CLAIMS:

1. A method of dewaxing a distillate fuel oil comprising:

hydroprocessing a distillate fuel oil stream in a reactor to produce a distillate fuel oil stream that is at least partially hydroprocessed, wherein the reactor has an upstream hydroprocessing zone comprising a first catalyst bed, a subsequent hydroprocessing zone comprising a second catalyst bed, and a distributor tray between the upstream hydroprocessing zone and the subsequent hydroprocessing zone; and

feeding at least a portion of the distillate fuel oil stream that has been at least partially hydroprocessed to a cavitation unit wherein the portion of the distillate fuel oil stream is subjected to cavitation to reduce the pour point, reduce the cloud point, reduce the cold filter plugging point, or a combination thereof of the portion of the distillate fuel oil stream, and wherein the portion of distillate fuel oil stream fed to the cavitation unit is collected from the distributor tray.

2. The method of claim 1, wherein the cavitation unit is a hydrodynamic cavitation unit, and wherein the hydrodynamic cavitation unit subjects the at least a portion of the distillate fuel oil stream to hydrodynamic cavitation to convert at least a portion of the hydrocarbons present in the at least a portion of distillate fuel oil stream by isomerization or cracking.

3. The method of claim 1, wherein the distillate fuel oil stream has a T95 of at least 630ºF.

4. The method of claim 1, wherein the cavitation is performed at a severity to achieve a cloud point reduction of at least 1ºC.

5. The method of claim 1, wherein the cavitation is performed at a severity to achieve a cloud point reduction of 1ºC to 10ºC.

6. The method of claim 5, wherein the cavitation is performed at a severity to achieve a cloud point reduction of 1ºC to 5ºC.

7. The method of claim 1, wherein the cavitation is performed at a severity to achieve a pour point reduction of at least 1ºC.

8. The method of claim 1, wherein the cavitation is performed at a severity to achieve a pour point reduction of 1ºC to 10ºC.

9. The method of claim 8, wherein the cavitation is performed at a severity to achieve a pour point reduction of 1ºC to 5ºC.

10. The method of claim 1, wherein the cavitation is performed at a severity to achieve a cold filter plugging point reduction of at least 1ºC.

11. The method of claim 1, further comprising reinjecting the portion of the distillate fuel oil stream that is at least partially hydroprocessed into the reactor for additional hydroprocessing after the portion of the distillate fuel oil stream is subjected to cavitation.

12. The method of claim 1, further comprising reinjecting the portion of the distillate fuel oil stream that is at least partially hydroprocessed into the reactor into the subsequent hydroprocessing zone for additional hydroprocessing after the portion of the distillate fuel oil stream is subjected to cavitation.

13. The method of claim 1, further comprising feeding the portion of the distillate fuel oil stream that is at least partially hydroprocessed to a high pressure separator to recover a hydrogen containing gas after subjecting the portion of the distillate fuel oil stream to cavitation.

14. The method of claim 1, further comprising feeding the portion of the distillate fuel oil stream that is at least partially hydroprocessed to a high pressure separator to recover a hydrogen containing gas before subjecting the portion of the distillate fuel oil stream to cavitation.

15. The method of claim 1, wherein the cavitation is performed in the absence of a catalyst.

16. The method of claim 1, wherein the feed to the cavitation unit is devoid of a distinct vapor phase.

17. The method of claim 1, further comprising upgrading the distillate fuel oil stream by distillation, extraction, hydroprocessing, hydrocracking, fluidized cat cracking, solvent dewaxing, delayed coking, fluid coking, partial oxidation, gasification, or a combination thereof.

18. The method of claim 1, wherein the distillate fuel oil has an API gravity of 25 degrees or more.

19. A system for dewaxing a distillate fuel oil comprising:

a distillate fuel oil stream;

a hydroprocessing unit receiving the distillate fuel stream and adapted to at least partially hydroprocess the distillate fuel stream and thereby produce a processed stream, wherein the hydroprocessing unit has an upstream hydroprocessing zone comprising a first catalyst bed, a subsequent hydroprocessing zone comprising a second catalyst bed, and a distributor tray between the upstream hydroprocessing zone and the subsequent hydroprocessing zone; and

a hydrodynamic cavitation unit downstream of the hydroprocessing unit and adapted to receive at least a portion of the processed stream and subject the processed stream to hydrodynamic cavitation to reduce the pour point, reduce the cloud point, reduce the cold filter plugging point, or a combination thereof of the portion of the processed stream, and wherein the portion of the processed stream fed to the cavitation unit is collected from the distributor tray.