CLAIMS

1. A polymer composition for use in enhancing the production of oil from a formation, the composition comprising:

a powder polymer having an average molecular weight of 0.5 to 30 Million Daltons suspended in a water soluble solvent at a weight ratio of powder polymer to water soluble solvent ranging from 20:80 to 80:20; wherein the water soluble solvent has an HLB of greater or equal to 8 and comprises a mixture of non-ionic and anionic surfactants; and wherein the polymer composition is contains less than or equal to 3 wt. % water;

wherein when the polymer composition is hydrated in an aqueous fluid for an injection solution in less than or equal to 4 hours containing a polymer concentration ranging from 100 ppm to 50,000 ppm and having a filter ratio of less than or equal to 1.5 at 15 psi using a 1.2µm filter.

2. The polymer composition of claim 1, wherein the polymer composition is hydrated in an aqueous fluid for an injection solution in less than or equal to 2 hours and having a filter ratio of less than or equal to 1.2 at 15 psi using a 1.2µm filter.

3. The polymer composition of claims 1-2, wherein the polymer composition is hydrated in an aqueous fluid for an injection solution in less than or equal to 4 hours, and having a turbidity of less than or equal to 20 NTU.

4. The polymer composition of claims 1-3, where the polymer composition is characterized as having a turbidity decrease of at least 25% after the powder polymer is suspended in the water soluble solvent for a period of at least 2 hours.

5. The polymer composition of claims 1-4, wherein the powder polymer is a biopolymer or a synthetic polymer, optionally selected from the group of polyacrylamides, partially hydrolyzed polyacrylamides, hydrophobically-modified associative polymers, copolymers of polyacrylamide and one or both of 2-acrylamido 2-methylpropane sulfonic acid and salts thereof, and N-vinyl pyrrolidone, single-, co-, or ter-polymers of N-vinyl pyrrolidones, polyacrylic acid, polyvinyl alcohol, and mixtures thereof.

6. The polymer composition of claims 1-5, wherein the water soluble solvent further comprises isopropyl alcohol (IPA), n-propyl alcohol, isobutyl alcohol (IBA), methyl-isobutyl alcohol, secondary butyl alcohol (SBA), ethylene glycol monobutyl ether, diethylene glycol monobutyl ether, triethylene glycol monobutyl ether, or mixtures thereof.

7. The polymer composition of claims 1-6, wherein the non-ionic surfactant is selected from ethoxylated surfactants, nonylphenol ethoxylates, alcohol ethoxylates, and mixtures thereof; and/or wherein the anionic surfactant is selected from internal olefin sulfonates, isomerized olefin sulfonates, alkyl aryl sulfonates, medium alcohol (C10 to C17) alkoxy sulfates, alcohol ether [alkoxy]carboxylates, alcohol ether [alkoxy]sulfates, alkyl sulfonate, α-olefin sulfonates (AOS), dihexyl sulfosuccinates, alkylpolyalkoxy sulfates, sulfonated amphoteric surfactants, or mixtures thereof.

8. The polymer composition of claims 1-7, wherein the water soluble solvent further comprises a co-solvent, wherein the co-solvent is selected from the group of an ionic surfactant, non-ionic surfactant, anionic surfactant, cationic surfactant, nonionic surfactant, amphoteric surfactant, ketones, esters, ethers, glycol ethers, glycol ether esters, lactams, cyclic ureas, alcohols, aromatic hydrocarbons, aliphatic hydrocarbons, alicyclic hydrocarbons, nitroalkanes, unsaturated hydrocarbons, halocarbons, alkyl aryl sulfonates (AAS), a-olefin sulfonates (AOS), internal olefin sulfonates (IOS), alcohol ether sulfates derived from propoxylated Ci_2-C_2o alcohols, ethoxylated alcohols, mixtures of an alcohol and an ethoxylated alcohol, mixtures of anionic and cationic surfactants, disulfonated surfactants, aromatic ether polysulfonates, isomerized olefin sulfonates, alkyl aryl sulfonates, medium alcohol (C10 to C17) alkoxy sulfates, alcohol ether [alkoxy]carboxylates, alcohol ether [alkoxy]sulfates, primary amines, secondary amines, tertiary amines, quaternary ammonium cations, cationic surfactants that are linked to a terminal sulfonate or carboxylate group, alkyl aryl alkoxy alcohols, alkyl alkoxy alcohols, alkyl alkoxylated esters, alkyl polyglycosides, alkoxy ethoxyethanol compounds, isobutoxy ethoxyethanol ("iBDGE"), n-pentoxy ethoxyethanol ("n-PDGE"), 2-methylbutoxy ethoxyethanol ("2-MBDGE"), methylbutoxy ethoxyethanol (“3-MBDGE"), (3,3-dimethylbutoxy ethoxyethanol ("3,3-DMBDGE"), cyclohexylmethyleneoxy ethoxyethanol (hereafter "CHMDGE"), 4-Methylpent-2-oxy ethoxyethanol ("MIBCDGE"), n-hexoxy ethoxyethanol (hereafter "n-HDGE"), 4-methylpentoxy ethoxyethanol ("4-MPDGE"), butoxy ethanol, propoxy ethanol, hexoxy ethanol, isoproproxy 2-propanol, butoxy 2-propanol, propoxy 2-propanol, tertiary butoxy 2-propanol, ethoxy ethanol, butoxy ethoxy ethanol,

propoxy ethoxy ethanol, hexoxy ethoxy ethanol, methoxy ethanol, methoxy 2-propanol and ethoxy ethanol, n-methyl-2-pyrrolidone, dimethyl ethylene urea, and mixtures thereof.

9. A method of enhancing oil recovery in a subterranean reservoir, the method comprising

providing a wellbore in fluid communication with the subterranean reservoir;

providing a polymer suspension, wherein the polymer suspension comprises a powder polymer having an average molecular weight of 0.5 to 30 Million Daltons at a weight ratio of powder polymer to water soluble solvent ranging from 20:80 to 80:20; wherein the water soluble solvent has an HLB of greater or equal to 8 and comprises a mixture of non-ionic and anionic surfactants; and wherein the polymer suspension contains less than or equal to 3 wt. % water;

providing an aqueous fluid selected from any of surface water, water recovered from a production well, sea water, synthetic water, produced reservoir brine, reservoir brine, fresh water, produced water, water, saltwater, brine, synthetic brine, synthetic seawater brine, and mixtures thereof;

mixing a sufficient amount of the polymer suspension in the aqueous fluid for the polymer to be hydrated resulting in an injection solution in less than or equal to 4 hours, the injection solution containing a polymer concentration ranging from 100 ppm to 50,000 ppm and having a filter ratio of less than 1.5 at 15 psi using a 1.2µm filter;

injecting the injection solution into the wellbore into the subterranean reservoir.

10. The method of claim 9, wherein the mixing of a sufficient amount of the polymer suspension in the aqueous fluid is via a mixing tank or an in-line mixer; and/or wherein the mixing of a sufficient amount of the polymer suspension in the aqueous fluid resulting in an injection solution having a filter ratio of less than or equal to 1.2 at 15 psi using a 1.2µm filter.

11. The method of claims 9-10, wherein providing the polymer suspension comprises mixing the powder polymer into the water soluble solvent and wherein the weight ratio of powder polymer to water soluble solvent ranges from 30:70 to 70:30or wherein the weight ratio of powder polymer to water soluble solvent ranges from 40:60 to 60:40.

12. The method of claims 9-11, wherein: the wellbore is an injection wellbore associated with an injection well, and the method further comprising:

providing a production well spaced apart from the injection well a predetermined distance and having a production wellbore in fluid communication with the subterranean reservoir,

wherein the injection of the injection solution increases flow of hydrocarbons to the production wellbore; or the wellbore is a hydraulic fracturing wellbore associated with a hydraulic fracturing well.

13. A method for making a polymer suspension for use in enhancing the production of oil from a formation, the method comprising:

mixing a powder polymer having an average molecular weight of 0.5 to 30 Million Daltons into a water soluble solvent at a weight ratio of powder polymer to water soluble solvent ranging from 20:80 to 80:20; wherein the water soluble solvent has an HLB of greater or equal to 8 and comprises a mixture of non-ionic and anionic surfactants;

wherein the polymer suspension is stable, pumpable, and contains less than or equal to 3 wt.% water; and

wherein when the polymer suspension is hydrated for an injection solution in less than or equal to 4 hours, containing a polymer concentration ranging from 100 ppm to 50,000 ppm and having a filter ratio of less than or equal to 1.5 at 15 psi using a 1.2µm filter, by mixing a sufficient amount of the polymer suspension in an aqueous fluid.

14. The method of claim 13, wherein the mixing of a sufficient amount of the polymer suspension in the aqueous fluid resulting in an injection solution having a filter ratio of less than or equal to 1.2 at 15 psi using a 1.2µm filter; and/or wherein the mixing of a sufficient amount of the polymer suspension in the aqueous fluid resulting in an injection solution having a turbidity of less than or equal to 20 NTU, and/or wherein after the powder polymer is suspended in the water soluble solvent for a period of at least 2 hours with a turbidity decrease of at least 25%.

15. The method of claims 13-14, wherein providing the powder polymer is a biopolymer or a synthetic polymer.

16. The method of claims 13-15, wherein the weight ratio of powder polymer to water soluble solvent ranges from 30:70 to 70:30 or wherein the weight ratio of powder polymer to water soluble solvent ranges from 40:60 to 60:40.