CLAIMS

1. A method for startup of a distillation tower, the method comprising:

providing the distillation tower comprising a lower section and a rectifier section, wherein the lower section is configured to form solids from a contaminant within a stream that enters the distillation tower and wherein the lower section and rectifier section are configured such that a vapor rises from the lower section to the rectifier section through a first flow controlling device and such that liquid flows from the rectifier section to a spray assembly in the lower section through a second flow controlling device;

feeding the stream to the lower section;

maintaining the first flow controlling device in a closed position and directly feeding methane to at least one of the rectifier section and a rectifier section outlet line of the rectifier section when a contaminant concentration of the contaminant exiting as a vapor in an upper portion of the lower section is outside of a predetermined concentration;

discontinuously feeding spray from the rectifier section to the lower section when a melt tray amount of liquid in a melt tray assembly of the lower section is less than a predetermined melt tray amount;

opening the first flow controlling device and introducing the vapor from the lower section to the rectifier section when the contaminant concentration exiting the upper portion of the lower section is within the predetermined concentration; and

opening the second flow controlling device and continuously feeding spray from the rectifier section to the lower section when the amount of liquid in the melt tray assembly is greater than or equal to the predetermined melt tray amount.

2. The method of claim 1, further comprising:

producing hydrocarbons from the distillation tower.

3. The method of claim 1, wherein the predetermined concentration is between 2 and 7 percent.

4. The method of claim 1, wherein the predetermined concentration is between 3 and 6 percent.

5. The method of claim 1, further comprising discontinuing directly feeding methane to the rectifier section when the contaminant concentration exiting the upper portion of the lower section is within the predetermined concentration.

6. The method of claim 1, further comprising chilling the stream before the stream enters the lower section.

7. The method of claim 1, further comprising heating a stream exiting a lower portion of the lower section with a reboiler.

8. The method of claim 1, wherein discontinuously feeding spray comprises discontinuously introducing the spray from the rectifier section to the spray assembly in the lower section.

9. The method of claim 1, wherein discontinuously feeding spray occurs before opening the first flow controlling device and allowing the vapor from the lower section to enter the rectifier section.

10. The method of claim 1, wherein continuously feeding spray comprises continuously introducing the spray from the rectifier section to the spray assembly in the lower section.

11. The method of claim 1, wherein continuously feeding spray occurs before opening the first flow controlling device and allowing the vapor from the lower section to enter the rectifier section.

12. The method of claim 1, wherein the lower section comprises a middle controlled freeze zone section and a stripper section.

13. The method of claim 12, wherein the middle controlled freeze zone section comprises the upper portion of the lower section.

14. A distillation tower for startup, comprising:

a rectifier section;

a lower section comprising a spray assembly and a melt tray assembly and configured to form solid from contaminant within a stream, wherein the lower section and rectifier section are configured such that vapor rises from the lower section to the rectifier section through a first flow controlling device and such that liquid flows from the rectifier section to the spray assembly in the lower section through a second flow controlling device; and

a storage unit holding methane that fluidly connects to at least one of the rectifier section and a rectifier section outlet line of the rectifier section;

wherein the first flow controlling device is maintained in an open position such that the lower section introduces the contaminant exiting as a vapor from an upper portion of the lower section to the rectifier section when a contaminant concentration of the vapor exiting the upper portion of the lower section is within a predetermined concentration;

wherein the first flow controlling device is maintained in a closed position such that the lower section does not introduce the vapor from the lower section to the rectifier section when the contaminant concentration exiting the upper portion of the lower section is outside of the predetermined concentration; and

wherein the second flow controlling device opens and closes such that the lower section discontinuously receives spray from the rectifier section when a melt tray amount of liquid in the melt tray assembly is below a predetermined melt tray amount.

15. The method of claim 14, wherein the predetermined concentration is between 2 and 7 percent.

16. The method of claim 14, wherein the predetermined concentration is between 3 and 6 percent.

17. The method of claim 14, further comprising a chiller that chills the stream before the stream enters the lower section.

18. The method of claim 14, further comprising a reboiler that heats a stream that exits a lower portion of the lower section.

19. The method of claim 14, wherein the lower section continuously receives spray from the rectifier section when a melt tray amount of liquid in the melt tray assembly is greater than or equal to a predetermined melt tray amount.

20. The method of claim 14, wherein the lower section comprises a middle controlled freeze zone section and a stripper section.

21. The method of claim 20, wherein the middle controlled freeze zone section comprises the upper portion of the lower section.