CLAIMS:

1. A process for preparing a liquid hydrocarbon product comprising:

providing a reduced reactivity tar having a bromine number no greater than 28;

blending the reduced reactivity tar with a utility fluid to produce a lower viscosity, reduced reactivity tar;

hydroprocessing the lower viscosity, reduced reactivity tar at a temperature of 400ºC to 500ºC to produce a total liquids product (TLP) comprising the liquid hydrocarbon product and a recycle solvent;

separating the recycle solvent from the TLP, wherein the recycle solvent has a solubility blending number (S_{BN}) of greater than 120;

increasing the temperature of the lower viscosity, reduced reactivity tar during the hydroprocessing if the S_{BN} of the recycle solvent is less than 120; and

flowing the recycle solvent to the reduced reactivity tar for blending to produce the lower viscosity, reduced reactivity tar.

2. The process of claim 1, wherein the lower viscosity, reduced reactivity tar is hydroprocessed at a temperature of 400ºC to 450ºC.

3. The process of claim 1, wherein the utility fluid comprises the recycle solvent, and wherein the S_{BN} of the recycle solvent is greater than 120 to 160.

4. The process of claim 3, wherein the S_{BN} of the recycle solvent is greater than 120 to 150.

5. The process of claim 4, wherein the S_{BN} of the recycle solvent is 130 to 150.

6. The process of any of claims 1-5, further comprising processing the lower viscosity, reduced reactivity tar to remove solids therefrom prior to hydroprocessing.

7. The process of claim 6, further comprising centrifuging the lower viscosity, reduced reactivity tar to remove all solids having a size of greater than 25 μm.

8. The process of any of claims 1-5, wherein the utility fluid comprises a solvent selected from the group consisting of benzene, ethylbenzene, trimethylbenzene, xylenes, toluene, naphthalenes, alkylnaphthalenes, tetralins, alkyltetralins, and any combination thereof.

9. A process for preparing a liquid hydrocarbon product comprising:

heat soaking a tar stream to produce a reduced reactivity tar having a bromine number no greater than 28;

blending the reduced reactivity tar with a utility fluid to produce a lower viscosity, reduced reactivity tar;

centrifuging the lower viscosity, reduced reactivity tar to remove solids therefrom; then

hydroprocessing the lower viscosity, reduced reactivity tar at a temperature of greater than 400ºC to produce a total liquids product (TLP) comprising the liquid hydrocarbon product and a recycle solvent;

separating the recycle solvent from the TLP, wherein the recycle solvent has a solubility blending number (S_{BN}) of greater than 120;

increasing the temperature of the lower viscosity, reduced reactivity tar during the hydroprocessing if the S_{BN} of the recycle solvent is less than 120; and

flowing the recycle solvent to the reduced reactivity tar for blending to produce the lower viscosity, reduced reactivity tar.

10. The process of claim 9, wherein the lower viscosity, reduced reactivity tar is hydroprocessed at a temperature of greater than 400ºC to 500ºC.

11 The process of claim 10, wherein the temperature is 400ºC to 450ºC.

12. The process of claim 9, wherein the utility fluid comprises the recycle solvent, and wherein the S_{BN} of the recycle solvent is greater than 120 to 150.

13. The process of claim 12, wherein the S_{BN} of the recycle solvent is 130 to 150.

14. The process of claim 9, wherein after centrifuging, the lower viscosity, reduced reactivity tar is free of solids having a size of greater than 25 μm.

15. The process of claim 9, wherein the utility fluid comprises a solvent selected from the group consisting of benzene, ethylbenzene, trimethylbenzene, xylenes, toluene, naphthalenes, alkylnaphthalenes, tetralins, alkyltetralins, and any combination thereof.

16. A process for preparing a liquid hydrocarbon product comprising:

heat soaking a tar stream to produce a reduced reactivity tar having a bromine number no greater than 28;

blending the reduced reactivity tar with a utility fluid to produce a lower viscosity, reduced reactivity tar;

hydroprocessing the lower viscosity, reduced reactivity tar at a temperature of greater than 400ºC to produce a total liquids product (TLP) comprising the liquid hydrocarbon product and a recycle solvent;

separating the recycle solvent from the TLP;

measuring a solubility blending number (S_{BN}) of the recycle solvent;

increasing the temperature of the lower viscosity, reduced reactivity tar during the hydroprocessing if the S_{BN} of the recycle solvent is less than 120; and

flowing the recycle solvent to the reduced reactivity tar for blending to produce the lower viscosity, reduced reactivity tar.

17. The process of claim 16, wherein the temperature of the lower viscosity, reduced reactivity tar is 400ºC to 450ºC.

18. The process of claim 16 or claim 17, wherein the utility fluid comprises the recycle solvent, and wherein the S_{BN} of the recycle solvent is 130 to 150.

19. A process for preparing a liquid hydrocarbon product comprising:

heat soaking a tar stream to produce a first process stream comprising a reduced reactivity tar having a bromine number no greater than 28;

blending the first process stream with a utility fluid to reduce viscosity of the first process stream and produce a second process stream comprising solids and a reduced reactivity, lower viscosity tar;

centrifuging the second process stream to produce a third process stream comprising the reduced reactivity, lower viscosity tar and having a concentration of solids less than the second process stream;

hydroprocessing the third process stream at a temperature of greater than 400ºC to 500ºC to produce a fourth stream comprising the liquid hydrocarbon product and a recycle solvent;

separating the recycle solvent from the fourth stream, wherein the recycle solvent has a solubility blending number (S_{BN}) of 130 to 150;

increasing the temperature of the lower viscosity, reduced reactivity tar during the hydroprocessing if the S_{BN} of the recycle solvent is less than 130; and

flowing the recycle solvent to the first process stream for blending to produce the second process stream.

20. A process for producing a hydroprocessed tar, the process comprising:

(a) providing a process stream comprising a reduced reactivity tar;

(b) mixing the process stream with a utility fluid having a solubility blending number (S_{BN}) < 110 to produce a tar-fluid mixture;

(c) catalytically hydroprocessing the tar-fluid mixture at a temperature greater than 400 ºC to produce a total liquids product (TLP) comprising the liquid hydrocarbon product and the utility fluid;

(d) separating a recycle solvent and a hydroprocessed tar from the TLP, wherein the recycle solvent has a true boiling point range that is substantially the same as that of the utility fluid, and has a solubility blending number (S_{BN}) ≥ 120;

(e) increasing the temperature of the lower viscosity, reduced reactivity tar during the hydroprocessing if the S_{BN} of the recycle solvent is less than 120; and

(f) substituting at least a portion of the recycle solvent for the utility fluid in step (b).