

## Beneficial Reuse of Treated Produced Water

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Alberta's oil and gas industry generates millions of cubic meters of produced water on an annual basis. The majority of this produced water is required by regulation to be re-injected back into the formations from which it came either to enhance oil production, maintain reservoir pressure or is sent to approved disposal wells. Under the right set of circumstance the potential may exist to treat and reuse produced water that in the past was considered a waste stream. Treatment and reuse may reduce the costs that oil and gas operators pay to dispose of their produced water and potentially reduce demand on fresh water supplies in water scarce areas.

In 2009 ConocoPhillips Canada in collaboration with GP Resources completed a field scale pilot test to assess the effectiveness of using electro-dialysis reversal (EDR) to treat produced water from a natural gas well completed in the lower glauconitic formation at depth of 1500 m. Approximately 70 m<sup>3</sup> of produced water was treated. Extensive analytical testing of untreated and treated water samples at various stages of the pilot were completed to adequately document the mass removal mechanisms and treatment effectiveness. The pilot test was successful in reducing the TDS of the produced water from approximately 26,000 mg/L to less than 500 mg/L.

This presentation will provide:

- a review of the EDR technology;
- a review of the analytical results of the 2009 pilot study;
- discussion of the mass removal and recycle rate;
- review of regulatory environment related to produced water reuse and potential stumbling blocks;
- preliminary results from a model developed using data from the pilot test to assess the economic feasibility for the beneficial reuse of treated water; and,
- a discussion of next steps for this research.

### Scott Hillier, M.Sc, P,Eng

Mr. Hillier has over 20 years of experience in the geosciences including hydrogeology, environmental and geotechnical engineering. Special fields of competence include contaminant hydrogeology, water quantity and quality studies, water treatment, soil and groundwater remediation, project management, regulatory and public engagement, characterization of soil and groundwater contaminant situations, development of remedial action plans, design and analysis of field scale programs for remedial systems, and waste management. He has worked for the past 9 years for ConocoPhillips in varying roles and since 2007 has focused his career on water resources management for the Western Canada Gas Business Unit..