Petrochemistry-2013

OMICS Group Conferences
Accelerating Scientific Discovery

World Congress on
Petrochemistry and Chemical Engineering

November 18-20, 2013 Hilton San Antonio Airport, USA

Sustainable water management in the oil and gas industry to increase water supplies

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Abstract

During oil and gas extraction, large quantities of water are generated as a waste by-product. Water management strategies are necessary to enhance petroleum production while protecting the environment from damage caused by discharges of untreated brackish water. Produced water represents a large, presently under-utilized, "new" water supply mostly generated in water scarce areas. By applying treatment and appropriate conveyance strategies, there is a high potential, as well as economic drivers, to put this water to beneficial use to augment limited, conventional water supplies.

Because of the unique conditions under which produced water is generated, special considerations must be taken into account when selecting treatment technologies. The majority of produced water is generated in remote locations with minimal personnel on-site. Therefore, treatment technologies must be robust, reliable, and require minimal operator maintenance and treatment chemicals. High water recovery and low residuals generation is also important because disposal is costly and difficult. Additionally, produced water is generated at individual well-sites with finite life-spans, therefore, treatment equipment must be mobile to move from site to site, modular to accommodate changing water volumes, and flexible to treat a wide range of water qualities. No single treatment technology exists to accomplish all of these design challenges, therefore, hybrid combinations of technologies consisting of pretreatment, desalination, post treatment, and brine minimization are considered.

This presentation describes beneficial uses of treated produced water, technology selection and design criteria, and examples of successful produced water treatment plants from the Western United States.