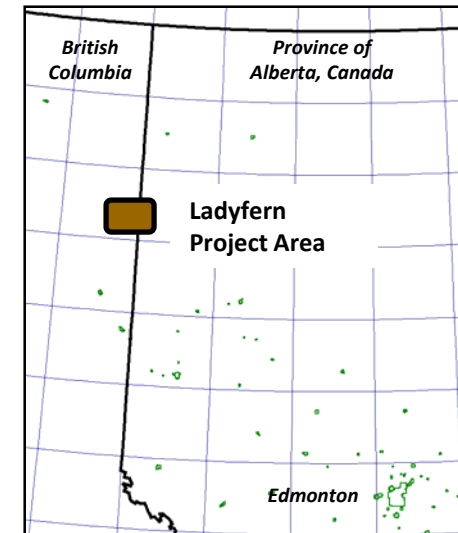


SFD Case Study: Ladyfern Reef, Western Canada (*Stratigraphic Trapping*)

The Ladyfern reef natural gas field was discovered in 2000. It attracted international attention due to its size and prolific test rates. It also represented the first large commercial discovery on the emerging HydroThermal Dolostone (HTD) play.

Between 2006 and 2008, NXT was approached by several industry clients to conduct regional SFD reconnaissance for deeper gas plays throughout northeastern British Columbia and northern Alberta. These clients wanted to use the Ladyfern field as a template for their exploration programs.

Accordingly, NXT acquired three template flight lines over Ladyfern in 2007 (N1A71130) and 2008 (80310-N5A, N1A).



References: Boreen *et al*, (2001) “Ladyfern, N.E.B.C.: Major Gas Discovery in the Devonian Slave Point Formation.” abstract, CSPG annual convention, pp112(1-5).

Reimer *et al*, (2001) “TSR-HTD Ten Years Later: An Exploration Update with Examples from Western and Eastern Canada.” abstract, CSPG annual convention, pp043(1-4).

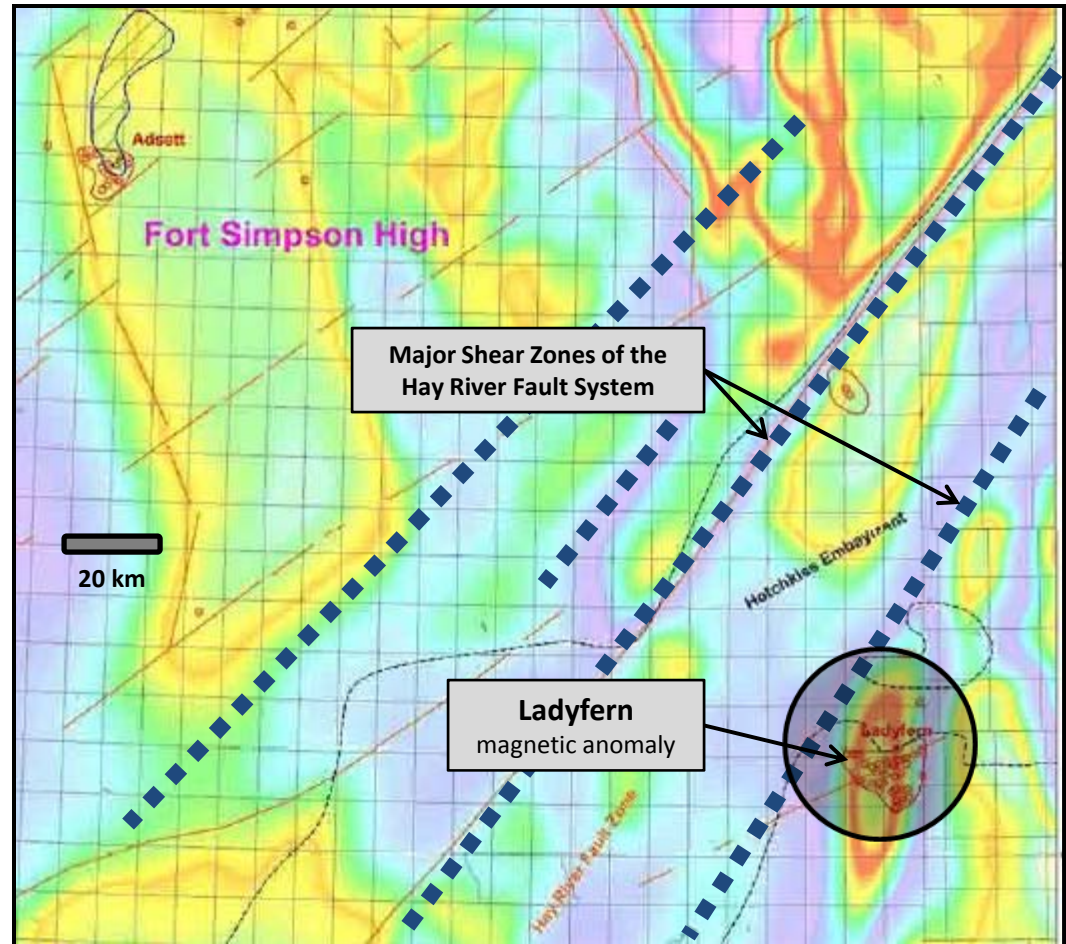
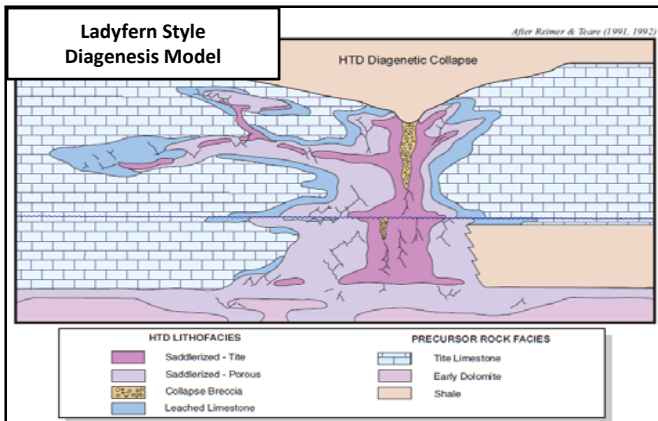
“Exploration Assessment of Deep Devonian Gas Plays, Northeast British Columbia.” Petroleum Geology Open File 2003-4, B.C. Ministry of Energy and Mines.

SFD Case Example Western Canada

Ladyfern Reef

Geological Setting

- Ladyfern is a natural gas accumulation hosted in a stratigraphic trap: Devonian Slave Point reef.
- The productive reservoir facies has developed via burial diagenesis: HydroThermal Dolomitization (HTD).
- Splays and antithetic faults associated with the (nearby) Hay River dextral transform system are believed to have acted as conduits for the hydrothermal fluids.
- The aggressive nature of HTD diagenesis has created a series of 'sag' or 'collapse' features in and around the reef, which are readily visible on seismic.
- The Ladyfern field is associated with a local magnetic anomaly.

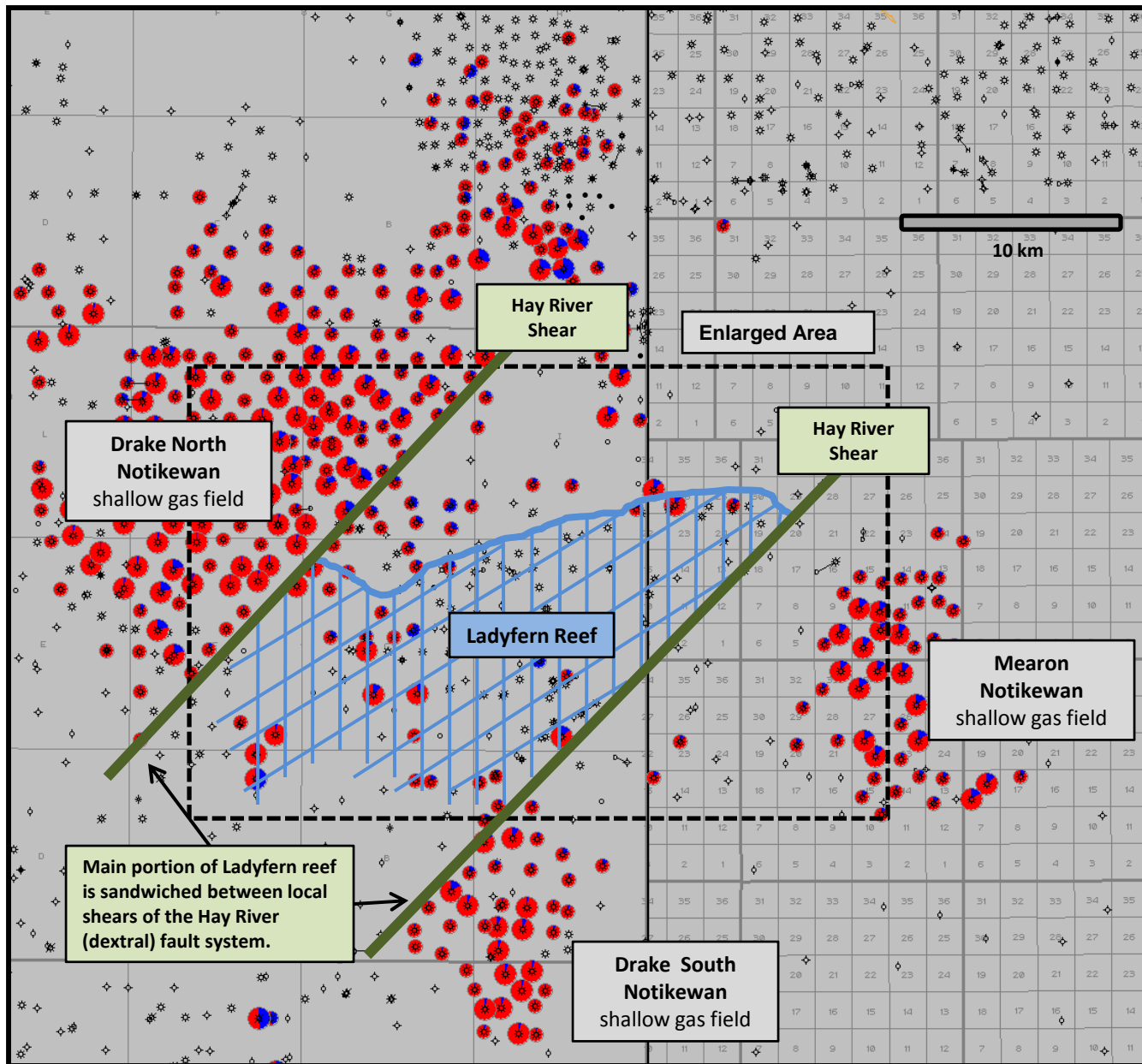


Generalized Regional Structural Fabric of the Ladyfern – Adsett Region, Northeastern British Columbia, as Interpreted from Aeromagnetic Data.
Source: B.C.M.E.M. open file 2003-4.

SFD Case Example
Western Canada

Ladyfern Reef

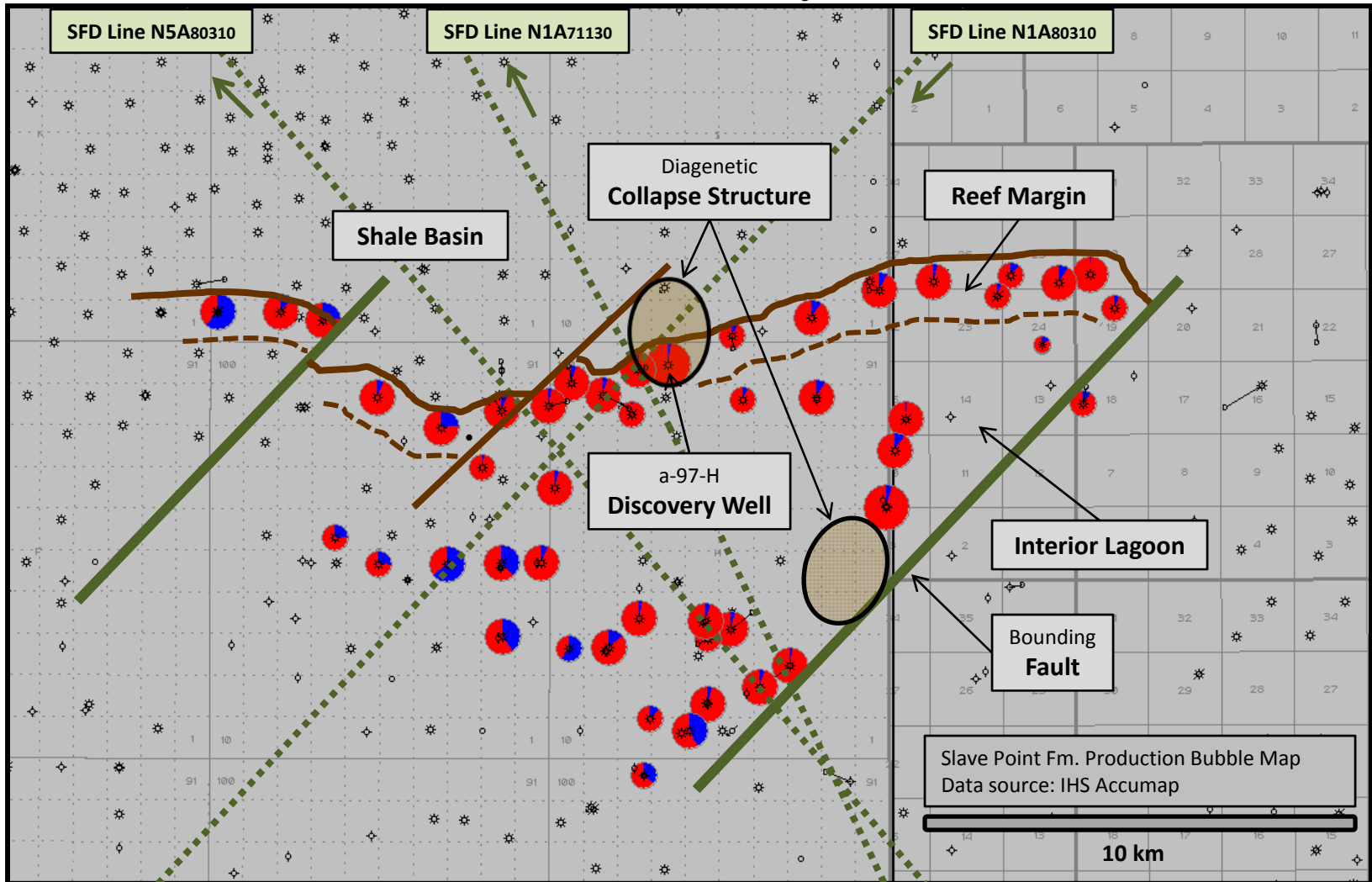
Regional setting of the Ladyfern reef, illustrating the position of local shears associated with the Hay River fault system and adjacent shallow gas fields.



*SFD Case Example
Western Canada
Ladyfern Reef*

Generalized Architecture of the Ladyfern Gas Field

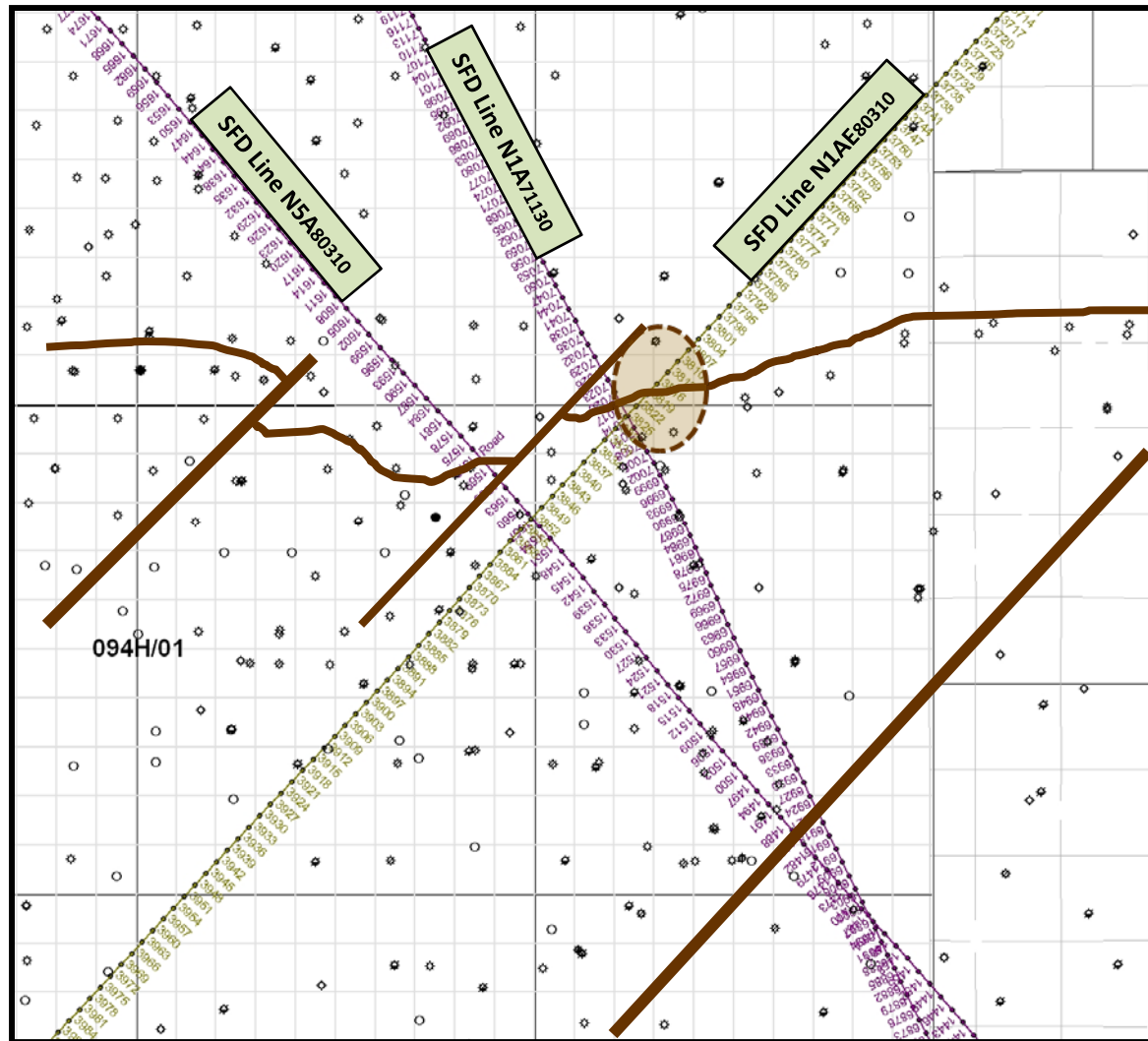
Enlarged Area



*SFD Case Example
Western Canada
Ladyfern Reef*

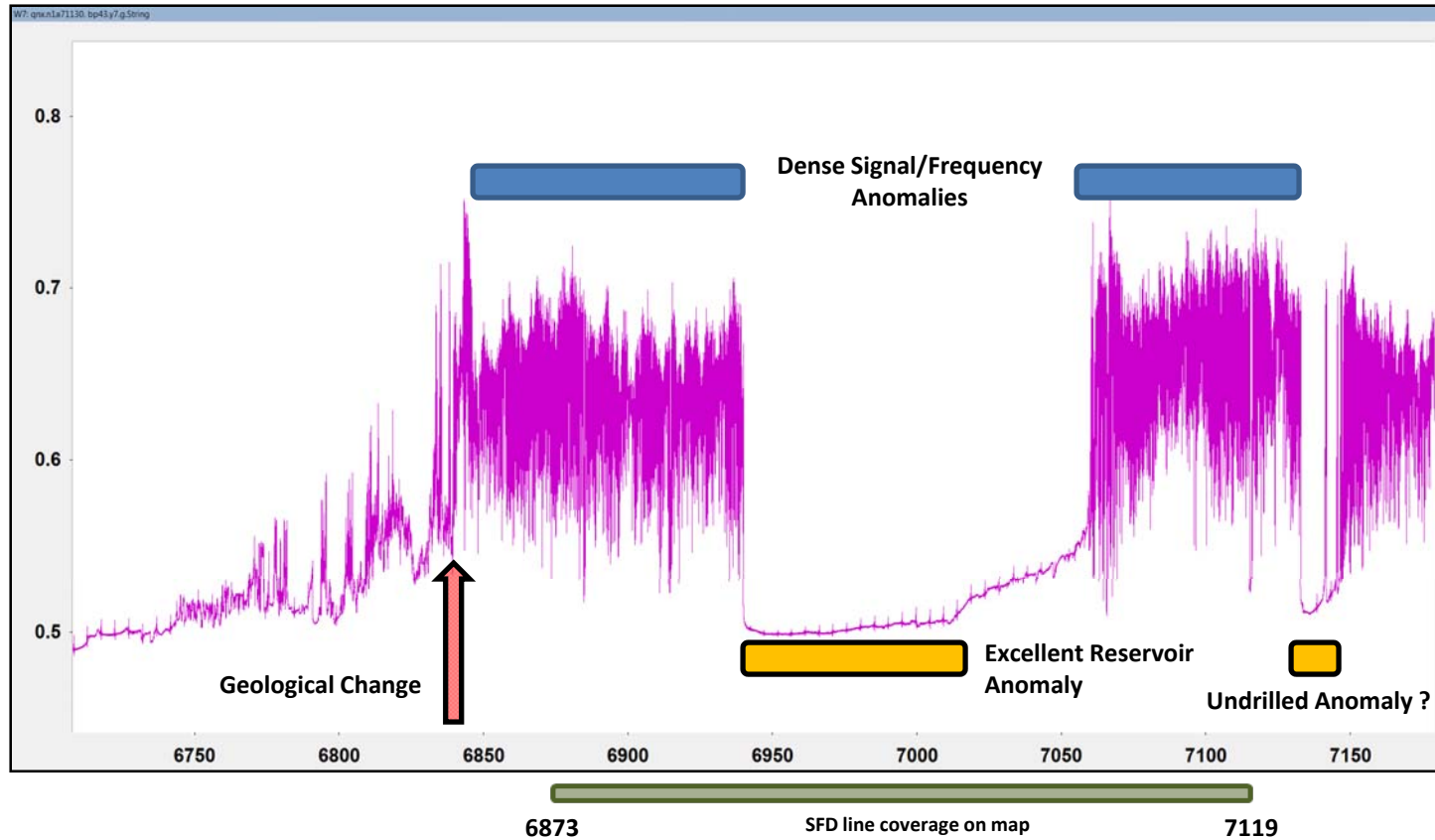
**Principal Goals of the SFD
Template Program:**

- Obtain reservoir signal(s) over the Ladyfern gas pool
- Determine if the HTD diagenetic collapse features can be detected
- Determine if the Hay River fault shears can be detected
- Determine if a shallow gas signal is present
- Appraise the spatial resolution of the SFD signal



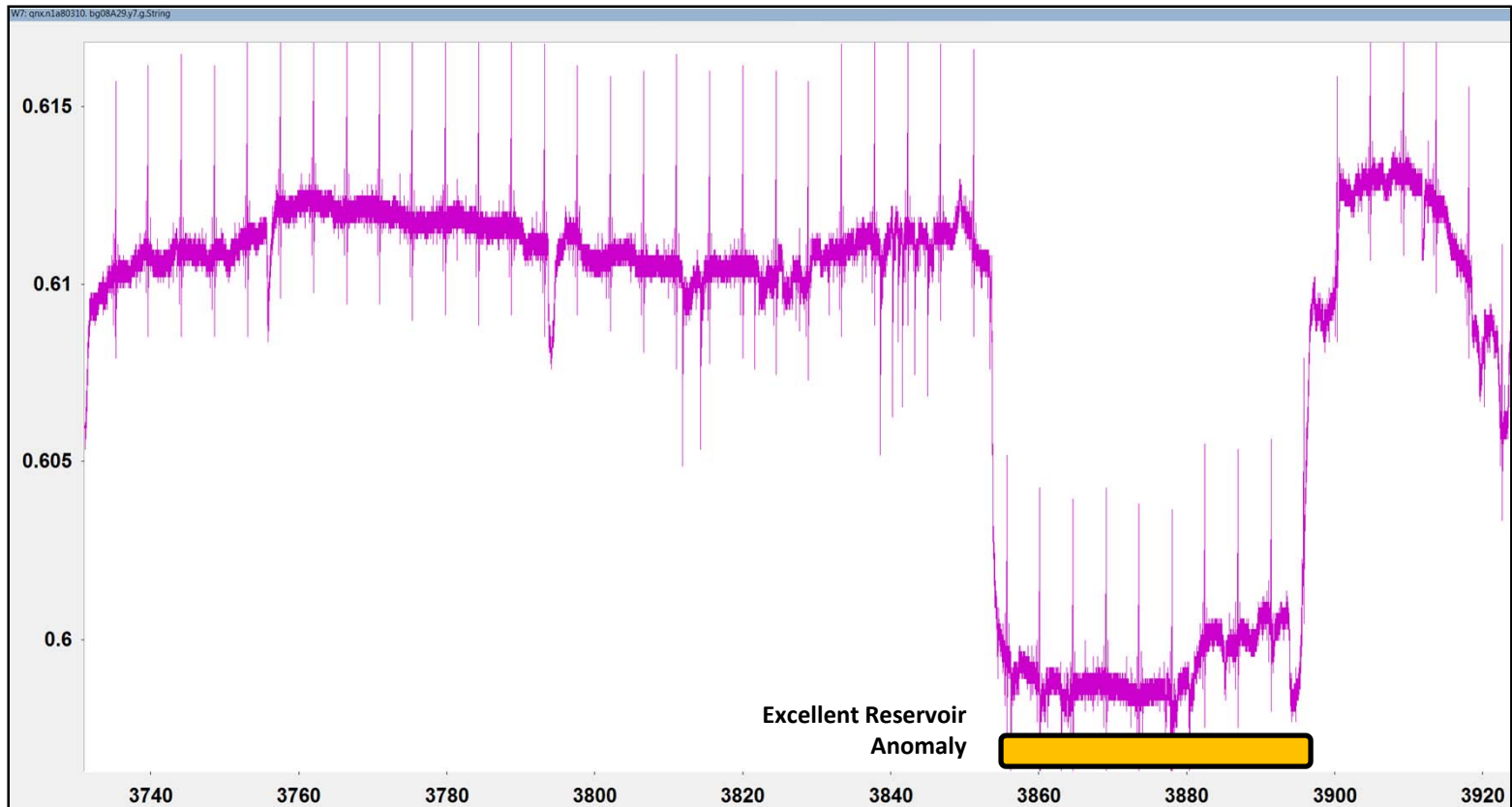
SFD Case Example
Western Canada

Ladyfern Reef



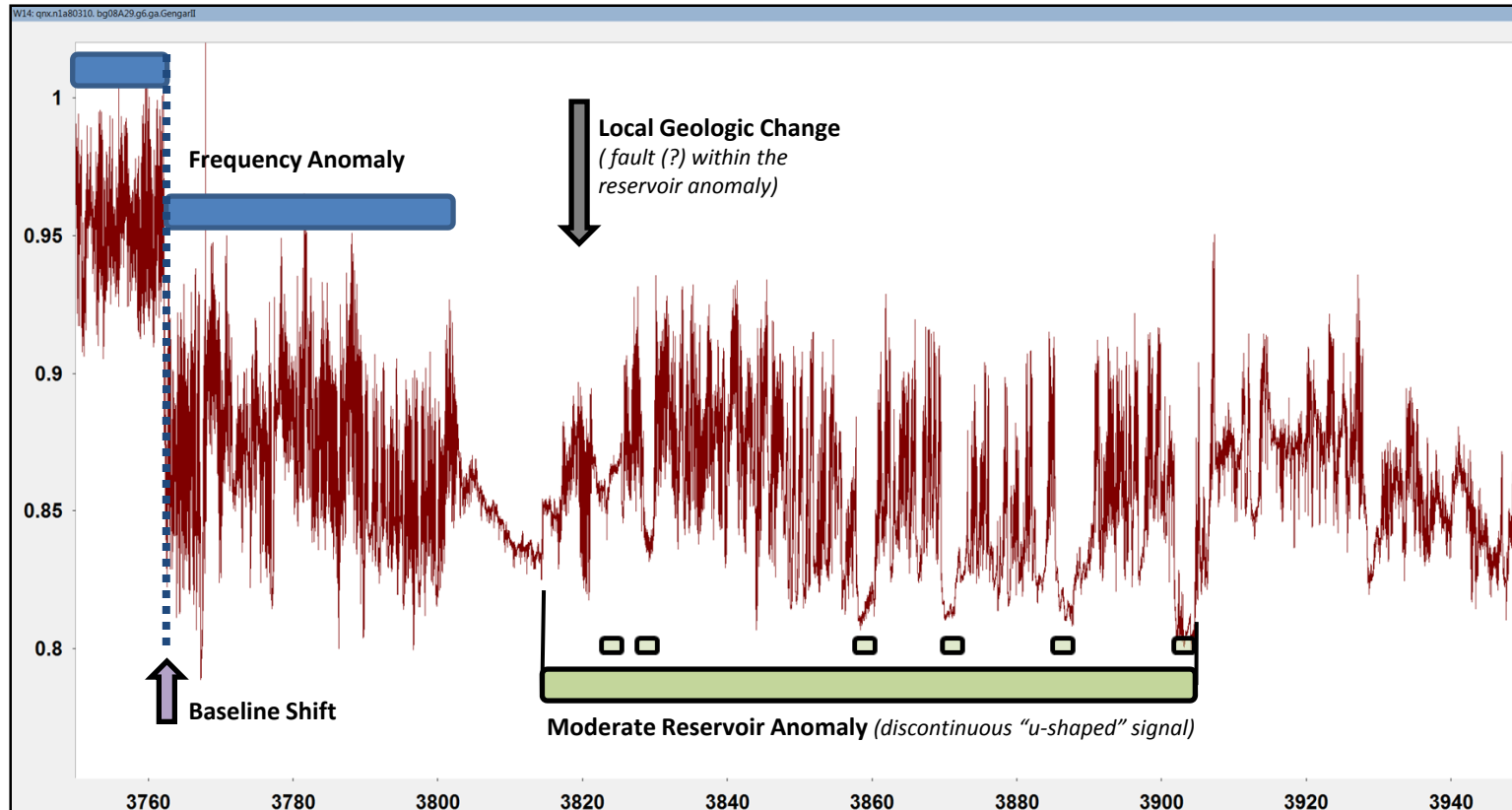
SFD signal display along Line N1A71130: 6700 - 7180 seconds; sensor 'S'.

*SFD Case Example
Western Canada
Ladyfern Reef*



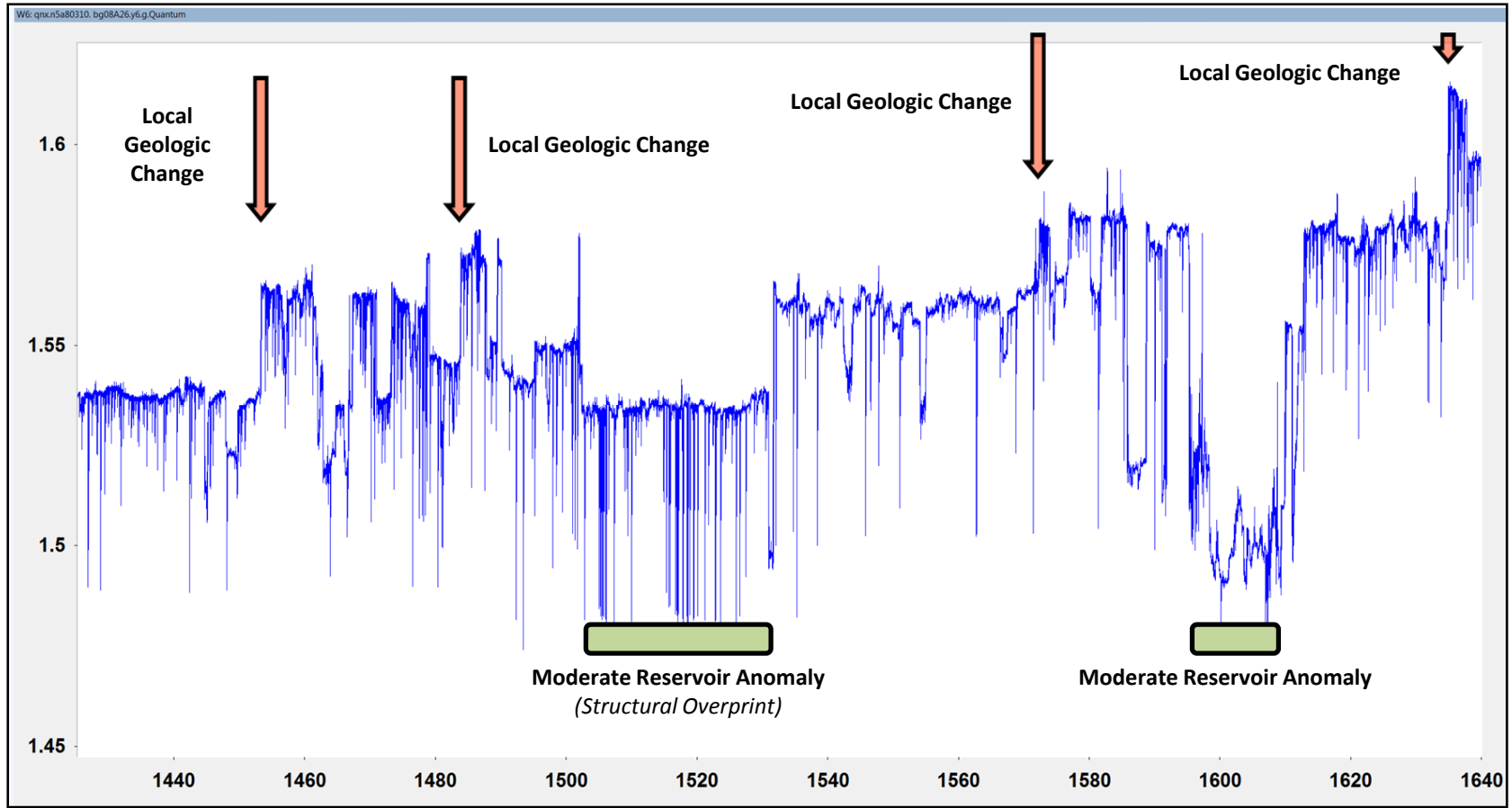
SFD signal display along Line N1A80310: 3735 - 3920 seconds; sensor 'S'.

SFD Case Example
Western Canada
Ladyfern Reef



SFD signal display along Line N1A80310: 3750 - 3950 seconds; sensor 'G2'.







SFD Case Example
Western Canada
Ladyfern Reef

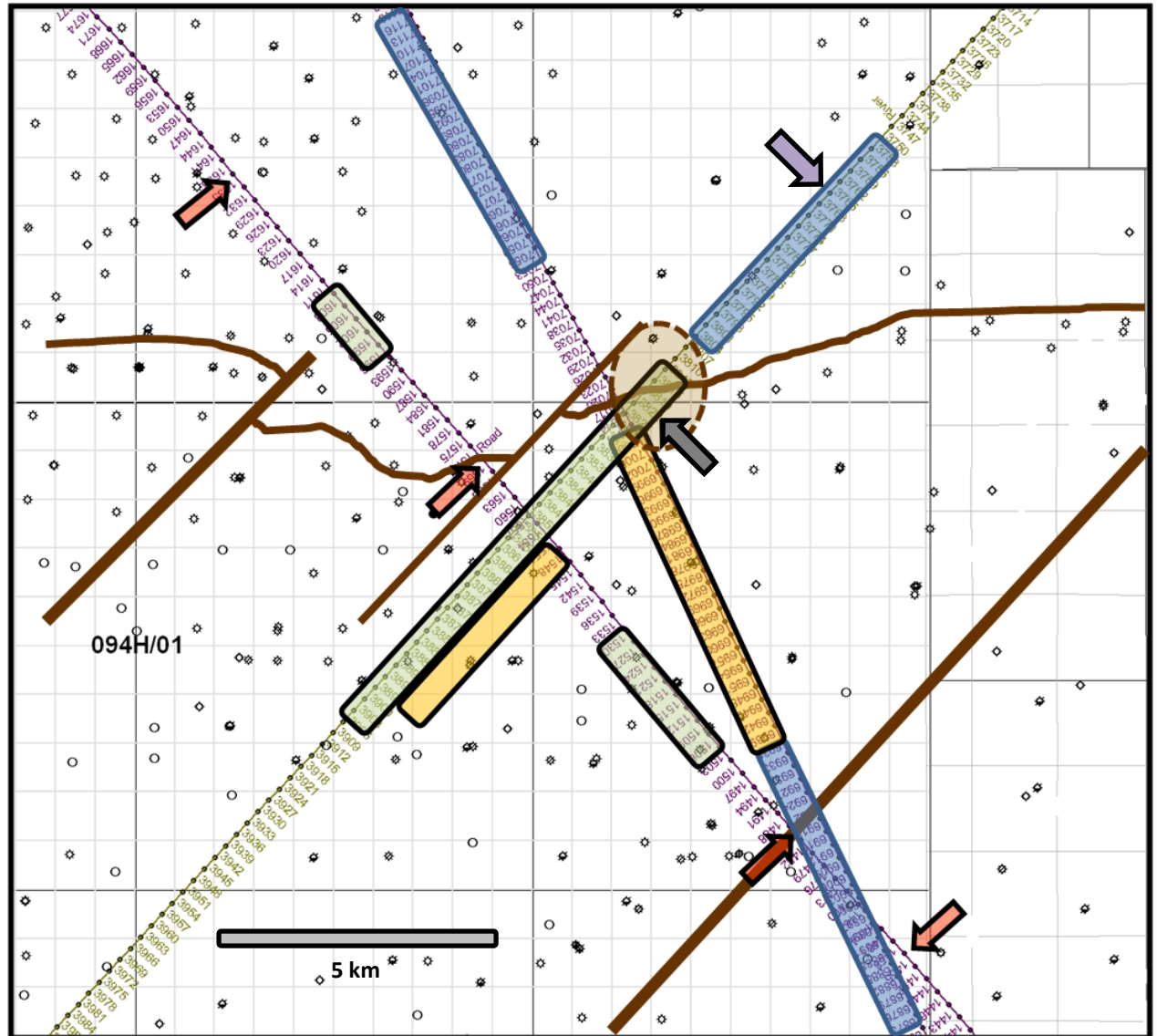


SFD signal display along Line N5A80310: 1425 - 1640 seconds; sensor 'Q'.

SFD Case Example
Western Canada
Ladyfern Reef

Location of Principal SFD Signal Anomalies in the Ladyfern Reef Area:

- Excellent Reservoir Indicator 
- Moderate Reservoir Indicator 
- Dense Signal/Frequency Anomaly 
- Local Geologic Change 
- Baseline Shift 
- Probable Fault 



Note: The correlation of SFD signal response to actual geologic features represents an informed technical opinion as prepared by the NXT interpretation team. These interpretations, while believed reasonable, are non-unique. Other correlations and interpretations are possible.

*SFD Case Example
Western Canada*

Ladyfern Reef

Key Observations

Sensor 'S' Line N1A71130

- ✓ Detects an excellent reservoir anomaly across the heart of the Ladyfern pool.
- ✓ Detects a second high-quality reservoir anomaly approximately 10 km NW of the Ladyfern pool.
- ✓ Detects a local geologic change approximately 2.5 km SE of the Ladyfern pool.
- ✓ Detects dense signal/frequency anomalies on either side of, and adjacent to, the Ladyfern pool.

Sensor 'S' Line N1A80310

- ✓ Detects an excellent reservoir anomaly across the middle region of the Ladyfern pool.

Sensor 'G2' Line N1A80310

- ✓ Detects a modest reservoir anomaly across the heart of the Ladyfern pool.
- ✓ Detects a dense signal/frequency anomaly in advance of, and adjacent to, the Ladyfern pool.
- ✓ Detects a local geologic change (*typical fault signal*) at the northern edge of the Ladyfern pool, inside the collapse feature.
- ✓ Detects a baseline shift anomaly approximately 5 km NE of the Ladyfern pool.

Sensor 'Q' Line N5A80310

- ✓ Detects a modest reservoir anomaly across the middle region of the Ladyfern pool.
- ✓ Detects a second modest reservoir anomaly approximately 3 km NW of the Ladyfern pool.
- ✓ Detects 4 local geologic changes in the vicinity of the Ladyfern pool.
Two of these correspond directly with the southeastern (*fault edge*) and northwestern (*reef edge*) of the Ladyfern pool.

*SFD Case Example
Western Canada*

Ladyfern Reef

Summary & Conclusions

1. Four sensors on three flight lines detected moderate to excellent reservoir anomalies over the Ladyfern pool. Two of the sensors provided spatial resolution of the pool's northern edge to within ± 0.25 km.
2. The Ladyfern reservoir anomalies are characterized by a typical voltage-drop and U-shaped signal with/without structural overprint. Preceding voltage buildups are not pronounced.
3. The bounding Hay River shear faults were accurately located (± 0.25 km) by local geologic change anomalies on one line.
4. The northern HTD diagenetic collapse feature was not detected directly (*i.e. associated with an independent anomaly*), however one sensor detected a prominent fault anomaly within the collapse.
5. An obvious shallow gas signal was not observed.

The Ladyfern reef template survey provides excellent SFD reference signals, which incorporate clear reservoir anomalies coupled with adjacent dense signal/frequency anomalies, plus good detection and spatial resolution of associated (HTD-driving) fault systems.

The smaller (modest) reservoir anomaly on line N5A80310 may represent an undrilled extension to the most northwesterly productive compartment of the Ladyfern reef.

The small reservoir anomaly observed on line N1A71130 may represent an undrilled reef trend, which from drilling map inspection could represent an extension of the Chinchaga River Slave Point pool.