CLAIMS

What is claimed is:

1. A method for treating a feed stream (12) from a chemical enhanced oil recovery (CEOR) process comprising:

contacting a feed stream (12) with a plurality of media composite particles (20) to remove hydrocarbons from the feed stream (12), the feed stream (12) comprising the hydrocarbons, a concentration of a viscosity-enhancing polymer of at least 10 mg/L, and an aqueous fluid, the media composite particles (20) each comprising a mixture of a cellulose-based material and a polymer; and

generating a treated stream (40) comprising a reduced amount of the hydrocarbons and at least a majority of a concentration of the viscosity-enhancing polymer remaining therein relative to the feed stream (12), wherein the viscosity-enhancing polymer includes hydrolyzed polyacrylamide (HPAM).

~~2. The method of claim 1, wherein the polymer comprises hydrolyzed polyacrylamide (HPAM).~~

~~3~~2. The method of claim 1, wherein the concentration of a viscosity-enhancing polymer in the feed stream is 50 mg/L or more.

~~4~~3. The method of claim 1, wherein the treated stream comprises a hydrocarbon concentration of 30 ppm or less.

~~5~~4. The method of claim 1, wherein the contacting reduces an amount of hydrocarbons in the feed stream (12) by at least 80% relative to a concentration of hydrocarbons in the treated stream (40).

~~6~~5. The method of claim 1, wherein the treated stream (40) comprises at least 80% of a concentration of the polymer from the feed stream (12).

~~7~~6. The method of claim 1, wherein the feed stream (12) further comprises an additive selected from the group consisting of an alcohol, a hydrophilic additive, a stabilizer, a salt, a surfactant, and combinations thereof.

~~8~~7. The method of claim 1, further comprising reusing the treated stream (40) as a completion fluid in an oil production process.

~~9~~8. The method of claim 1, wherein a concentration of the hydrocarbons in the feed stream (12) is from 100 to 1500 mg/L.

~~10~~9. The method of claim 1, wherein the contacting comprises introducing the feed stream (12) into a first vessel (18A) comprising the media composite particles (20), and introducing the feed stream into a second vessel (18B) comprising the media composite particles (20) in flow series with the first vessel (18A).

~~11~~10. The method of claim 1, further comprising backwashing the media composite particles (20) to produce a hydrocarbon liquid effluent (45); combining the hydrocarbon liquid effluent (45) with the feed stream (12), and contacting the feed stream (12) and hydrocarbon liquid effluent (45) with the plurality of media composite particles (20).

~~12~~11. A system (10) for treating a feed stream from a chemical enhanced oil recovery (CEOR) process comprising:

a source of a feed stream (12) comprising hydrocarbons, a concentration of a viscosity-enhancing polymer of at least 10 mg/L, and an aqueous fluid; and

a first vessel (18A) comprising a plurality of media composite particles (20) therein effective to remove a quantity of the hydrocarbons from the feed stream (12) and generate a treated stream (40) comprising a reduced amount of the hydrocarbons and at least a majority of the viscosity-enhancing polymer remaining therein relative to the feed stream (12);

wherein the media composite particles (20) each comprise a mixture of a cellulose-based material and a polymer, and wherein the viscosity-enhancing polymer includes hydrolyzed polyacrylamide (HPAM).

~~13. The system (10) of claim 12, wherein the polymer comprises hydrolyzed polyacrylamide (HPAM).~~

~~14~~12. The system (10) of claim ~~12~~11, wherein the concentration of a viscosity-enhancing polymer in the feed stream is 50 mg/L or more.

~~15~~13. The system (10) of claim ~~12~~11, wherein the feed stream (12) further comprises an additive selected from the group consisting of an alcohol, a hydrophilic additive, a stabilizer, a salt, a surfactant, and combinations thereof.

~~16~~14. The system (10) of claim ~~12~~11, wherein the feed stream (12) comprises produced water from a CEOR process.

~~17~~15. The system (10) of claim ~~12~~11, wherein a hydrocarbon concentration in the feed stream (12) is from 100 to 1500 mg/L.

~~18~~16. The system (10) of claim ~~12~~11, further comprising a second vessel (18B) comprising a plurality of the media composite particles (20) in flow series with the first vessel (18A), and a source (42) of a backwash fluid (44) in fluid communication with an inlet of the first vessel (18A) to deliver an amount of the backwash fluid to the first vessel (18A) or the second vessel (18B).

~~19~~17. The system (10) of claim ~~12~~11, further comprising a separator device (38) upstream from the first vessel (18A), the separator device (38) comprising at least one of a hydrocyclone, a filter device, a gravity settling device, and a flotation device.

~~20~~18. The system (10) of claim ~~12~~11, wherein the cellulose-based material comprises maple wood, and wherein the polymer comprises high density polyethylene.