



Figure 1: Alberta (left) and North Dakota (right) Examples

## Geostatistically Analyzing Shallow Data to Explore for Deeper Targets

TMI-01 is an exploration technology which allows data from above to be used to geostatistically predict what is happening deeper. Sedimentary processes are horizontal. Faulting and structural processes tend to be more vertical. Because stacked sands and shales and salt will each be deposited thinly over a very large area (an area tied to the area of the basin or the depositional system), if multiple wells test this sequence of sands and shale and salt, then predictions can be made about what is vertically underneath. DRC has developed processes for doing these studies, and believes this technology has widespread application in basins worldwide.

The left side of Figure 1 shows tops along a geologic cross-section from the Alberta Basin. The tops show the location of shallow Cretaceous production, as well as several deeper horizons. The data analyzed was gas chemistry, which is collected by the Crown because of concerns about Devonian gas, which has hydrogen sulfide in it and is dangerous to the public. Doing a fingerprint analysis of all the gas in this part of Alberta shows there are four types of gas. The gas which bleeds off of oil in Devonian Reefs is sometimes the only gas produced from shallower Cretaceous fields. Because of reactivation tectonics, we know there are vertical faults in this part of Alberta. These vertical faults provide a migration pathway for gas to leak off of Devonian oil fields and collect in Cretaceous fields. Therefore, by deepening those Cretaceous fields which have only produced Devonian gas, DRC predicts 300,000 to 600,000 BOE Leduc or equivalent Devonian oil fields will be found. These Leduc fields are below seismic resolution (which is why they have been missed), will have pores the size of your fist, good permeability, and high quality oil.

The right side of Figure 1 shows a map to the south of these Leduc Reefs, in the North Dakota portion of the Williston Basin. In this example, there are typically over 20 formation tops in the North Dakota Oil and Gas Commission database for each well. These formation tops allow the calculation of sediment thickness for the different intervals at each well location. The map shows how this analysis of several intervals above the Bakken shale, a major new resource play in the U.S., was used on blind tests to predict successful Bakken wells prediction. This blind test had success ranges from 79% to 93%. This same geostatistical approach can be used in other nearby basins and in basins throughout the world which have sufficient data available.

DRC proposes an investment of \$2,000,000 to obtain and integrate data which confirms the predictions, allows DRC to start to lease existing identified locations, to collect and integrate other data to support or refute the hypothesis, and to package the results to sell a drilling program in play fairways where this geostatistical technology is applied. Technical lead is Dr. Robert Ehrlich.