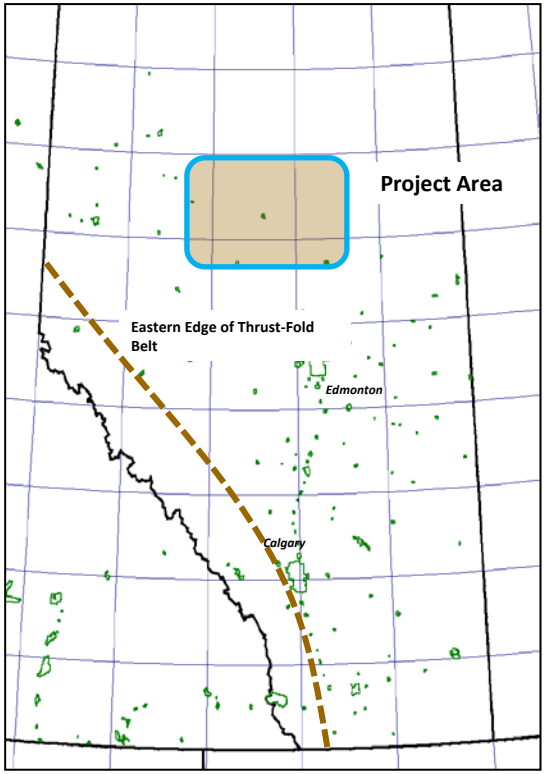
## *SFD® Case Example:* **Paleozoic Clastic Reservoirs, Alberta, Canada**

*The Lower Devonian aged Granite Wash is composed of highly porous and permeable sandstones with minor conglomerates, from which light oil is produced. Sediments were eroded from the Peace River Arch and deposited locally on the Precambrian basement unconformities through a series of alluvial and shallow marine events. Reservoirs are contained in the thinner sediments that drape and onlap fault blocks and horst/graben features.*

*NXT has conducted various Research and Development surveys in the area to quantify the response of the SFD® survey system. These fields were used as templates for surveys conducted in similar geological settings.*

***Province of Alberta, Canada***




***Reference:***

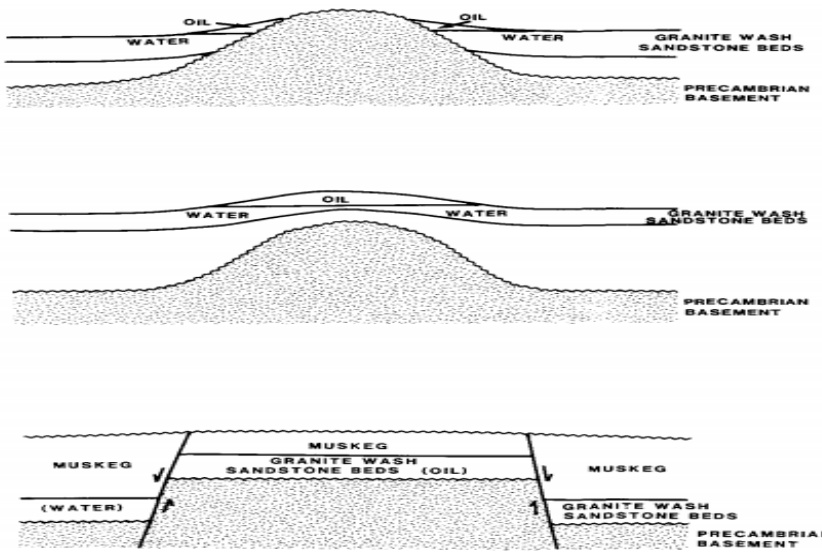
*Hein, Frances J. et.al , 1996; Bulletin of Canadian Petroleum Geology: Granite Wash alluvial fans, fan-deltas and tidal environments, northwestern Alberta.*

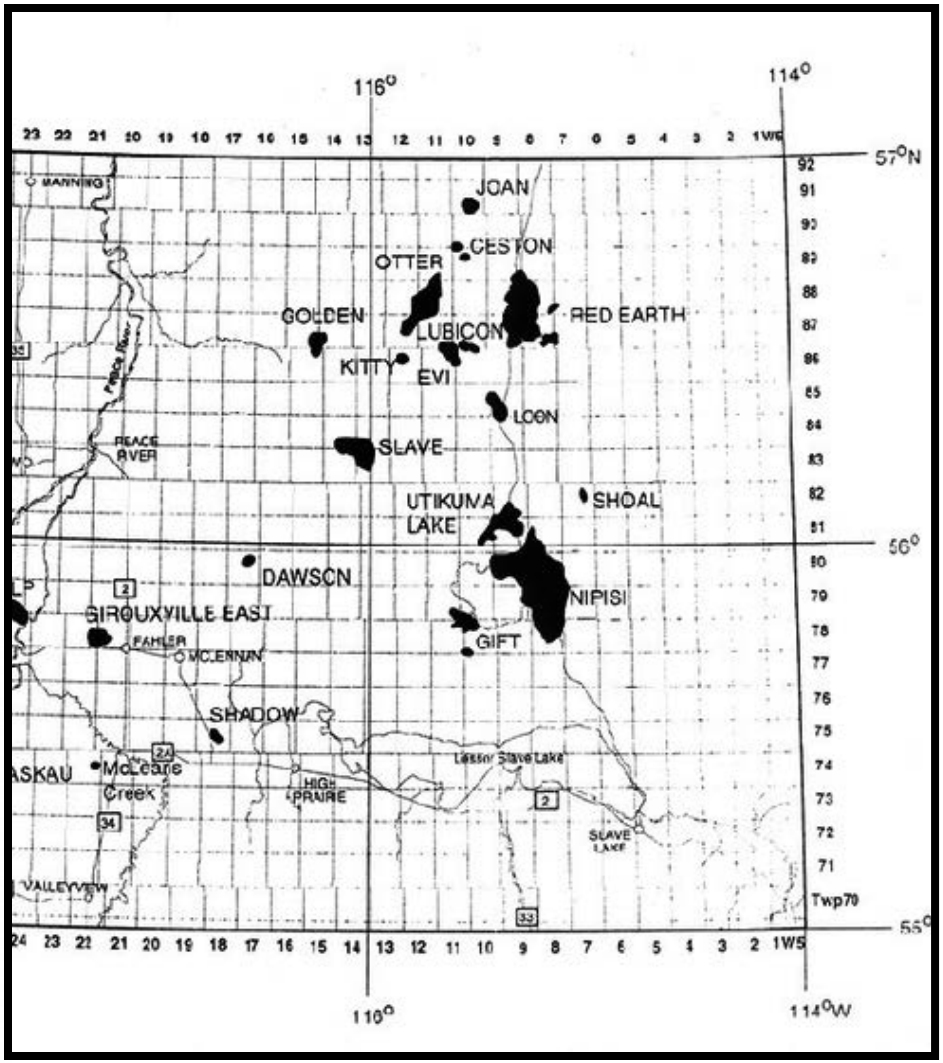
*Angus, Kevin et.al. The Canadian Society of Exploration Geophysicists and Geologists. Paleozoic Clastic Reservoirs. Atlas – Chapter 1*

## *SFD® Case Example - Western Canada Paleozoic Clastic Reservoirs*

- The map shows the major producing fields from the Granite Wash formation in Northern Alberta.
- Oil is trapped in the Granite Wash sandstone reservoirs which pinch out against or drape over numerous positive paleotopographic features on the Precambrian surface. The top of the Granite Wash zone is sealed by the overlying anhydrite of the Muskeg formation. Lateral seal is provided by the surrounding tight basement rocks.
- There are more than 500,000 wells drilled in Alberta province alone. This extremely rich geological information provides a very clear model of the subsurface to test the SFD® technology.

**Schematic Models of Granite Wash Zone traps**



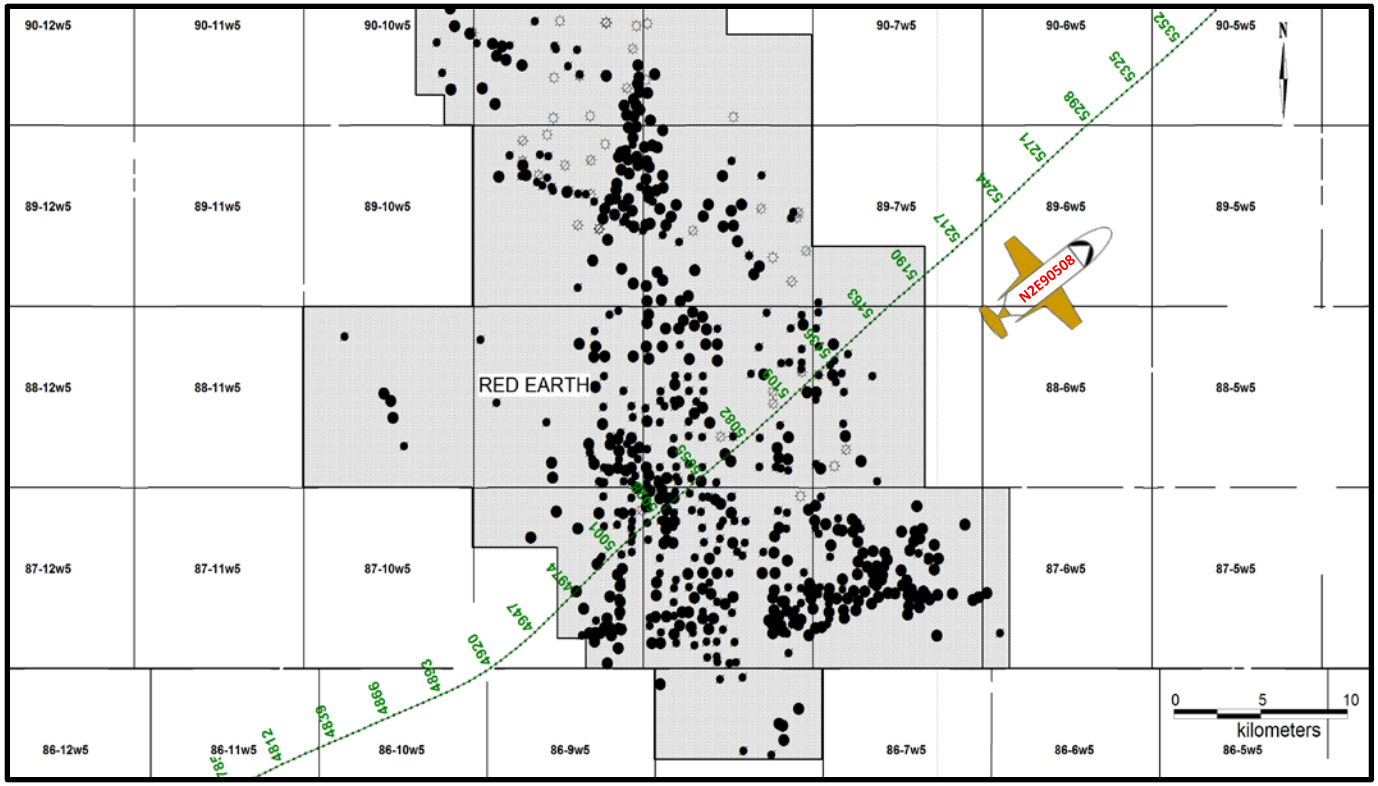



*SFD® Case Example - Western Canada Paleozoic Clastic Reservoirs - **Red Earth***

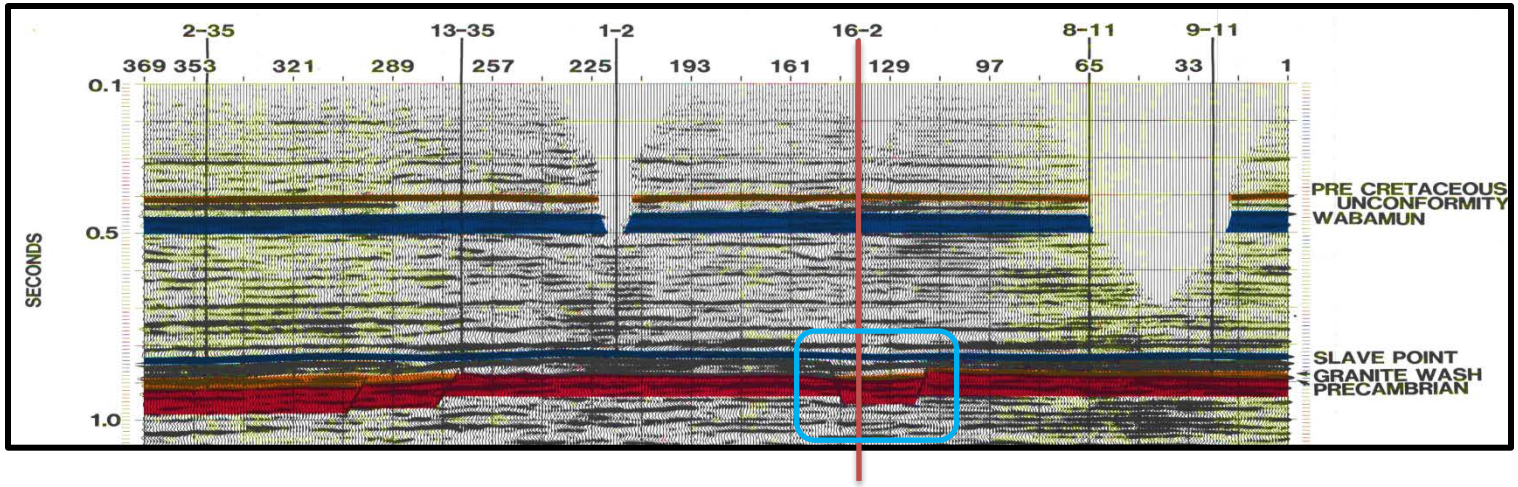
## Red Earth Field – North Western Alberta

### North Western Alberta

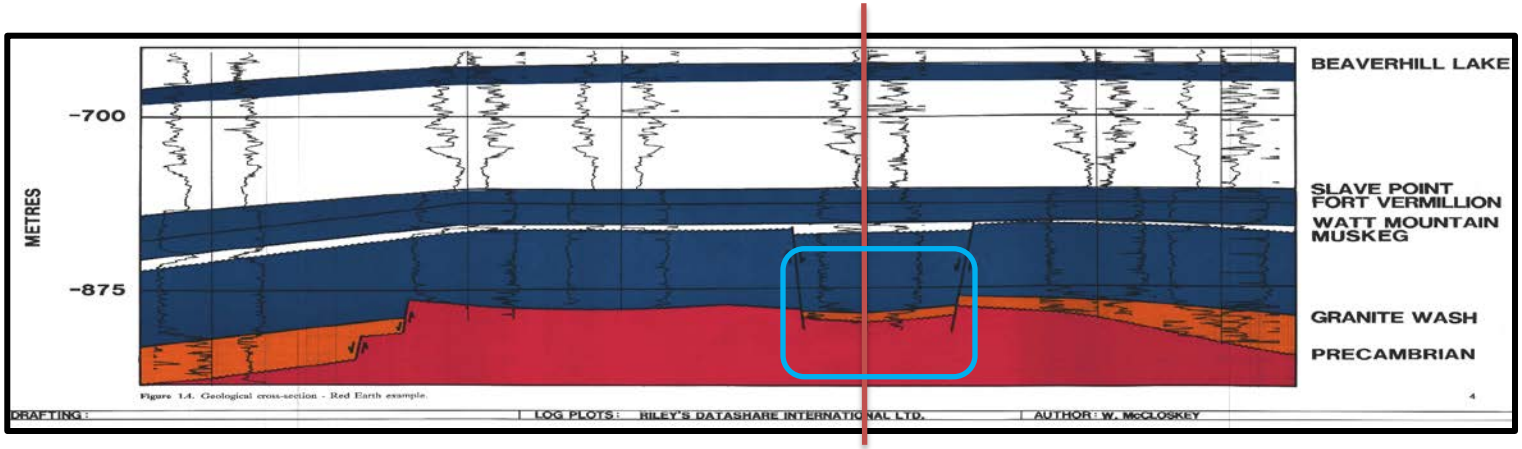
- SFD® flight 90508 was acquired in North Western Alberta over the Granite Wash reservoir systems.
- The Red Earth pool was picked to evaluate the SFD® signal responses.
- Surface Area : 40 km$^2$
- Pool Reserves (OOIP) : 1000 MMbbl
- Net Pay : 3.75 m
- Oil API : 36° - 42°



*SFD® Case Example - Western Canada Paleozoic Clastic Reservoirs - **Red Earth***

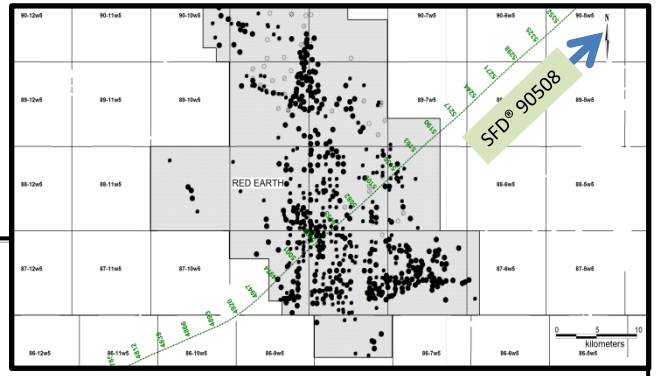


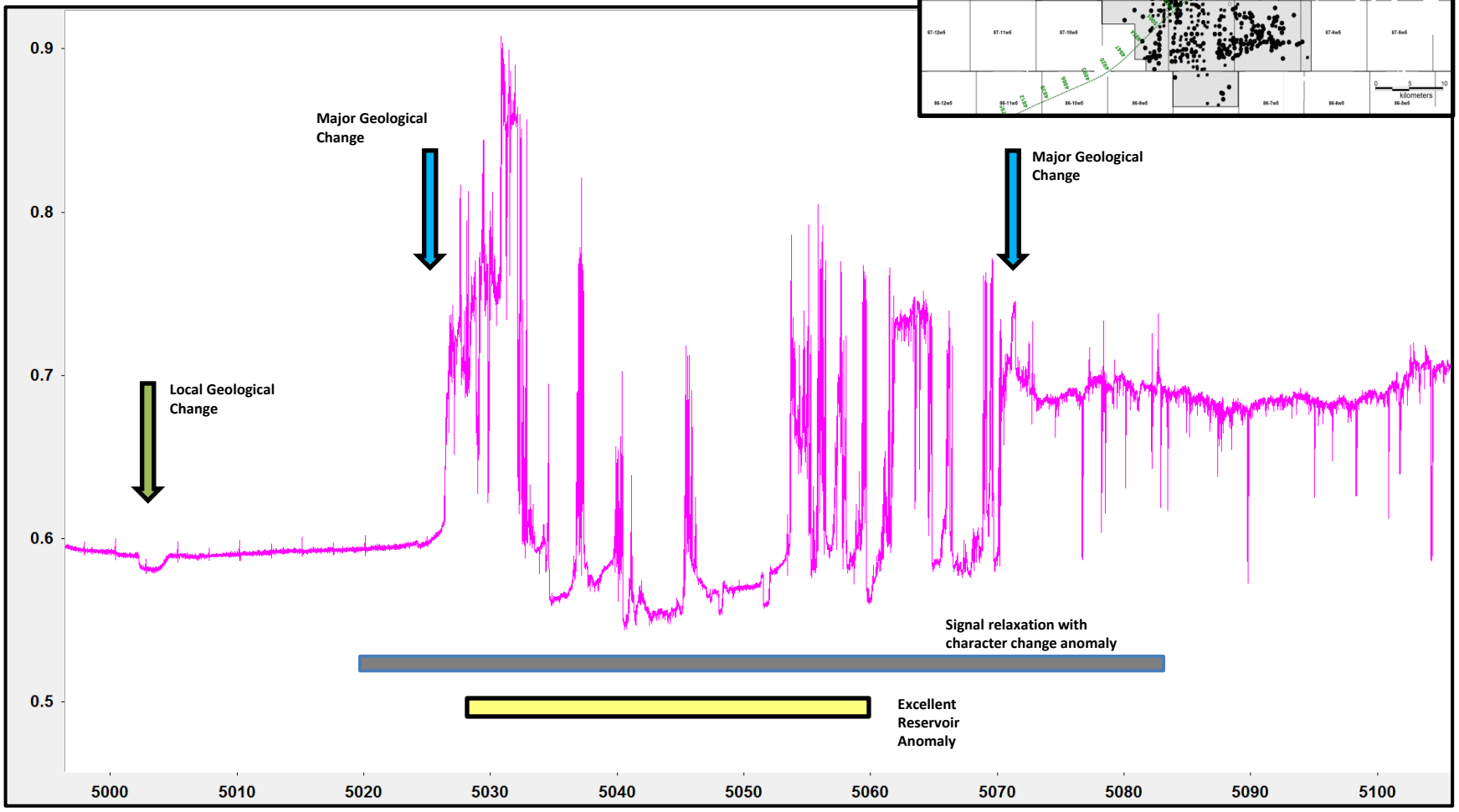

A typical Granite Wash geological section is shown here, where the lowest stratigraphic reflection identified on the seismic section is the Precambrian event (red). This high amplitude positive reflection coefficient (peak) event represents the interface between the low velocity Granite Wash zone and the high velocity Precambrian basement. Above this event is a high amplitude negative reflection coefficient (trough) event (yellow) representing the interface between the Granite Wash zone and the overlying, high velocity Muskeg Formation anhydrites.



*SFD® Case Example - Western Canada Paleozoic Clastic Reservoirs - **Red Earth***

## SFD® 90508 Red Earth Granite Wash Pool



*SFD® Case Example - Western Canada Paleozoic Clastic Reservoirs - **Red Earth***

# Red Earth Granite Wash Pool

## Summary

- SFD® flight 90580 detected an excellent reservoir anomaly over the main Granite Wash pool.
- SFD® showed an anomalous region starting with a local geological change at 5000 seconds and finishing with a major geological change at 5075 seconds.
- Within the anomalous region the signal attributes are used to further delineate the core reservoir anomaly between 5025 and 5075 seconds.