



# Role of oil and gas industry in groundwater conservation

Hani Khalifa

*Produced Water Society Middle East, email: hkkhalifa@producedwatersociety.com*

The oil and gas industry is the main industry in the GCC. It is also a main consumer and a major producer of water in these countries, as well as at the global level. In GCC, oil and gas operations consume about 50 to 80 billion gallons (about 200 to 300 million cubic meters) of ground water annually and it generate about 300 billion gallons (1.1 billion cubic meters) of water every year and increasing. With the increasing global energy demand, the GCC oil and gas industry is on the verge of rapidly increasing its water production. Over the next 10 years, it is forecasted that the generated water from the oil and gas industry may double in volume.

Produced water is mostly reinjected into the crude producing reservoirs for enhanced oil recovery. However, this task consumes a substantial amount of energy, which requires additional amount of fresh water. The reinjection process consumes 400 to 700 MW annually, which is equivalent to several decent size power plant productions.

Produced water has a very wide range of chemistry. It includes oil, heavy metals and naturally radioactive elements. This makes it unfeasible for many applications. However, technological development is closing this gap very fast.

## 1. Is produced water a burden or a resource?

Fresh water resources in the GCC are highly stressed. In addition, increasingly stringent laws are forcing GCC producers to actively look for alternatives for consuming

precious ground water. Oman has been leading the exploration of produced water reuse. At NIMR Field, PDO successfully tested the use of reed beds to treat 240,000 barrels per day of produced water to recover oil and produced water with a quality that can be reused in other oil operations. This project used 90% less power should conventional methods were adopted. Similarly, other efforts are ongoing to explore desalination high hypersaline produced water to generate wash water for oil processing. Several universities are researching the use of advanced ceramic membranes to desalinate produced water.

## 2. Concluding thoughts

Oil and gas industry is the main user of scarce ground water and a major producer of a water that is not yet very attractive as a source of usable water. A lot of research is still required in order to change this reality. Lowering cost of desalination of hypersaline produced water can result in significant reduction in ground water consumption by the oil and gas industry. Oil and gas companies are continuously working with regulatory bodies in the region to conserve precious ground water.