Engineering Day 2023

Food Security and Environmental Sustainability

Desalination of seawater in Al-Ahsa

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ABSTRACT

Reverse osmosis membrane improvement has resulted in a 44% share of global desalination production and an 80% share of the overall number of desalination plants deployed worldwide. Reverse osmosis desalination has become more popular as components have increased, and costs have reduced. Change assimilation filters are the fundamental innovation for desalination installations, and they have been used to a wide range of saltwater resources through membrane pretreatment and multilayer structure planning. There are two different components of opposite assimilation desalination: salty water switch assimilation and seawater turn around assimilation. Contrasts in the two water sources, such as saltiness, foulants, waste saline solution removal plant area, and options, have led to a significant difference in execution, process development, and reliability opposing assimilation are equivalent and depend on the specific components of the water supply. This article reveals key boundaries of a RO process that change indefinitely.

INTRODUCTION

The natural mechanism of osmosis is essential, because it serves an important purpose. Salts are being drawn from a less concentrated solution to a more concentrated one. Similar to how the kidneys remove excess water from the blood, plant roots employ osmosis to absorb water from the soil.
If you're having trouble seeing how osmosis works, if left to its own devices, every solution will tend toward a more concentrated condition. Separating the two water bottles with a tractor trailer barrier would cause the water with the lower salt content to flow toward the container with the greater salt concentration.

METHODS

Alternatives to reverse osmosis water filtration system

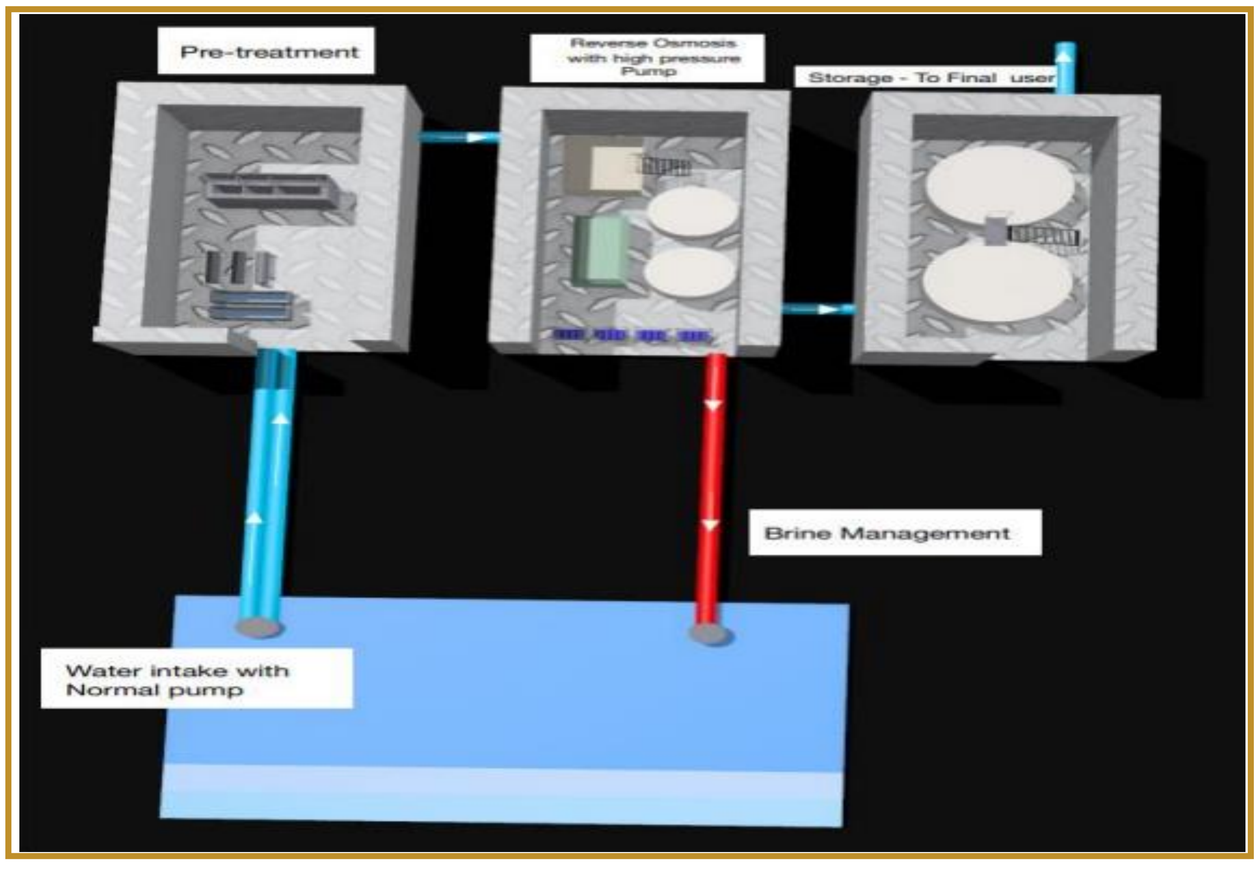
- Membrane filtration
- Ion exchange
- Oxidation are some of the processes involved
- Adsorption
- Coagulation/Flocculation
- Electrochemical Treatment
- Biological Treatment

Why reverse osmosis is best?
Reverse osmosis is one of the most efficient ways to treat water. There have been studies showing that reverse osmosis water filters can get rid of up to 99% of contaminants like lead, asbestos, and 80 others. In many regions of the globe, water purification technology like reverse osmosis have made it unnecessary to prescribe boiling water before use.

RESULTS

- Reverse osmosis has been chosen to be the best method.
- Total water produced in a year is 200000 ton/year.
- Powers acquired by the first and second pump are 1.989 and 30.81 kW respectively.
- RO module was found to be 6.4m in diameter, 4.8768 in height and it’s volume is 155.202 m2.
- Total cost of all the equipment is 1164386$.
- The plant location chosen to be at Al-Uqaire, the closest seashore to Al-Ahsa.

PROTOTYPE / MODEL



CONCLUSION

Desalination of seawater demonstrates that it is a dependable source of fresh water and that it is a solution to the problem of global water scarcity. In places where the only available water sources are seawater or brackish water, desalination procedures are typically employed to create drinking water. For desalination, a variety of technologies have been created, and many more are now being researched and developed. They can be used both on a small scale, which is for delivering water to tiny settlements (like solar distillation), and on a large one, which is for building massive facilities to supply water to cities (e.g. reverse osmosis).Although the costs of desalination appear to be declining over time, they are still more expensive than traditional drinking water procedures. Finally, each desalination plant must consider environmental factors.

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