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Aquifer Storage and Recovery for Cost Effective Off-stream Storage

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Management of water has become a key issue facing the Oil and Gas sector. For example, in February 2007, Alberta Environment and the Department of Fisheries and Oceans introduced an interim Athabasca River Water Management Framework, establishing potential caps on water withdrawals for Oilsands operators. Industry has responded by developing alternatives for sourcing and storing water. One of the most promising options is off-stream storage, commonly achieved by using surface reservoirs or tanks.

Aquifer Storage and Recovery (ASR) is a technique of creating water storage by injecting surplus potable or treated water into aquifers for later extraction. ASR provides:

- Substantial underground water storage with high recovery rates
- Significant cost savings when compared to surface water storage
- The ability to store water when supply is plentiful and extract the water when restrictions are in place.

Determining feasibility of an ASR project requires an Integrated Program using advanced technologies for site selection, exploration and testing. ASR projects can be implemented in response to a variety of "drivers", and thus each ASR project has a unique scope of necessary science and engineering inputs detailing the hydraulic setting and geochemical processes that must be considered in the design and implementation of the ASR project.

This presentation shows how these technologies can be utilized to maximize ASR effectiveness for sustainable groundwater management. Due to the technical and hydrogeological complexities of ASR projects, they are normally implemented in carefully developed and executed phases; allowing appropriate opportunity for decision making and program adjustment in response to the subsurface conditions encountered. Common elements include:

- Phase 1 Feasibility Assessment and Conceptual Design
- Phase 2 Field Test Program
- Phase 3 ASR Wellfield Expansion

Field examples are presented to illustrate ASR effectiveness, as well as to display cost effectiveness when compared to surface reservoirs or tanks. Potential geological targets for ASR projects in Alberta are identified and discussed at the conceptual level.

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David Mercer has been working with groundwater for the past 20 years, primarily with groundwater monitoring instrumentation. He has worked as a project manager on a wide variety of sites, including Nuclear Waste Repository characterizations and Environmental Site investigations. Mr. Mercer received his B.Sc. in Geology from the University of British Columbia in 1988. Since that time, most of his experience was gained working with Westbay Instruments, a company specializing in advanced groundwater monitoring instrumentation. Mr. Mercer is currently a Business Development Manager with Schlumberger Water Services.

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