

Applying Airborne Electromagnetics (EM) for Shallow Aquifer Exploration

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Shallow groundwater sources in quaternary sediments are often complex in nature and challenging to map. Traditional geologic mapping and exploration methods to delineate these features, such as the Empress Formation in northern Alberta, can be time consuming, costly, and provide uncertain results. Airborne electromagnetic (EM) techniques have proven effective in delineating these aquifers over extensive geographic areas in a very timely and cost effective manner.

Brion Energy Corporation (Brion), in collaboration with DMT Geosciences Ltd. (DMT), has employed these techniques to identify shallow groundwater sources near our assets. Once these sources have been located, more traditional methods have been employed to verify and assess the aquifers. As some of the geological units in and around the paleo-channels have similar electrical properties, existing geological control from drilling are then applied in modeling of the airborne geophysical data.

Paleo-channels are complex in shape with heterogeneous sediments, which poses additional challenges when drilling. For these circumstances, additional relatively low cost ground based EM methods (Time Domain Electromagnetics, or TDEM) have been applied to confirm shallow aquifer targets to improve drilling and well testing success.

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Michael De Luca is a Senior Hydrogeologist with Brion Energy Corporation (Brion) since 2010. Mike has lead all water resource exploration programs during this time for Brions SAGD Assets. He has 18 years of experience and graduated from the University of Waterloo with a B.Sc. in geology in 1996 and a M. Sc. in hydrogeology in 2000. He has worked as an exploration geologist in gold mining and has worked as a hydrogeologist since 2000. Mike has worked throughout Canada, USA and South America, with the majority of his experience in Western Canada.

