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 ~~greater than 350ºC~~ 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 ~~110~~ 120; ~~and~~

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, further comprising increasing the temperature of the lower viscosity, reduced reactivity tar during the hydroprocessing if the S_{BN} of the recycle solvent is less than 115.~~

~~3. The process of claims 1 or 2, wherein the lower viscosity, reduced reactivity tar is hydroprocessed at a temperature of greater than 350ºC to about 500ºC.~~

~~4.~~2. The process of ~~any of any of claims 1-3~~ claim 1, wherein the lower viscosity, reduced reactivity tar is hydroprocessed at a temperature of ~~about~~ 400ºC to ~~about~~ 450ºC.

~~5.~~3. The process of ~~any of claims 1-4~~ claim 1, wherein the utility fluid comprises the recycle solvent, and wherein the S_{BN} of the recycle solvent is greater than ~~110~~ 120 to ~~about~~ 160.

~~6.~~4. The process of ~~any of claims 1-5~~ claim 3, wherein the S_{BN} of the recycle solvent is greater than 120 to ~~about~~ 150.

~~7.~~5. The process of ~~any of claims 1-6~~ claim 4, wherein the S_{BN} of the recycle solvent is ~~about~~ 130 to ~~about~~ 150.

~~8.~~6. The process of any of claims ~~1-7~~ 1-5, further comprising processing the lower viscosity, reduced reactivity tar to remove solids therefrom prior to hydroprocessing.

~~9.~~7. The process of ~~any of claims 1-8~~ claim 6, further comprising centrifuging the lower viscosity, reduced reactivity tar to remove ~~substantially~~ all solids having a size of greater than 25 μm.

~~10. The process of any of claims 1-9, wherein the utility fluid comprises two ring aromatics, three ring aromatic, four ring aromatics, or any combination thereof.~~

~~11.~~8. The process of any of claims ~~1-10~~ 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.

~~12. The process of any of claims 1-11, wherein the hydroprocessing of the lower viscosity, reduced reactivity tar further comprises:~~

~~heating the lower viscosity, reduced reactivity tar to a temperature of about 260ºC to about 300ºC in a pretreater containing hydrogen; then~~

~~heating the lower viscosity, reduced reactivity tar to a temperature of about 325ºC to about 375ºC in a first reactor containing hydrogen; then~~

~~heating the lower viscosity, reduced reactivity tar to a temperature of about 360ºC to about 450ºC in a second reactor containing hydrogen.~~

~~13.~~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 ~~350ºC~~ 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 ~~115~~ 120; ~~and~~

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.

~~14. The process of claim 13, further comprising 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.~~

~~15.~~10. The process of ~~claims 13 or 14~~ claim 9, wherein the lower viscosity, reduced reactivity tar is hydroprocessed at a temperature of greater than ~~350ºC~~ 400ºC to ~~about~~ 500ºC.

~~16.~~11 The process of claim ~~15~~ 10, wherein the temperature is ~~about~~ 400ºC to ~~about~~ 450ºC.

~~17.~~12. The process of ~~any of claims 13-16~~ claim 9, wherein the utility fluid comprises the recycle solvent, and wherein the S_{BN} of the recycle solvent is greater than 120 to ~~about~~ 150.

~~18.~~13. The process of claim ~~17~~ 12, wherein the S_{BN} of the recycle solvent is ~~about~~ 130 to ~~about~~ 150.

~~19.~~14. The process of ~~any of claims 13-16~~ claim 9, wherein after centrifuging, the lower viscosity, reduced reactivity tar is ~~substantially~~ free of solids having a size of greater than 25 μm.

~~20. The process of any of claims 13-16, wherein the utility fluid comprises two-ring aromatics, three-ring aromatic, four-ring aromatics, or any combination thereof.~~

~~21.~~15. The process of ~~any of claims 13-16~~ 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.

~~22.~~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 ~~350ºC~~ 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 ~~115~~ 120; and

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

~~23.~~17. The process of claim ~~22~~ 16, wherein the temperature of the lower viscosity, reduced reactivity tar is ~~about~~ 400ºC to ~~about~~ 450ºC.

~~24.~~18. The process of ~~claims 22 or 23~~ claim 16 or claim 17, wherein the utility fluid comprises the recycle solvent, and wherein the S_{BN} of the recycle solvent is ~~about~~ 130 to ~~about~~ 150.

~~25.~~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 ~~350ºC~~ 400ºC to ~~about 450ºC~~ 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 ~~about~~ 130 to ~~about~~ 150; ~~and~~

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.

~~26.~~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}) ≥ ~~110~~ 120; ~~and~~

~~(d)~~(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

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