WHAT IS CLAIMED IS:

1. A system for desalination of a liquid, the liquid having a dissolved salt, the system comprising:

at least one primary treatment process;

at least one secondary treatment process, wherein the at least one secondary treatment process comprises at least one reactor; and

at least one tertiary treatment process;

wherein the at least one primary treatment process is configured to adjust a pH of the liquid to target pH level and to add at least one chemical additive to the liquid;

wherein the at least one reactor is configured to heat the liquid to a temperature of at least 350°F and to supply a pressure to the liquid to maintain the liquid in a liquid state;

wherein the dissolved salt of the liquid is configured to react with at least a portion of the at least one chemical additive to form an insoluble product within the at least one reactor;

wherein heat is produced when the insoluble product is formed within that at least one reactor; and

wherein at least a portion of the insoluble product formed within the at least one reactor is configured to be removed from the liquid during the at least one tertiary treatment process.

2. The system of Claim 1,

wherein the target pH level is 10;

wherein the at least one chemical additive comprises a phosphate salt;

wherein the insoluble product comprises a cation of dissolved salt and phosphate; and

wherein the at least one tertiary treatment process configured to remove the insoluble product from the liquid comprises a filter.

3. The system of Claim 1, wherein the target pH level is 10.

4. The system of Claim 1 or 3, wherein the at least one chemical additive comprises a phosphate salt.

5. The system of Claim 4, wherein the phosphate salt comprises trisodium phosphate.

6. The system of any one of Claims 1 or 3-5, wherein the insoluble product comprises a cation of dissolved salt and phosphate.

7. The system of Claim 6, wherein the insoluble product comprises at least one of sodium phosphate, calcium phosphate and magnesium phosphate.

8. The system of any one of Claims 1 or 3-7, wherein the at least one tertiary treatment process configured to remove the insoluble product from the liquid comprises a filter.

9. The system of any one of Claims 1 or 3-8, wherein the at least one tertiary treatment process configured to remove the insoluble product from the liquid comprises at least one settling tank or at least one polishing tank.

10. The system of any one of Claims 1-9, wherein the system does not include reverse osmosis or any other membrane technology.

11. The system of any one of Claims 1-10, wherein the at least one primary treatment process comprises lime softening to remove at least a portion of hardness of the liquid before the liquid enters the at least one reactor.

12. The system of any one of Claims 1-11, wherein the at least one primary treatment process further comprises removing at least one of sand, silt, grit and gases.

13. The system of any one of Claims 1-12, further comprising at least one heat exchange unit, the at least one heat exchange unit being configured to transfer heat from the liquid at one location of the system to the liquid at a different location of the system.

14. The system of any one of Claims 1-13, wherein heat produced when the insoluble product is formed within that at least one reactor is configured to permit the system to operate without an external introduction of heat to the liquid.

15. The system of any one of Claims 1-13, further comprising an external heating system configured to transfer heat to the liquid within the at least one reactor.

16. The system of Claim 15, wherein the external heating system comprises an oil heating system.

17. The system of Claim 16, wherein an oil circulated through the oil heating system comprises a plant-based oil.

18. The system of any one of Claims 1-17, further comprising at least one turbine configured to be moved when liquid is moved through at least one portion of the system, the at least one turbine being configured to generate at least some energy.

19. The system of any one of Claims 1-18, wherein the primary treatment process further comprises at least one mixing tank, wherein the at least one mixing tank is configured to facilitate mixing of the at least one chemical additive in the liquid.

20. The system of any one of Claims 1-19, wherein the system further comprises at least one quaternary treatment process.

21. The system of Claim 20, wherein the at least one quaternary treatment process comprises disinfection.

22. The system of Claim 21, wherein disinfection comprises UV disinfection or chlorination.

23. The system of any one of Claims 1-22, wherein the system is configured to treat at least one of the following: sea water, well water, brackish water, water generated in hydraulic fracturing procedures and wastewater.

24. The system of any one of Claims 1-23, wherein the at least one reactor is configured to heat the liquid to a temperature of at least 400°F.

25. The system of any one of Claims 1-23, wherein the at least one reactor is configured to heat the liquid to a temperature of at least 450°F.

26. The system of any one of Claims 1-23, wherein the at least one reactor is configured to heat the liquid to a temperature of at least 500°F.

27. A method for desalination of a liquid, the liquid having a dissolved salt, the method comprising:

treating the liquid using at least one primary treatment process;

treating the liquid using at least one secondary treatment process, wherein the at least one secondary treatment process comprises at least one reactor; and

treating the liquid using at least one tertiary treatment process;

wherein the at least one primary treatment process is configured to adjust a pH of the liquid to target pH level and to add at least one chemical additive to the liquid;

wherein the at least one reactor is configured to heat the liquid to a temperature of at least 350°F and to supply a pressure to the liquid to maintain the liquid in a liquid state;

wherein the dissolved salt of the liquid is configured to react with at least a portion of the at least one chemical additive to form an insoluble product within the at least one reactor;

wherein heat is produced when the insoluble product is formed within that at least one reactor; and

wherein at least a portion of the insoluble product formed within the at least one reactor is configured to be removed from the liquid during the at least one tertiary treatment process.

28. The method of Claim 27,

wherein the target pH level is 10;

wherein the at least one chemical additive comprises a phosphate salt;

wherein the insoluble product comprises a cation of dissolved salt and phosphate; and

wherein the at least one tertiary treatment process configured to remove the insoluble product from the liquid comprises a filter.

29. The method of Claim 27, wherein the target pH level is 10.

30. The method of Claim 27 or 29, wherein the at least one chemical additive comprises a phosphate salt.

31. The method of Claim 30, wherein the phosphate salt comprises trisodium phosphate.

32. The method of any one of Claims 27 or 29-31, wherein the insoluble product comprises a cation of dissolved salt and phosphate.

33. The method of Claim 32, wherein the insoluble product comprises at least one of sodium phosphate, calcium phosphate and magnesium phosphate.

34. A system for desalination comprising:

a fluid source having fluid to be desalinated;

a first filtering vessel having a first filtering fluid inlet, a first filtering fluid outlet and a first filtering drain, the first filtering fluid inlet being in fluid communication with the fluid source;

a degassing vessel having a degassing fluid inlet, a degassing fluid outlet and a gas release, the degassing fluid inlet being in fluid communication with the first filtering fluid outlet;

a heating vessel having a hollow interior, the heating vessel having a transfer tube positioned within and traversing the hollow interior, the transfer tube having a heating vessel inlet and a heating vessel outlet, the heating vessel inlet being in fluid communication with the degassing fluid outlet, the hollow interior having a first fluid, the heating vessel being heated by a heater, the heating vessel outlet having a one-way valve;

a second filtering vessel having at least one filter, a second filtering inlet, a second filtering outlet and a second drain, the second filtering inlet being in fluid communication with the heating vessel outlet;

a holding tank having a desalinated fluid inlet, the desalinated fluid inlet being in fluid communication with the second filtering outlet;

a pump for pumping fluid to be desalinated through the system.

35. The system of Claim 34, further comprising a mixing tank having a mixing tank inlet, a mixing tank outlet, a chemical inlet and a mixing mechanism, the mixing tank being positioned between the degassing vessel and the heating vessel such that the mixing tank outlet is in fluid communication with the degassing fluid outlet and the mixing tank inlet is in fluid communication with the heating vessel inlet.

36. The system of Claim 34 or 35, wherein the transfer tube is made of an alloy metal.

37. The system of any one of Claims 34-36, wherein the first fluid is an oil.

38. The system of Claim 37, wherein the first fluid is a mineral oil.

39. The system of Claim 37, wherein the first fluid is a sunflower oil.

40. The system of any one of Claims 34-39, wherein the one-way valve is opened at a predetermined temperature.

41. The system of Claim 40, wherein the predetermined temperature is 450°F.

42. The system of any one of Claims 34-41, wherein the heater is an electric heater.

43. The system of any one of Claims 34-42, wherein the heater is positioned within the hollow interior of the heating vessel.

44. The system of any one of Claims 34-43, wherein the heating vessel has an interior pressure of 550 psi.

45. The system of any one of Claims 34-44, further comprising a heat exchanger for pre-heating the fluid to be desalinated prior to entering the heating vessel and cooling the fluid to be desalinated after it has passed through the heating vessel.

46. The system of any one of Claims 34-45, further comprising a settling tank having a settling tank inlet, a settling tank outlet and a settling tank drain, the settling tank being positioned between the second filtering vessel and the holding tank such that the settling tank inlet is in fluid communication with the second filtering outlet and the settling tank outlet is in fluid communication with the desalinated fluid inlet.

47. The system of Claim 46, further comprising a polishing vessel having a polishing vessel inlet and a polishing vessel outlet, the polishing vessel containing a plurality of resin beads, the polishing vessel being positioned between the settling tank and the holding tank such that the polishing vessel inlet is in fluid communication with the settling tank outlet and the polishing vessel outlet is in fluid communication with the desalinated fluid inlet.

48. A method of desalinating a fluid comprising the steps of:

providing a fluid to be desalinated;

filtering out at least a portion of the suspended solids within the fluid to be desalinated;

removing at least a portion of the gasses within the fluid to be desalinated;

mixing fluid treatment chemicals with the fluid to be desalinated prior to the fluid to be desalinated being transported through the heating vessel;

providing a heating vessel having a hollow interior, the heating vessel having a transfer tube positioned within and traversing the hollow interior, the transfer tube having an inlet and an outlet, the heating vessel being heated by a heater, the hollow interior being filled with a first fluid and the transfer tube transporting the fluid to be desalinated through the heating vessel;

filtering the fluid to be desalinated such that molecules larger than 3 micros are removed;

allowing the fluid to be desalinated to settle in a settling tank to allow precipitated molecules to settle out of solution to create a desalinated fluid;

collecting the desalinated fluid in a holding tank.

49. The method of Claim 48, wherein the fluid treatment chemicals is a phosphate.

50. The method of Claim 49, wherein the fluid treatment chemicals is trisodium phosphate.

51. The method of Claim 48, wherein the fluid treatment chemicals is a dispersant.

52. The method of Claim 51, wherein the fluid treatment chemicals is an iron oxide dispersant.

53. The method of any one of Claims 48-52, further comprising the step of adding aluminum sulfate to the settling tank to precipitate out phosphate molecules.

54. The method of any one of Claims 48-53, further comprising the step of polishing the fluid in a vessel having resin beads prior to collecting the desalinated fluid in a holding tank.

55. The method of any one of Claims 48-54, further comprising the step of treating the desalinated fluid with UV to kill bacteria.

56. The system or method of any one of Claims 1-55, further comprising one or more features as described and/or illustrated herein and/or as recited in any one of the claims.

CLAIMS:

1. A system for desalination of a liquid, the liquid having a dissolved salt, the system comprising:

at least one primary treatment process;

at least one secondary treatment process, wherein the at least one secondary treatment process comprises at least one reactor; and

at least one tertiary treatment process;

wherein the at least one primary treatment process is configured to adjust a pH of the liquid to a minimum target pH level and to add at least one chemical additive to the liquid;

wherein the at least one reactor is configured to heat the liquid to a temperature of at least 350°F and to supply a pressure to the liquid to maintain the liquid in a liquid state;

wherein the dissolved salt of the liquid is configured to react with at least a portion of the at least one chemical additive to form an insoluble product within the at least one reactor;

wherein heat is produced when the insoluble product is formed within that at least one reactor; and

wherein at least a portion of the insoluble product formed within the at least one reactor is configured to be removed from the liquid during the at least one tertiary treatment process.

2. The system of Claim 1,

wherein the minimum target pH level is 10;

wherein the at least one chemical additive comprises a phosphate salt;

wherein the insoluble product comprises a cation of dissolved salt and phosphate; and

wherein the at least one tertiary treatment process is configured to remove the insoluble product from the liquid comprises a filter.

3. The system of Claim 1, wherein the minimum target pH level is 10.

4. The system of Claim 1, wherein the at least one chemical additive comprises a phosphate salt.

5. The system of Claim 1, wherein the insoluble product comprises a cation of dissolved salt and phosphate.

6. The system of Claim 1, wherein the at least one tertiary treatment process is configured to remove the insoluble product from the liquid comprises a filter.

7. The system of Claim 1, wherein the at least one tertiary treatment process is configured to remove the insoluble product from the liquid comprises at least one settling tank or at least one polishing tank.

8. The system of Claim 1, wherein the system does not include reverse osmosis or any other membrane technology.

9. The system of Claim 1, wherein the at least one primary treatment process comprises lime softening to remove at least a portion of hardness of the liquid before the liquid enters the at least one reactor.

10. The system of Claim 1, wherein the at least one primary treatment process further comprises removing at least one of sand, silt, grit and gases.

11. The system of Claim 1, further comprising at least one heat exchange unit, the at least one heat exchange unit being configured to transfer heat from the liquid at one location of the system to the liquid at a different location of the system.

12. The system of Claim 1, wherein heat produced when the insoluble product is formed within that at least one reactor is configured to permit the system to operate without an external introduction of heat to the liquid.

13. The system of Claim 1, further comprising an external heating system configured to transfer heat to the liquid within the at least one reactor.

14. The system of Claim 13, wherein the external heating system comprises an oil heating system.

15. The system of Claim 1, further comprising at least one turbine configured to be moved when liquid is moved through at least one portion of the system, the at least one turbine being configured to generate at least some energy.

16. The system of Claim 1, wherein the primary treatment process further comprises at least one mixing tank, wherein the at least one mixing tank is configured to facilitate mixing of the at least one chemical additive in the liquid.

17. The system of Claim 1, wherein the system further comprises at least one quaternary treatment process.

18. The system of Claim 17, wherein the at least one quaternary treatment process comprises disinfection.

19. A method for desalination of a liquid, the liquid having a dissolved salt, the method comprising:

treating the liquid using at least one primary treatment process;

treating the liquid using at least one secondary treatment process, wherein the at least one secondary treatment process comprises at least one reactor; and

treating the liquid using at least one tertiary treatment process;

wherein the at least one primary treatment process is configured to adjust a pH of the liquid to a minimum target pH level and to add at least one chemical additive to the liquid;

wherein the at least one reactor is configured to heat the liquid to a temperature of at least 350°F and to supply a pressure to the liquid to maintain the liquid in a liquid state;

wherein the dissolved salt of the liquid is configured to react with at least a portion of the at least one chemical additive to form an insoluble product within the at least one reactor;

wherein heat is produced when the insoluble product is formed within that at least one reactor; and

wherein at least a portion of the insoluble product formed within the at least one reactor is configured to be removed from the liquid during the at least one tertiary treatment process.

20. The method of Claim 19,

wherein the minimum target pH level is 10;

wherein the at least one chemical additive comprises a phosphate salt;

wherein the insoluble product comprises a cation of dissolved salt and phosphate; and

wherein the at least one tertiary treatment process configured to remove the insoluble product from the liquid comprises a filter.

21. The method of Claim 19, wherein the minimum target pH level is 10.

22. The method of Claim 19, wherein the at least one chemical additive comprises a phosphate salt.

23. A system for desalination comprising:

a first filtering vessel comprising a first filtering fluid inlet and a first filtering fluid outlet, the first filtering fluid inlet being in fluid communication with the fluid source, the fluid source comprising a fluid to be treated, wherein the fluid to be treated comprises a salt;

a degassing vessel comprising a degassing fluid inlet, a degassing fluid outlet and a gas release, the degassing fluid inlet being in fluid communication with the first filtering fluid outlet;

a heating vessel comprising an interior, the heating vessel comprising a transfer tube positioned within and traversing the interior, the transfer tube comprising a heating vessel inlet and a heating vessel outlet, the heating vessel inlet being in fluid communication with the degassing fluid outlet, the interior configured to receive a first fluid, the heating vessel being heated by a heater;

wherein the fluid to be treated is configured to be heated to a temperature of at least 350°F and maintained as a liquid within the heating vessel; and

wherein at least a portion of dissolved ions of the salt are configured to form an insoluble product within the heating vessel;

a second filtering vessel comprising at least one filter, a second filtering inlet and a second filtering outlet, the second filtering inlet being in fluid communication with the heating vessel outlet, the second filtering vessel being configured to remove the insoluble product from the fluid being treated.

24. The system of Claim 23, further comprising a mixing tank having a mixing tank inlet, a mixing tank outlet, a chemical inlet and a mixing mechanism, the mixing tank being positioned between the degassing vessel and the heating vessel such that the mixing tank outlet is in fluid communication with the degassing fluid outlet and the mixing tank inlet is in fluid communication with the heating vessel inlet, wherein the mixing tank is configured to add at least one additive to the fluid to be treated.

25. The system of Claim 23, wherein the transfer tube comprises an alloy metal.

26. The system of Claim 23, wherein the first fluid comprises an oil.

27. The system of Claim 26, wherein the first fluid comprises at least one of a mineral oil and a sunflower oil.

28. The system of Claim 23, wherein the heater comprises ~~is~~ an electric heater.

29. The system of Claim 23, wherein the heater is positioned within the interior of the heating vessel.

30. The system of Claim 23, wherein the heating vessel is configured to maintain an interior pressure of 500 to 600 psi.

31. The system of Claim 23, further comprising a heat exchanger for pre-heating the fluid to be treated prior to entering the heating vessel and cooling the fluid to be treated after it has passed through the heating vessel.

32. The system of Claim 23, further comprising a settling tank comprising a settling tank inlet, a settling tank outlet and a settling tank drain, the settling tank being positioned hydraulically after the second filtering vessel such that the settling tank inlet is in fluid communication with the second filtering outlet.

33. The system of Claim 32, wherein the polishing vessel comprises a polishing vessel inlet and a polishing vessel outlet, the polishing vessel configured to receive a plurality of resin beads, the polishing vessel being positioned hydraulically after the settling tank such that the polishing vessel inlet is in fluid communication with the settling tank outlet.

34. A method of desalinating a fluid comprising the steps of:

receiving a fluid to be desalinated;

filtering at least a portion of the suspended solids within the fluid to be desalinated using at least one filter;

removing at least a portion of the gases from the fluid to be desalinated using a degassing device or a deaerator;

mixing at least one treatment chemical with the fluid to be desalinated prior to the fluid to be desalinated being transferred to a reactor;

heating the fluid to be desalinated in the reactor, wherein the reactor is configured to heat the fluid to be desalinated to a temperature of at least 350°F and to supply a pressure to the liquid to maintain the liquid in a liquid state; and

allowing the fluid to be desalinated to settle in a settling tank to allow precipitated materials to settle.

35. The method of Claim 34, wherein the treatment chemical comprises a phosphate.

36. The method of Claim 35, wherein the treatment chemical comprises trisodium phosphate.

37. The method of Claim 34, wherein the treatment chemical comprises a dispersant.

38. The method of Claim 37, wherein the treatment chemicals comprises is an iron oxide dispersant.

39. The method of Claim 34, further comprising the step of adding aluminum sulfate to the fluid to be desalinated within settling tank to at least partially precipitate phosphate molecules.

40. The method of Claim 34, further comprising the step of polishing the fluid to be desalinated in a vessel having resin beads prior to collecting said fluid in a holding tank.

41. The method of Claim 34, further comprising the step of treating the fluid to be desalinated using UV.