CLAIMS

1. A method for separating a feed stream in a distillation tower, the method comprising:

providing a controlled freeze zone section in the distillation tower, wherein the controlled freeze zone section comprises a melt tray assembly and a spray assembly and wherein the spray assembly is above the melt tray assembly;

introducing the feed stream to the controlled freeze zone section, wherein the feed stream comprises a first contaminant;

spraying a liquid from the spray assembly onto the feed stream in the controlled freeze zone section of the distillation tower;

operating the controlled freeze zone section of the distillation tower at a temperature and pressure at which the first contaminant in the feed stream forms a solid in the controlled freeze zone section; and

feeding a liquid comprising a second contaminant to the melt tray assembly above the melt tray in the controlled freeze zone section of the distillation tower;

wherein the liquid comprising the second contaminant is fed into the controlled freeze zone section until the liquid accumulated in the melt tray assembly is at a predetermined level in the controlled freeze zone section; and

wherein the feeding of the second contaminant only occurs while starting up the distillation tower.

2. The method of claim 1, wherein feeding the second contaminant occurs before introducing the feed stream.

3. The method of claim 1, wherein feeding the second contaminant comprises directly feeding the second contaminant to the controlled freeze zone section.

4. The method of claim 3, wherein directly feeding the second contaminant occurs one of continuously and intermittently.

5. The method of claim 1, wherein the second contaminant comprises the same contaminant as the first contaminant.

6. The method of claim 1, wherein the first contaminant comprises the same contaminant as the second contaminant.

7. The method of claim 1, wherein each of the first contaminant and the second contaminant comprise carbon dioxide.

8. The method of claim 1, further comprising recovering hydrocarbons from the feed stream.

9. The method of claim 1, wherein feeding the second contaminant occurs after introducing the feed stream.

10. The method of claim 1, wherein feeding the second contaminant comprises indirectly feeding the second contaminant to the controlled freeze zone section.

11. The method of claim 10, wherein indirectly feeding the second contaminant occurs one of continuously and intermittently.

12. The method of claim 10, wherein indirectly feeding the second contaminant comprises at least one of (i) feeding the second contaminant before introducing the feed stream to the controlled freeze zone section and (ii) feeding the second contaminant to a first channel in the absence of feeding the second contaminant to the feed stream.

13. The method of claim 12, wherein (i) comprises mixing the second contaminant with the feed stream before introducing the feed stream to the controlled freeze zone section.

14. The method of claim 1, wherein the first contaminant comprises carbon dioxide.