WHAT IS CLAIMED IS:

1. A method for processing a waste oil stream comprising:
   a) passing the waste oil stream into a first flash distillation vessel and producing a first overhead stream and a first bottom stream;
   b) passing at least a portion of the first overhead stream directly out of the first flash distillation vessel via a sealed distillate outlet and passing substantially all of the first bottom stream to a heated liquid layer contained in a second flash distillation vessel and producing a second overhead stream and a second bottom stream by direct contact with the heated liquid layer; and
   c) passing a portion of the second bottom stream out of the second flash distillation vessel and heating and returning another portion of the second bottom stream to the second flash distillation vessel to maintain the heated liquid layer in the second distillation vessel at a selected temperature and at a selected level, the selected temperature and selected level being sufficient to flash a portion of the heated first bottom stream to the second flash distillation vessel thereby producing the second bottom stream and the second overhead stream.

2. The method of claim 1 wherein at least one of the first and second flash distillation vessels is operated under vacuum.

3. The method of claim 1 wherein the first overhead stream comprises water, light hydrocarbons and low boiling, point materials having a boiling point below 350 degrees Fahrenheit.

4. The method according to claim 3 wherein the waste oil stream is heated prior to distillation to remove the water, light hydrocarbons and low boiling point materials.

5. The method of claim 1 wherein the second overhead stream comprises fuel compounds having a boiling point between 350 degrees and 500 degrees Fahrenheit.

6. The method of claim 5 wherein a third overhead stream having a base oil compounds with a boiling range from about 500 to about 650° F. and a fourth overhead stream having base oil compounds with a boiling point from about 650 to about 1050° F.

7. The method according to claim 6 wherein the fourth overhead stream is treated with solvent extraction to remove high quality oil, and the treated fourth overhead stream is then combined with the third overhead stream and the combined treated fourth overhead stream and third overhead stream are hydrogenated.

8. The method of claim 1 further comprising extracting a third overhead stream from a third flash distillation vessel that comprises base oil compounds having a boiling point between 500 and 650 degrees Fahrenheit.

9. The method of claim 1 further comprising extracting a third overhead stream from a third flash distillation vessel that comprises base oil compounds having a boiling point between 650 and 1050 degrees Fahrenheit.

10. The method of claim 9 further comprising:

contacting the third overhead stream with a solvent effective to separate high quality base oil from lower quality base oil in a solvent extraction zone and recovering a stream of high quality base oil and solvent and a stream of lower quality base oil and solvent;

separating the high quality base oil and the solvent to produce a stream of product high quality base oil;

separating the lower quality base oil and the solvent to produce a lower quality base oil stream; and

combining the second overhead stream with the lower quality base oil stream to produce a combined stream and passing the combined stream to hydrogenation to produce a high quality base oil stream.

11. The method of claim 1 wherein the waste oil stream is a waste oil prone to coking.

12. The method according to claim 1 wherein the waste oil stream is treated with an alkali or base to condition the liquid stream prior to distillation in the first flash distillation vessel.

13. The method according to claim 12 wherein the alkali or base is one of sodium carbonate, sodium hydroxide and potassium hydroxide.

14. The method of claim 1 wherein the first flash distillation vessel and the second flash distillation vessel are operated at or near atmospheric pressure.

15. A method for separating a waste oil stream comprising:
    a) treating the waste oil stream with one of an alkali or base in a heater;
    b) charging the treated waste oil stream into a flash distillation vessel having a liquid stream inlet, a sealed distillate outlet near the top of the vessel, a lower portion and a bottom stream outlet near the bottom of the vessel and a single stage of separation to produce an overhead stream through the overhead outlet and a bottom stream from the bottom stream outlet; and
    c) passing substantially all of the heated bottom stream to a liquid layer in a second flash distillation zone, the liquid layer being at a temperature sufficient to flash a portion of the bottom stream.

16. The method of claim 15 wherein a plurality of flash distillation vessels are used to produce a plurality of distillate streams and a plurality of product bottom streams.

17. The method of claim 16 wherein three flash distillation vessels are used.

18. The method of claim 16 wherein four flash distillation vessels are used.

19. The method of claim 16 wherein five or more distillation vessels are used.

20. The method of claim 16 wherein a distillate stream having a boiling range from about 500 to about 650° F. and a distillate stream having a boiling point from about 650 to about 1100° F. are produced.

21. The method of claim 15 wherein at least one of the flash distillation vessels is operated under vacuum.

22. The method according to claim 15 wherein the overhead stream comprises water, light hydrocarbons and low boiling point materials having a boiling point below 350 degrees Fahrenheit.

23. The method according to claim 15 wherein the alkali or base is one of sodium carbonate, sodium hydroxide, and potassium hydroxide.

24. The method of claim 15 wherein the flash distillation vessel is operated at or near atmospheric pressure.

25. A method for separating a waste oil stream by flash distillation, comprising:

treating the waste oil stream with one of sodium carbonate, sodium hydroxide and potassium hydroxide in a heater to condition the waste oil stream prior to flash distillation;

treating the conditioned waste oil stream to remove water, light hydrocarbons and low boiling point materials having a boiling point below 350 degrees Fahrenheit in a first flash distillation vessel to generate a conditioned and treated waste oil stream, and removing the water, light hydrocarbons and low boiling point materials having a boiling point below 350 degrees Fahrenheit using a first outlet line that is sealed from an external environment;

passing substantially all of the conditioned and treated waste oil stream directly into a heated liquid layer contained in a second flash distillation vessel and producing an overhead stream of fuel components having a boiling point between 350 degrees and 500 degrees Fahrenheit and a bottom stream by direct contact with the heated liquid layer;

heating a portion of the bottom stream to a selected temperature and returning the portion of the heated bottom stream to the second flash distillation vessel to maintain the heated liquid layer in the selected distillation vessel at a selected temperature and at a selected level in the second flash distillation vessel in a lower portion of the vessel, the selected temperature and selected level being sufficient to flash a portion of the conditioned and treated waste oil stream to produce the bottom stream and the overhead stream;

passing at least a portion of the overhead stream and the bottom stream out of the second flash distillation vessel; and

wherein at least one of the flash distillation zones is operated under vacuum.

26. The method of claim 25 wherein the first flash distillation vessel is operated at or near atmospheric pressure.