## CLAIMS

1. A saltwater desalination and salt plant comprising:

a desalination plant having a feed stream and a reject stream,

a salt plant comprising:

a feed stream, said desalination plant reject stream forming at least a portion of said salt plant feed stream,

a filter to selectively remove scaling species from said salt plant feed stream to result in a filtered salt plant feed stream; and

equipment for processing said filtered salt plant feed stream into a high purity moist salt or slurry.

2. The saltwater desalination and salt plant of claim 1 wherein said filter removes at least about 99% of the sulfates from said salt plant feed stream and passes at least about 50% of the chloride in said salt plant feed stream.

3. The saltwater desalination and salt plant of claim 2 wherein said filter removes at least about 99.9% of the sulfates from said salt plant feed stream.

4. The saltwater desalination and salt plant of claim 3 wherein said filter removes at least about 90% of the calcium and at least about 95% of the magnesium from said salt plant feed stream.

5. The saltwater desalination and salt plant of claim 4 wherein said filter removes at least about 95% of the calcium and at least about 98% of the magnesium from said salt plant feed stream.

6. The saltwater desalination and salt plant of claim 5 wherein said filter is a nanofiltration section.

7. The saltwater desalination and salt plant of claim 6 wherein said nanofiltration section is a 2-PASS nanofiltration system; wherein said nanofiltration section rejects

less than about 30% of chloride, greater than about 90% of sulfate, greater than about 68% of calcium, and greater than about 77% of magnesium average per pass.

8. The saltwater desalination and salt plant of claim 7 wherein said equipment for processing said filtered feed stream into a moist salt or slurry comprises:

an evaporator section and a crystallizer section;

said evaporator section adapted to receive permeate from said nanofiltration section;

said crystallizer section adapted to receive concentrate from said evaporator section.

9. The saltwater desalination and salt plant of claim 8 wherein said salt plant can include an optional concentrator section located between said nanofiltration section and said evaporator section.

10. The saltwater desalination and salt plant of claim 9 wherein said concentrator section is a reverse osmosis section.

11. The saltwater desalination and salt plant of claim 8 wherein said desalination plant further comprises:

a pretreatment section, and a reverse osmosis section;

said desalination plant feed stream adapted to pass through said pretreatment section and into said reverse osmosis section;

said reverse osmosis section receiving said desalination plant feed stream and produces a permeate stream and a reject stream, said reject stream adapted for feeding into said desalination plant reject stream.

12. The saltwater desalination and salt plant of claim 8 wherein said desalination plant further comprises:

a pretreatment section, a nanofiltration section, and a reverse osmosis section;

said desalination plant feed stream adapted for passage through said pretreatment section and for direction into said nanofiltration section;

said nanofiltration section produces a permeate stream and a reject stream, said nanofiltration section permeate stream being directed into said reverse osmosis section;

said reverse osmosis section produces a permeate stream and a reject stream, said reverse osmosis reject stream defining said desalination plant reject stream.

13. A method of producing salt comprising:

directing a saltwater desalination plant reject stream into a salt plant feed stream;

selectively filtering said salt plant feed stream to remove scaling species; and

processing said filtered feed stream into a high purity moist salt or slurry.

14. The method of claim 13 wherein said selective filtering removes at least about 99% of the sulfates from said salt plant feed stream.

15. The method of claim 14 wherein said selective filtering removes at least about 99.9% of the sulfates from said salt plant feed stream.

16. The method of claim 15 wherein said selective filtering removes at least about 90% of the calcium and at least about 95% of the magnesium from said salt plant feed stream.

17. The method of claim 16 wherein said selective filtering removes at least about 95% of the calcium and at least about 98% of the magnesium from said salt plant feed stream.

18. The method of claim 17 wherein a nanofiltration section is used to selectively filter said plant feed stream, said nanofiltration section can be operated at a reduced pH to enhance calcium and magnesium removal.

19. The method of claim 18 wherein said nanofiltration section is a 2-PASS nanofiltration system.

20. The method of claim 19 wherein said filtered feed stream is processed into a moist salt or slurry by:

an evaporator section and a crystallizer section;

said evaporator section receives said filtered feed stream from said filter; and

said crystallizer section receives said filtered feed stream from said evaporator section.

**CLAIMS**

1. A method of producing salt comprising:

directing a saltwater desalination plant reject stream into a salt plant feed stream;

selectively filtering said salt plant feed stream to remove scaling species, wherein said filtering step comprises directing said salt plant feed stream through a nanofiltration section to produce a filtered feed stream wherein at least 90% of the calcium and at least about 98% of the magnesium has been removed from said salt plant feed stream in said nanofiltration section;

processing said filtered feed stream by directing said filtered feed stream through a membrane-based concentrator section to produce a concentrated stream;

directing said concentrated stream to an evaporator section, wherein a high purity moist salt or slurry is produced; and

directing said high purity moist salt or slurry to a crystallizer section, wherein said salt is produced, wherein said nanofiltration section is operated at a pH that is less than about 7.0 to enhance calcium and magnesium removal.

2. The method of claim 1 wherein said selective filtering removes at least about 99% of the sulfates from said salt plant feed stream.

3. The method of claim 2 wherein said selective filtering removes at least about 99.9% of the sulfates from said salt plant feed stream.

4. The method of claim 1 wherein said selective filtering removes at least about 95% of the calcium from said salt plant feed stream.

5. The method of claim 1 wherein said nanofiltration section is a 2-PASS nanofiltration system.

6. The method of claim 1 wherein said membrane-based concentrator section comprises a reverse osmosis section.

7. The method of claim 6 wherein said reverse osmosis section comprises a third stage that is a high pressure brine recovery stage.

8. The method of claim 1, wherein said nanofiltration section is operated at a pH that is less than about 6.5 to enhance calcium and magnesium removal.

9. A method of producing salt comprising:

directing a saltwater desalination plant reject stream into a salt plant feed stream;

selectively filtering said salt plant feed stream to remove scaling species, wherein said filtering step comprises directing said salt plant feed stream through a nanofiltration section to produce a filtered feed stream wherein at least 90% of the calcium and at least about 98% of the magnesium has been removed from said salt plant feed stream in said nanofiltration section;

and processing said filtered feed stream by directing said filtered feed stream through a membrane-based concentrator section to produce a concentrated stream, wherein said nanofiltration section is operated at a pH that is less than about 7.0 to enhance calcium and magnesium removal.

10. The method of claim 9 wherein said method further comprises:

directing said concentrated stream to an evaporator section, wherein a high purity moist salt or slurry is produced; and

directing said high purity moist salt or slurry to a crystallizer section, wherein said salt is produced.

11. The method of claim 9 wherein said nanofiltration section is operated at a pH that is less than about 6.5 to enhance calcium and magnesium removal.