CLAIMS

WHAT IS CLAIMED IS:

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

blending a tar stream comprising particles with a fluid and heating to a temperature of 250°C or greater to produce a fluid-feed mixture comprising tar, the particles, and the fluid;

wherein the fluid-feed mixture comprises about 20 wt% or greater of the fluid, based on a combined weight of the tar stream and the fluid; and

wherein about 25 wt% to about 99 wt% of the particles in the tar stream are dissolved or decomposed when producing the fluid-feed mixture.

2. The process of claim 1, wherein the tar stream and the fluid are blended together and heated to a temperature of 280°C to about 500°C to produce the fluid-feed mixture.

3. The process of ~~claims 1 or 2~~ claim 1, wherein the tar stream and the fluid are blended together and heated to a temperature of about 290°C to about 400°C to produce the fluid-feed mixture.

4. The process of ~~any of claims 1-3~~ claim 3, wherein the tar stream and the fluid are blended together and heated to a temperature of about 300°C to about 350°C to produce the fluid-feed mixture.

5. The process of ~~any of claims 1-4~~ claim 1, wherein about 40 wt% to about 95 wt% of the particles in the tar stream are dissolved or decomposed when producing the fluid-feed mixture.

6. The process of ~~any of claims 1-5~~ claim 1, wherein about 60 wt% to about 90 wt% of the particles in the tar stream are dissolved or decomposed when producing the fluid-feed mixture.

7. The process of ~~any of claims 1-6~~ claim 1, wherein the fluid-feed mixture comprises about 40 wt% to about 70 wt% of the fluid, based~~,~~ on the combined weight of the tar stream and the fluid.

8. The process of ~~any of claims 1-7~~ claim 1, wherein the fluid-feed mixture comprises about 45 wt% to about 60 wt% of the fluid, based~~,~~ on the combined weight of the tar stream and the fluid.

9. The process of ~~any of claims 1-8~~ claim 1, wherein the fluid is a utility fluid and comprises a recycle solvent, a mid-cut solvent, or a combination thereof.

10. The process of ~~any of claims 1-9~~ claim 1, wherein the fluid comprises a solvent selected from the group consisting of benzene, toluene, ethylbenzene, trimethylbenzene, xylenes, naphthalenes, alkylnaphthalenes, tetralins, alkyltetralins, and any combination thereof.

11. The process of ~~any of claims 1-10~~ claim 1, wherein the fluid comprises about 20 wt% to about 80 wt% of toluene.

12. The process of ~~any of claims 1-11~~ claim 1, wherein the particles comprise polymeric asphaltene particles, polymeric coke particles, pyrolytic coke particles, inorganic fines, or any combination thereof.

13. The process of ~~any of claims 1-12~~ claim 1, further comprising heat soaking the tar stream prior to blending the tar stream and the fluid.

14. The process of claim 13, wherein the heat soaking of the tar stream further comprises exposing the tar stream to steam to produce the tar stream comprising a reduced reactivity tar.

15. The process ~~any of claims 1-12~~ of claim 1, further comprising separating the fluid-feed mixture to produce a higher density portion and a lower density portion.

16. The process of claim 15, wherein the fluid-feed mixture is separated by centrifugation, and wherein the lower density portion is substantially free of the particles of size greater than 25 μm.

17. A process for preparing a low particulate liquid hydrocarbon product comprising:

blending a tar stream comprising particles with a fluid and heating to a temperature of 300°C or greater to produce a fluid-feed mixture comprising tar, the particles, and the fluid;

wherein the fluid-feed mixture comprises about 20 wt% or greater of the fluid, based on a combined weight of the tar stream and the fluid; and

wherein at least 40 wt% of the particles in the tar stream are dissolved or decomposed when producing the fluid-feed mixture.

18. The process of claim 17, wherein the tar stream and the fluid are blended together and heated to a temperature of about 300°C to about 350°C to produce the fluid-feed mixture.

19. The process of ~~claims 16 or~~ claim 17, wherein about 50 wt% to about 95 wt% of the particles in the tar stream are dissolved or decomposed when producing the fluid-feed mixture.

20. The process of ~~any of claims 17-19~~ claim 17, wherein the fluid-feed mixture comprises about 45 wt% to about 60 wt% of the fluid, based~~,~~ on the combined weight of the tar stream and the fluid.

21. The process of ~~any of claims 17-20~~ claim 17, wherein the fluid comprises a solvent selected from the group consisting of benzene, toluene, ethylbenzene, trimethylbenzene, xylenes, naphthalenes, alkylnaphthalenes, tetralins, alkyltetralins, and any combination thereof.

22. The process of ~~any of claims 17-21~~ claim 17, further comprising heat soaking the tar stream prior to blending the tar stream and the fluid, wherein the heat soaking of the tar stream further comprises exposing the tar stream to steam to produce the tar stream comprising a reduced reactivity tar.

23. The process of ~~any of claims 17-21~~ claim 17, further comprising separating by centrifugation the fluid-feed mixture to produce a higher density portion and a lower density portion, wherein the lower density portion is substantially free of the particles of size greater than 25 μm.

24. A process for preparing a low particulate liquid hydrocarbon product comprising:

blending a tar stream comprising particles with a fluid and heating to a temperature of about 300°C to about 400°C to produce a fluid-feed mixture comprising tar, the particles, and the fluid;

wherein the fluid-feed mixture comprises about 20 wt% or greater of the fluid, based on a combined weight of the tar stream and the fluid; and

wherein at least 50 wt% of the particles in the tar stream are dissolved or decomposed when producing the fluid-feed mixture.

25. A process for preparing a low particulate liquid hydrocarbon product comprising:

heat soaking a tar stream to produce an upgraded tar comprising particles;

blending the upgraded tar with a fluid to produce a fluid-tar mixture comprising ≥ 20 wt. % of the fluid based on the weight of the fluid-tar mixture, wherein the fluid comprises one or more of benzene, toluene, ethylbenzene, trimethylbenzene, xylenes, naphthalenes, alkylnaphthalenes, tetralins, and alkyltetralins;

heating the fluid-tar mixture to achieve a temperature ≥ 250°C for at least 60 seconds to produce a heated fluid-tar mixture, wherein the heating decomposes and/or dissolves ≥ 25 wt% of the upgraded tar's particles;

separating a higher density portion and a lower density portion from the heated fluid-tar mixture, wherein (i) ≥ 50 wt. % of particles in the heated fluid-feed mixture having a density ≥ 1.05 g/mL are transferred to the higher density portion, (ii) ≤ 10% of the upgraded tar in the fluid-tar mixture is transferred to the higher-density portion, and (iii) the lower density portion is substantially free of the particles of size greater than 25 μm.