CLAIMS

1. A carrier (200, 400) for storing and transporting cryogenic liquids, comprising:

a tank (202, 402) configured to store and transport a cryogenic liquid having a liquefaction

temperature;

a first pump (314, 414) configured to

fill the tank with the cryogenic liquid, and

empty the tank of a first portion of the cryogenic liquid, thereby leaving a second portion of the cryogenic liquid in the tank;

a tank structure (310, 322, 330, 332) that focuses the second portion of the cryogenic liquid at a location on a bottom of the tank; and

a second pump (312, 412) located at the location and configured to empty the tank of the second portion of the cryogenic liquid, whereby a residual portion of the cryogenic liquid is left therein,

characterized by further comprising

a focused heating structure (350, 360) configured to deliver heat to the location, wherein the heat is configured to raise a temperature of the residual portion above the liquefaction temperature, thereby vaporizing all of the residual portion.

2. The carrier of claim 1, wherein the tank structure comprises baffles (310) surrounding the second pump (312), the baffles being attached to the bottom of the tank, optionally further comprising a baffle top (318)that encloses the second pump within the baffles, the baffle top, and the bottom of the tank.

3. The carrier of claim 1, wherein the tank structure comprises a pump well (330) at the bottom of the tank, the pump well comprising an indented portion of the bottom of the tank into which the second pump (312) is situated, optionally further comprising a pump well top (332) that covers the pump well and encloses the second pump in the pump well.

4. The carrier of claim 1, wherein the tank structure comprises a slanted tank bottom (322, 422) that slants downwardly from opposite sides of the tank.

5. The carrier of any one of claims 1-4, wherein the focused heating structure comprises a gas injection line (340, 350) having an outlet adjacent the second pump, the gas injection line configured to introduce a gas at the location at the bottom of the tank, the gas having a temperature above the liquefaction temperature, optionally further comprising a first pump line (204) connected to the first pump (314) and configured to transport the cryogenic liquid in or out of the tank, wherein the gas injection line (350) is disposed within the first pump line.

6. The carrier of any one of claims 1-4, wherein the focused heating structure comprises a heating element (360) disposed underneath the location on the bottom of the tank, wherein the heating element is configured to heat the residual portion of the cryogenic liquid above the liquefaction temperature.

7. The carrier of any one of claims 1-6, wherein the cryogenic liquid is one of liquefied natural gas and liquid nitrogen.

8. A method (500) of transporting liquefied cryogenic liquids in a carrier (200, 400), comprising:

in a dual-use cryogenic storage tank (202, 402), storing and transporting (502) a cryogenic liquid having a liquefaction temperature;

using (504) a first pump (314, 414) to empty the cryogenic storage tank of a first portion of the cryogenic liquid, thereby leaving a second portion of the cryogenic liquid in the cryogenic storage tank;

focusing (506) the second portion of the cryogenic liquid at a location on a bottom of the cryogenic storage tank; and

using (508) a second pump (312, 412) located at the location, emptying the cryogenic storage tank of the second portion of the cryogenic liquid, whereby a residual portion of the cryogenic liquid is left therein;

characterized by further comprising

delivering (510) heat only to the location using a focused heating structure;

using (512) the focused heating structure, raising a temperature of the residual portion above the liquefaction temperature, thereby vaporizing all of the residual portion.

9. The method of claim 8, wherein the second portion of the cryogenic liquid is focused using baffles (310) surrounding the second pump (312), the baffles

being attached to the bottom of the cryogenic storage tank, optionally further comprising a baffle top (318) that encloses the second pump between the baffles, the baffle top, and the bottom of the cryogenic storage tank.

10. The method of claim 8, wherein the second portion of the cryogenic liquid is focused using a pump well (330) at the bottom of the cryogenic storage tank, the pump well comprising an indented portion of the bottom of the cryogenic storage tank into which the second pump is situated, optionally further comprising a pump well top (332) that covers the pump well and encloses the second pump in the pump well.

11. The method of claim 8, wherein the second portion of the cryogenic liquid is focused using a slanted tank bottom (322, 422) that slants downwardly from opposite sides of the cryogenic storage tank.

12. The method of any one of claims 8-11, wherein the focused heating structure comprises a gas injection line (340, 350) having an outlet adjacent the second pump (312), the method further comprising:

using the gas injection line, introducing a gas at the location at the bottom of the cryogenic storage tank, the gas having a temperature above the liquefaction temperature, optionally further comprising:

transporting the cryogenic liquid in or out of the cryogenic storage tank using a first pump line (204) connected to the first pump (314); and

disposing the gas injection line (350) within the first pump line.

13. The method of any one of claims 8-11, wherein the focused heating structure comprises a heating element (360) disposed underneath the location on the bottom of the tank, the method further comprising:

using the heating element, heating the residual portion of the cryogenic liquid above the liquefaction temperature.

14. The method of any one of claims 8-11, wherein the cryogenic liquid is a first cryogenic liquid, and further comprising:

after the residual portion is vaporized, cooling the cryogenic storage tank to a temperature that is at or below a liquefaction temperature of a second cryogenic liquid,

wherein a composition of the second cryogenic liquid is different from a composition of the first cryogenic liquid; and

filling the cryogenic storage tank with the second cryogenic liquid.

15. The method of any one of claims 8-14, wherein the cryogenic liquid is one of liquefied natural gas and liquid nitrogen.