.

19. The method of claim 16, comprising flowing the liquids into the circular liquid header via a plurality of lower lines that are perpendicular the circular distribution header.

20. The method of claim 19, comprising lowering a velocity and a pressure of the liquids by splitting the liquids among the plurality of lower lines.

21. The method of claim 16, comprising flowing entrained gases within the liquid outlet line to the gas outlet line via the downcomer.

22. The method of claim 16, wherein the multiphase separation system is implemented within a subsea environment.

23. The method of claim 16, wherein the multiphase separation system is a slug catcher.

24. The method of claim 16, comprising separating the multiphase fluid into the gases and the liquids within a stratification section of the circular distribution header.

25. The method of claim 16, comprising:

flowing the gases from the multiphase separation system to downstream liquid processing equipment or a gas export line; and

flowing the liquids from the multiphase separation system to downstream gas processing equipment or a liquid export line.

26. The method of claim 16, wherein the liquids comprise residual solid particulates.

27. The method of claim 16, comprising:

separating the liquids into oil and water;

flowing the oil out of the multiphase separation system via an oil outlet line; and

flowing the water out of the multiphase separation system via a water outlet line.

corresponding upper pipes **716**. In some embodiments, the upper pipes **716** are parallel to the lower pipes **714**.

[0061] While the present techniques may be susceptible to various modifications and alternative forms, the embodiments discussed above have been shown only by way of example. However, it should again be understood that the techniques is not intended to be limited to the particular embodiments disclosed herein. Indeed, the present techniques include all alternatives, modifications, and equivalents falling within the true spirit and scope of the appended claims.

CLAIMS

1. A multiphase separation system, including:

an inlet line configured to feed a multiphase fluid into a circular distribution header within the multiphase separation system, wherein the circular distribution header is coupled to a number of upper lines and a number of lower lines;

each upper line configured to feed gases into a circular gas header, wherein the circular gas header is in a second plane that is above a plane of the circular distribution header;

each lower line configured to feed liquids into a circular liquid header, wherein the circular liquid header is in a third plane that is below the plane of the circular distribution header;

a gas outlet line that is coupled to the circular gas header and is configured to flow the gases out of the multiphase separation system; and

a liquid outlet line that is coupled to the circular liquid header and is configured to flow the liquids out of the multiphase separation system;

wherein the gas outlet line and the liquid outlet line are coupled via a downcomer configured to allow entrained liquids to flow from the gas outlet line to the liquid outlet line.

2. The multiphase separation system of claim 1, wherein the number of upper lines and the number of lower lines are perpendicular to the circular distribution header.

3. The multiphase separation system of any of claims 1 or 2, wherein the circular gas header includes a droplet separation section configured to remove entrained liquids from the gases.

4. The multiphase separation system of any of claims 1-3, wherein the circular liquid header includes a liquid degassing section configured to remove entrained gases from the liquids.

5. The multiphase separation system of any of claims 1-4, wherein the multiphase separation system is implemented within a subsea environment.

6. The multiphase separation system of any of claims 1-5, wherein the circular distribution header includes a stratification section configured to separate gases from liquids within the multiphase fluid.

7. The multiphase separation system of any of claims 1-6, wherein the multiphase separation system includes a slug catcher.

8. The multiphase separation system of any of claims 1-7, wherein the second plane and the third plane are parallel to the plane of the distribution header.

9. The multiphase separation system of any of claims 1-8, wherein the downcomer is configured to allow entrained gases to flow from the liquid outlet line to the gas outlet line.

10. The multiphase separation system of any of claims 1-9, wherein the multiphase fluid includes production fluids from a subsea well.

11. The multiphase separation system of any of claims 1-10, wherein a desander is located upstream of the inlet line.

12. The multiphase separation system of any of claims 1-11, wherein a desander is located downstream of the liquid outlet line.

13. The multiphase separation system of any of claims 1-12, including;

an oil/water separation section that is coupled to the circular liquid header and is configured to separate the liquids into oil and water;

an oil outlet line that is coupled to the oil/water separation section and is configured to flow the oil out of the multiphase separation system; and

a water outlet line that is coupled to the oil/water separation section and is configured to flow the water out of the multiphase separation system.

14. The multiphase separation system of claims 13, wherein the oil/water separation section is coupled to the circular distribution header via a sealing downcomer.

15. The multiphase separation system of any of claims 1-13, wherein the gas outlet line and the liquid outlet line are not coupled via the downcomer.

16. A method for separation of liquids and gases within a multiphase fluid, including:

flowing a multiphase fluid into a circular distribution header of a multiphase separation system;

separating the multiphase fluid into gases and liquids within the circular distribution header;

flowing the gases into a circular gas header that is above a plane of the circular distribution header;

flowing the liquids into a circular liquid header that is below the plane of the circular distribution header;

flowing the gases out of the multiphase separation system via a gas outlet line; and

flowing the liquids out of the multiphase separation system via a liquid outlet line;

wherein entrained liquids within the gas outlet line are flowed to the liquid outlet line via a downcomer.

17. The method of any of claim 16, including flowing the gases into the circular gas header via a number of upper lines that are perpendicular the circular distribution header.

18. The method of claim 17, including lowering a velocity and a pressure of the gases by splitting the gases among the number of upper lines.

19. The method of any of claims 16 or 17, including flowing the liquids into the circular liquid header via a number of lower lines that are perpendicular the circular distribution header.

20. The method of claim 19, including lowering a velocity and a pressure of the liquids by splitting the liquids among the number of lower lines.

21. The method of any of claims 16, 17, or 19, including flowing entrained gases within the liquid outlet line to the gas outlet line via the downcomer.

22. The method of any of claims 16, 17, 19, or 21, wherein the multiphase separation system is implemented within a subsea environment.

23. The method of any of claims 16, 17, 19, 21, or 22, wherein the multiphase separation system is a slug catcher.

24. The method of any of claims 16, 17, 19, or 21-23, including separating the multiphase fluid into the gases and the liquids within a stratification section of the circular distribution header.

25. The method of any of claims 16, 17, 19, or 21-24, including:

flowing the gases from the multiphase separation system to downstream liquid processing equipment or a gas export line; and

flowing the liquids from the multiphase separation system to downstream gas processing equipment or a liquid export line.

26. The method of any of claims 16, 17, 19, or 21-25, wherein the liquids include residual solid particulates.

27. The method of any of claims 16, 17, 19, or 21-26, including:

separating the liquids into oil and water;

flowing the oil out of the multiphase separation system via an oil outlet line; and

flowing the water out of the multiphase separation system via a water outlet line.