CLAIMS

The invention claimed is:

1. A method of operating, during an at least partial shutdown of a refrigerant distribution subsystem in a natural gas liquefaction facility, comprising:

draining down at least a portion of a mixed refrigerant in one or more components of the refrigerant distribution subsystem into a high-pressure holding tank of a drain down subsystem, wherein draining down to the high-pressure holding tank is achieved by pumping the mixed refrigerant from the refrigerant distribution subsystem to the high-pressure holding tank or backfilling the refrigerant distribution subsystem with a backfill gas; and

transferring at least a portion of the mixed refrigerant into a low-pressure drum from the high-pressure holding tank, wherein the low-pressure drum has a vent coupled to a condenser.

2. The method of claim 1, further comprising:

returning the portion of the mixed refrigerant in the high-pressure refrigerant holding tankdrum to the refrigerant distribution subsystem.

3. The method of claim 1 or claim 2, further comprising:

returning the portion of the mixed refrigerant in the low-pressure refrigerant holding drum to the refrigerant distribution subsystem.

4. The method of any one of claims 1-3, wherein the mixed refrigerant in the refrigerant distribution subsystem is at a pressure of about 2 bar absolute (bara) to about 25 bara and a temperature of about -175 °C to about -25 °C.

5. The method of any one of claims 1-4, wherein the mixed refrigerant in the high-pressure holding tank is at a pressure of about 5 bara to about 25 bara and a temperature of about -175 °C to about -100 °C.

6. The method of any one of claims 1-5, wherein the mixed refrigerant in the low-pressure drum is at a pressure of atmospheric pressure to about 2 bara and a temperature of about -125 °C to about -25 °C.

7. The method of any one of claims 1-6, wherein draining down to the high-pressure holding tank is achieved by backfilling the refrigerant distribution subsystem with a backfill gas, wherein a pressure of the backfill gas prior to backfilling into the refrigerant distribution subsystem is higher than a pressure of the mixed refrigerant in the refrigerant distribution subsystem, and wherein the pressure of the mixed refrigerant in the refrigerant distribution subsystem is greater than a pressure of the mixed refrigerant in the high-pressure holding tank.

8. The method of any one of claims 1-7, wherein the mixed refrigerant is a mixture comprising methane, ethane, propane, butane, and optionally nitrogen.

~~9. The method of any one of claims 1-8, wherein the low-pressure refrigerant holding drum has a vent coupled to a condenser.~~

~~10~~9. A method of operating, during an at least partial shutdown of a refrigerant distribution subsystem in a natural gas liquefaction facility, comprising:

draining down at least a portion of a mixed refrigerant in one or more components of the refrigerant distribution subsystem into a low-pressure drum of a drain down subsystem, wherein the low-pressure drum has a vent coupled to a condenser; and

backfilling the refrigerant distribution subsystem with a backfill gas from a backfill subsystem;

wherein a pressure in the refrigerant distribution subsystem is higher than a pressure in the low-pressure drum, and

wherein the pressure in the refrigerant distribution subsystem is lower than a pressure of the backfill gas in the backfill subsystem.

11. The method of claim 10, further comprising:

returning the portion of the mixed refrigerant in the high-pressure refrigerant holding drum to the refrigerant distribution subsystem.

1210. The method of claim 10 or claim 119, further comprising:

returning the portion of the mixed refrigerant in the low-pressure refrigerant holding drum to the refrigerant distribution subsystem.

1311. The method of any one of claims 10-129 or 10, wherein the pressure of the backfill gas in the backfill subsystem is at about 5 bar absolute (bara) to about 35 bara and a temperature of about -175 °C to about -100 °C.

1412. The method of any one of claims 10-139-11, wherein the pressure in the refrigerant distribution subsystem is at about 2 bara to about 25 bara and a temperature of about -175 °C to about -25 °C.

1513. The method of any one of claims 10-149-12, wherein the pressure in the low-pressure drum is at about atmospheric pressure to about 2 bara and a temperature of about -125 °C to about -25 °C.

16. The method of any one of claims 10-15, wherein the low-pressure refrigerant holding drum has a vent coupled to a condenser.

1714. A natural gas liquefaction facility comprising:

a refrigerant distribution subsystem that contains a mixed refrigerant;

a drain down subsystem that comprises a high-pressure holding tank, a low-pressure drum, and a valve separating the high-pressure holding tank from the low-pressure drum, wherein a

pressure in the high-pressure holding tank is lower than the mixed refrigerant in the refrigerant distribution subsystem, wherein the low-pressure drum has a vent coupled to a condenser; and

a backfill subsystem that contains a backfill gas at a higher pressure than the mixed refrigerant in the refrigerant distribution subsystem;

wherein a plurality of first valves separate the refrigerant distribution subsystem and the drain down subsystem;

wherein a plurality of second valves separate the refrigerant distribution subsystem and the backfill subsystem;

wherein in a drain down mode (a) at least a portion of the mixed refrigerant from the refrigerant distribution subsystem transports to the high-pressure holding tank via a pressure drop across at least one of the plurality of first valves, (b) at least a portion of the backfill gas from the backfill subsystem transports to the refrigerant distribution subsystem via a pressure drop across at least one of the plurality of first valves, and, (c) when needed, mixed refrigerant from the high-pressure holding tank is allowed to enter the low-pressure drum via the valve.