

Hybrid RO & Softening Water Treatment Plant Process Design

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Reverse Osmosis, Softeners, Ground Water, Water Treatment, Hybrid softener, Automation

ABSTRACT

Hybrid membrane & Pellet softening is a local solution for a common problem of ground water desalination. Desalination of a ground water in dry area raised many concerns about environmental aspect also water losses through membrane brine.

City of Birjand located in east center of Iran, in a warm dry area with a minimum water resource almost all of city's potable water demand providing from deep wells with fully enrich water with minerals. 640 LPS from the overall water demand of this city are planned to be provided from these wells, mostly containing high concentration of hardness, heavy metal and salt.

Hybrid membrane & pellet reactor process was proposed in order to reduce side effects of Ro desalination also making a flexible process which would be adapted with seasonal and annual fluctuation of resource water quality. RO water treatment would be applicable here in order to remove heavy metals, slats and hardness while it had some basic disadvantage of highly losses of water through RO-Brine, environmental impact and high energy consumption.

In this treatment process the overall influent flow of 640 LPS firstly divided into two parallel streams of 220 LPS membrane desalination and 420 LPS capacity of pellet softening process. The partial flow of 420 LPS pumped into pellet reactor softening process where the main objective of hardness reduction would be reached while the heavy metal reduction would be achieved at the same place. Turbidity reduction and PH adjustment other process designed in this configuration.

Considering to the hybrid design of the plant many disadvantages of the latest RO desalination has been covered while the initial investment was decreased using this method.

Environmental aspect is the other important issue in this design, as the overall brine of the site was decreased in this configuration. Financial review has been done in this paper in order to compare proposed hybrid design and conventional water treatment methods.

About the Authors:



Ali Farahmand has been involved with water supply projects for much of his career. He began his career at Azad University (Mashad, Iran) with a degree in fluid-mechanical engineering, followed by winning a World Bank JJ Program scholarship which allowed him to study water supply engineering at UNESCO-IHE (Delft, Netherlands). He currently provides

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Mohsen Farivar graduated from Azad university of Shahrood (Iran) with a degree of MSc in chemical engineering at 2009. So far, he was engaged in Water treatment design of Sistan and Bojnoord water treatment plant. Currently he's working as water treatment process expert. Mr. Farivar is an engineer with Toossab Consulting Engineers Co.



Nassir Gifani has been engaged in Water consultancy for over 16 years , at 1996 graduated from Ferdosi university(Iran) with a Master of science degree . At 1987 graduated from the same university with a degree of Bsc in Mechanical engineering. Over these years he is responsible for Water treatment and transportation design consultancy and Engaged in the Water treatment design mostly located in Iran's capital and other eastern city of Iran. Mr. Gifani is an engineer with Toossab Consulting Engineers Co.