2008 Supplemental Geophysical Interpretation of the Little Chicago Seismic/Gravity Data

9224-K076-002E

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Synthetics

300A476710130450	**Syn01**
300N326720130000	**Syn02**
300D076710130150	**Syn03**

Seismic

LC08-101	**Clean**	**Seis01-C**
	Interpreted	**Seis01-I**
LC08-102	**Clean**	**Seis02-C**
	Interpreted	**Seis02-I**
LC08-103	**Clean**	**Seis03-C**
	Interpreted	**Seis03-I**

Introduction of 2008 Supplemental Report

This document/report is a supplemental report to the original Kodiak Petroleum "**Geophysical Interpretation of the Little Chicago Seismic/Gravity Data**" that was submitted to the **National Energy Board** in July of 2007. It would be beneficial for the reader to peruse the original report so as to get an understanding of the working hypothesizes that were in place at the time of the original 2007 seismic/gravity program. The text of the original report is included at the end of this Supplemental Report for convenience (see index).

The final conclusions that were reached in the original report were that further seismic/gravity was required to delineate a post Proterozoic clastic wedge that on-lapped against a Proterozoic high located on EL 413. This further seismic/gravity would be used to help establish closure on the north and possibly east side of the wedge and possible set up some drilling locations of about 2200 meters in depth. This report deals with this new investigation

Summary of Operations and Conditions

Seven, high fold (3800%) reflection seismic lines were shot in the little Chicago Area between January and March of 2007 in order to evaluate the EL413 concession (Figure GIS01A). In February of 2008, three additional reflection seismic lines were shot to further delineate the east and north portion of EL413. These addition lines were tied into the original program and were shot with the original parameters used in the 2007 data set. Gravity data was also collected at each of the surveyed stations on the both the original and the new program.

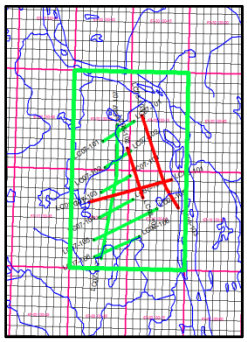

Figure GIS01A – EL413 Concession (Green lines-2007, Red lines-2008)

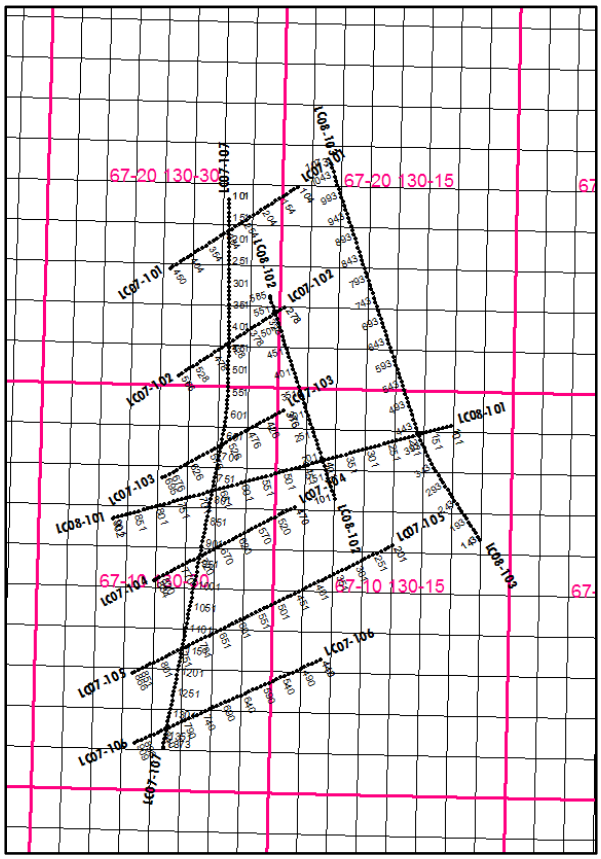

Figure GIS01B – Line Orientation map (LC07-2007 seismic, LC08 – 2008 seismic)

The topography over the EL 413 concession is relatively flat with a light growth of small conifer trees. Small lakes also dot the landscape and the Mackenzie River bounds the program on the north and east side of the concession (Fig. GI02). The main access into the area follows the existing CN line that runs from Fort Good Hope (Radili Ko) to Little Chicago and was opened up in December 2007/January 2008. The main camp was set up on the east side of EL413 about 5 kilometers south of Little Chicago and on the west side of the Mackenzie River located at the Devlan Moose Lake D-07 well site(00D07 6710 130150). Seismic line surveying and shot hole drilling started in January/February and was completed by the end of February. In conjunction with this phase of the operation, a ground based gravity survey was conducted using the same survey as the seismic program. Recording of the seismic data commenced on February 28th and took two weeks to complete.

During the operation, weather was near ideal for seismic shooting, as day time highs ranged from -40 to -10 degrees Celsius with average temperatures at -20 to -25 degrees Celsius. Winds were light to low. The only real difference between the shooting parameters between the 2007 program and the 2008 program were that no bentonite was used to pack the shot holes due to availability. Although more shot hole blow outs were recorded in the 2008, the data was equal in quality to the 2007 data set.

Figure GI02 – WSW-ENE Seismic line (LC07-105)

Shooting and Processing Parameter

The following is a list of the basic shooting and processing parameters for the Little Chicago Seismic data set (LC08):

Shot by:	GeoKinetics
Date Shot:	February/March 2007
Source:	Dynamite
Source Pattern:	Single hole
Source Depth:	12 meters
Charge size:	2 kilograms
Source Interval:	80 meters
Receivers:	Oyo 32CT Marsh, 14 Hz
Array:	6 inline over 20 meters
Receiver Interval:	20 meters
Number of Channels:	302 live
Receiver Geometry:	Split Spread
Near offset:	20 meters
Far offset:	3000 meters
Nominal fold:	3800 %
Recording Instruments:	I/O System IV
Filter:	0-187.5 Hertz
Notch:	out
Sample Interval:	2 ms.
Record Length:	4000 ms.
Processed by:	Arcis Processing, Calgary
Date:	March 2008
Processing Flow:	

- Demultiplex SegY, Geometry Assign, Editing, Gain Correction,
- Surf Con Deconvolution (50-2900 MSEC @ 0 M, 500-2900 MSEC @ 1000 M, 1000-2900 MSEC@3000 M, 80MSEC operator, 0.1%pw) Spectral Balance 3-187.5 Hz, Trace Balance
- Elevation & Weathering Corrections (2 layer, Vo=762M/S, Datum=400M, Vr=5700M/S)
- 1st Pass Velocity Analysis (Coherency Spectra Every 50 CDP's or 500M),
- 1st Pass Residual Statics (100-2000MSEC, +/-32MSEC),
- 2nd Pass Velocity Analysis (Coherency Spectra Every 50 CDP's or 500M),
- 2nd Pass Residual Statics (100-2000MSEC, +/-24MSEC), Mute (Time & Spatially variant),
- Multiple Removal (Radon Transform), 3rd Pass Velocity Analysis (Every 50 CDP's),
- Final NMO, Trim Statics (100-2000 MSEC, +/-6MSEC), Stack 3800%,
- Post Stack Kirchhoff Time Migration (75Degree, 95%Vels), Signal Enhancement,

- TV Filter: 0-2500MSEC 10/15-70/90 HZ; 2700-4000MSEC 8/12-70/70 HZ,
- Relative Amplitude Scaling (500MSEC)

Gravity Data

The land based gravity data was collected in conjunction with the Little Chicago 2-D seismic program and shared the same survey points over the program area. Additional points were collected along the access route leading to LC08-103. The collection of the data is dealt with in an Excel Geophysical Report entitled "Grandview (Little Chicago) 2008 Gravity on Seismic Program Final Report" and is included as part of this submission. Data gathering and processing is discussed in the above report and will not be dealt with here. However, the gravity interpretation will be discussed with the seismic interpretation.

Seismic Data Quality

Generally, the seismic data quality is very good to excellent for the area. Figure GI03 shows a sample of the north/south line (LC07-107) over the full record length. A spectral analysis (Figure GI04) of the data (extracted from the window show in yellow) shows a balanced spectrum from 20 -75 hertz with no notches. The window was selected based on first usable reflection data (200ms.) to 200 ms. below top of Proterozoic which occurs at about 1000 ms. A cross correlation between LC07-107 and LC07-104 (same time window) shows the quality of the tie between seismic lines. See figure GI05.

Older (1972), available seismic also has been interpreted and is included in Figure GI06 to show the contrast in quality between the two data sets. Although the newer data is of higher frequency content (see Figure GI07) and contains less noise, the older data is adequate for structure and some character recognition and ties acceptably to the newer data.

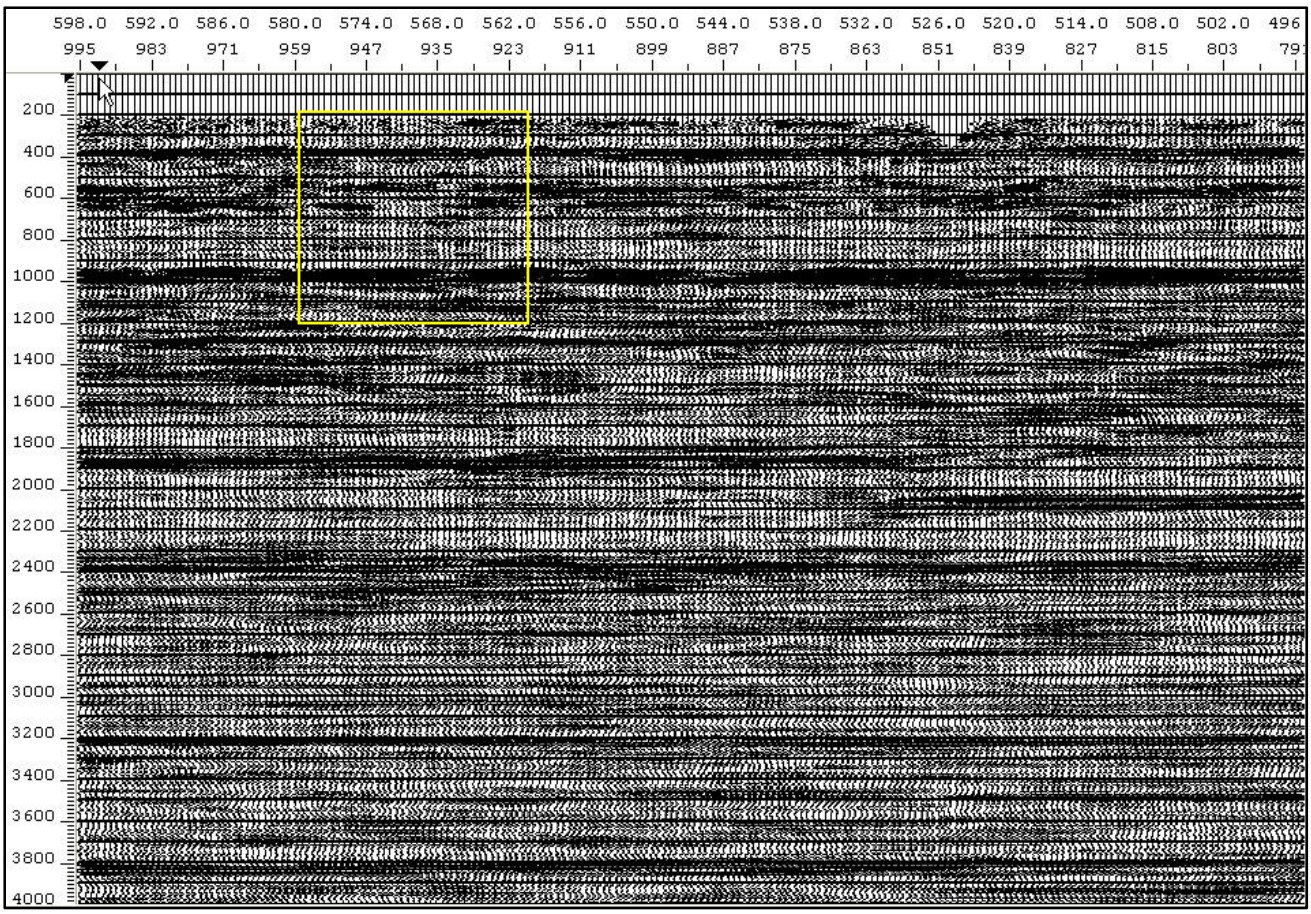

Figure GI03 – Sample of Little Chicago 2D data (yellow area shows where frequency spectrum was extracted from)

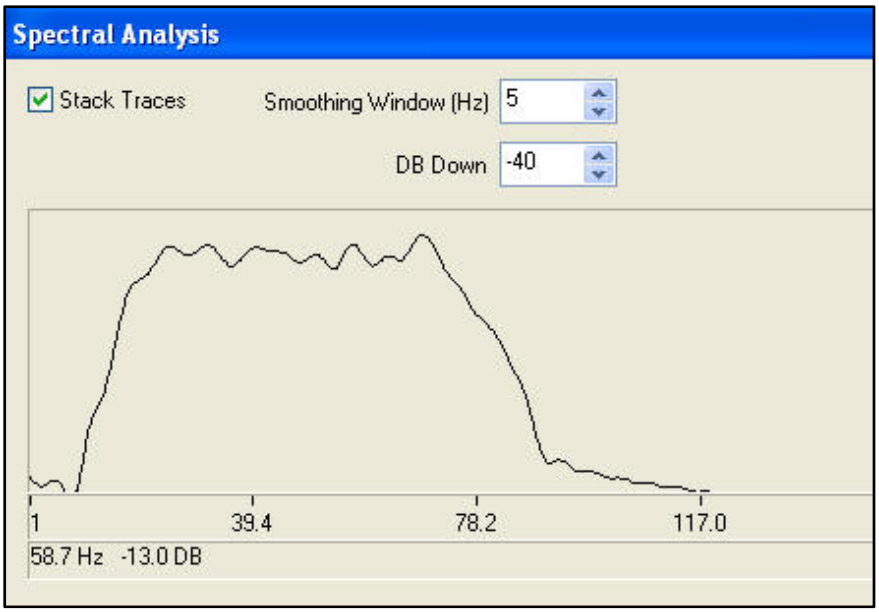

Figure GI04 – Spectral Analysis of Little Chicago seismic data (time window from 200-1200 ms.)

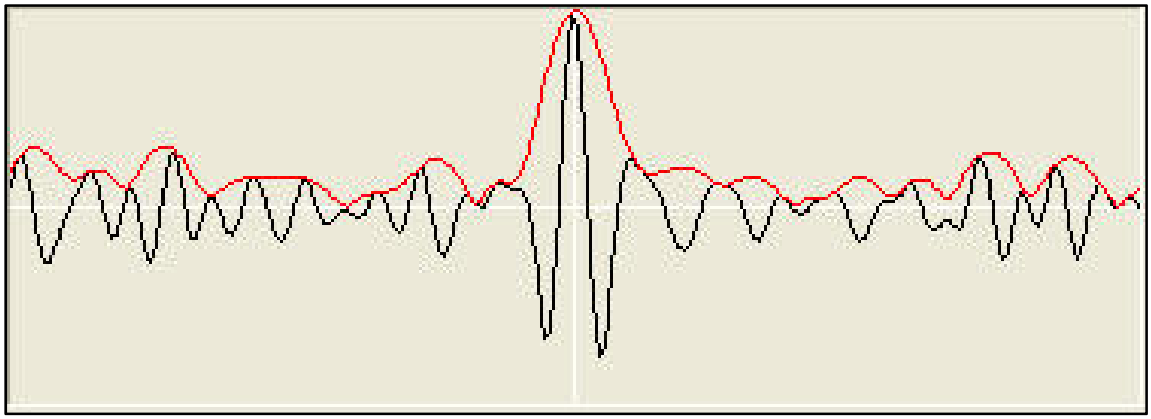

Figure GI05 – Cross correlation between LC07-107 and LC07-104. Time window is from 200 ms. to 1200 ms. (200 ms. below Proterozoic)

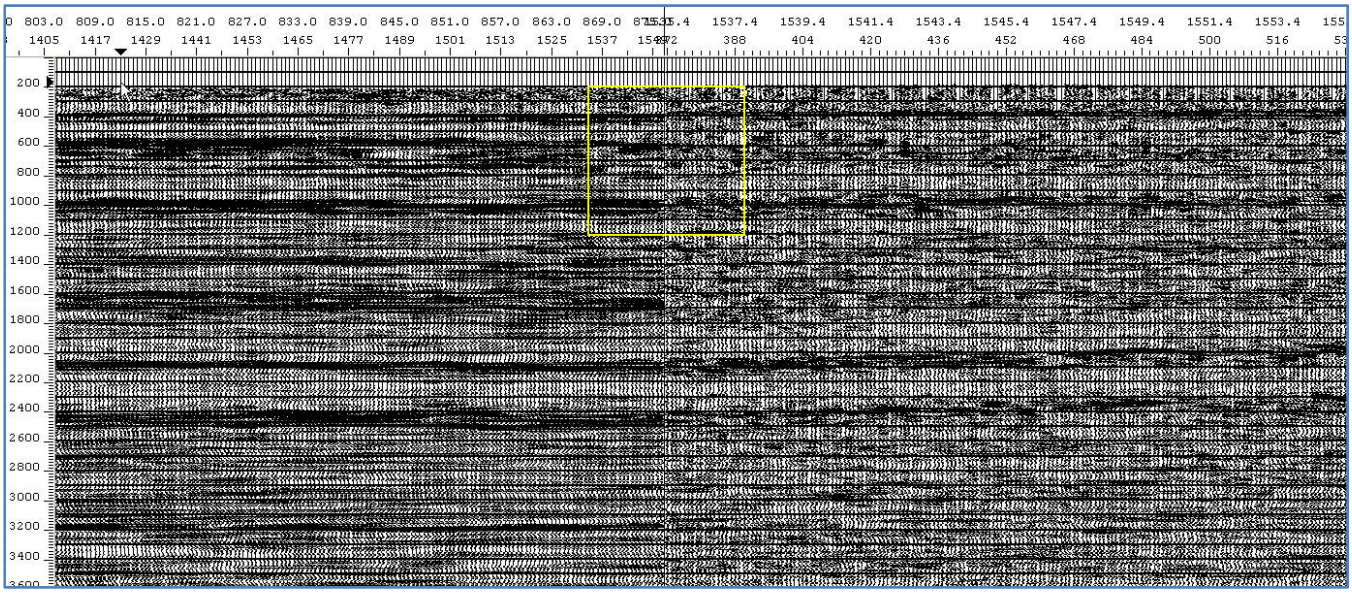

Figure GI06 - LC07 data on left, older (1972) data on right. Although new data is of higher frequency and contains less noise, the older data ties well and can be used for structural interpretation. Yellow window represents spectrum extraction in Fig. GI07.

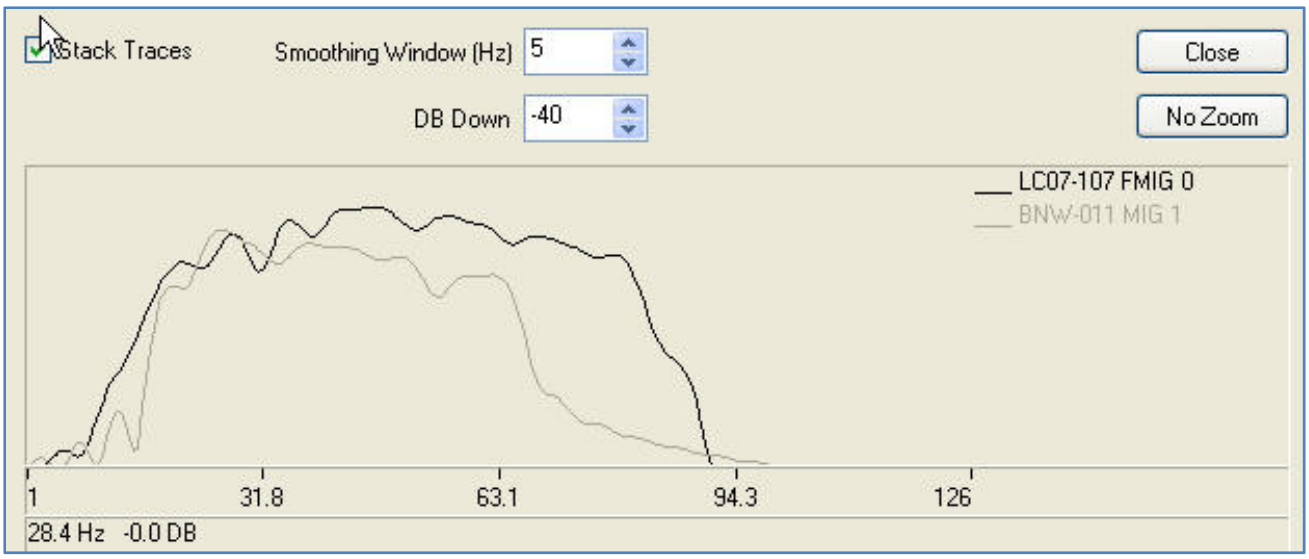

Figure GI07 – Spectral comparison between LC07 data and older (1972) data.

Existing wells on or near the EL413 are listed below in Table GI08 along with distances away from nearest LC07 seismic line tie. Although, none of the wells are direct ties to the seismic, a reasonably good result can be obtained from jump tying the wells into the seismic program. The most useful wells are the A47 and N32, as both of these are near 2000 meters in depth. An example of the jump tie is shown in Figure GI09 and Figure GI10.

Well	Date Drilled	Depth Drilled (TVDm)	Deepest Formation	Distance to jump tie (km)
300A476710130450	12/26/1959	1998	Franklin Mountain	13
300N326720130000	6/16/1966	1957.4	Saline River	17.4
300D076710130150	8/30/2004	900	Mount Kindle	5.8

Table GI08 – Wells (with sonic logs) used to tie LC07 data set.

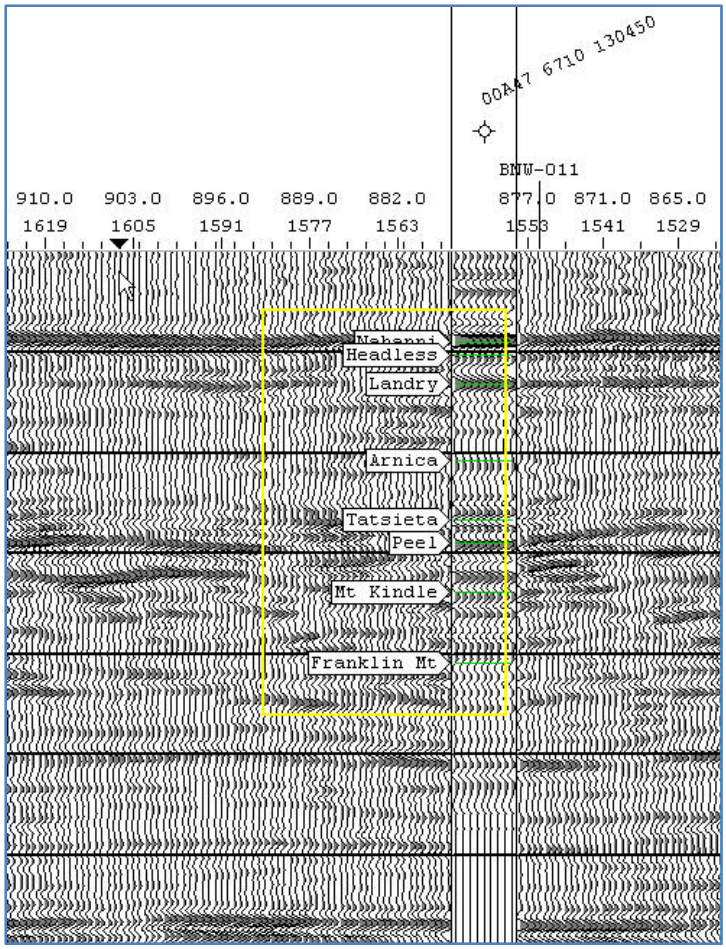

Figure GI09 -A47 jump tied to LC07-107. Yellow window shows cross correlation extraction in Figure GI10

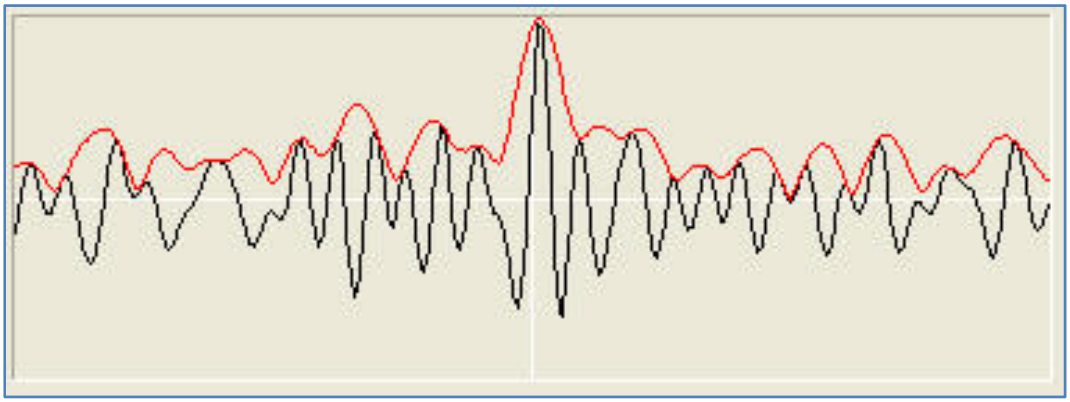

Figure GI10 – Cross Correlation between A47 and LC07-107

Geophysical Interpretation

After processing, all seismic and well data were loaded on to a computer work station and interpretated using Seisware (Zokero) and GeoSyn (IHS Energy). Final Bouguer gravity grid was imported into Seisware and mapped using this software.

The interpretation of the Little Chicago seismic /gravity will be broken into three main stratigraphic zones and will be discussed from deepest to shallowest; they are Proterozoic, Deep Paleozoic and Shallow Paleozoic.

The Proterozoic Section

The top of the Proterozoic section under EL 413 is located at 1000 – 1200 ms. The surface trend of the top of the Proterozoic (as tied in from the N-32 sonic log) is a monocline/anticline that is down dip to the SE, climbs to an apex that corresponds with the north segment of LC07-107 and then rolls off or climbs slightly to the north and northwest. This structural trend agrees very well with the Bouguer Gravity which shows the same basic form. See figure GI10, GI11 and GI12. These two surfaces will be used further in the Deep Paleozoic discussion. Little time was spent on the internal reflectors of the Proterozoic due to its lack of current economic potential and lack of well control. This being said, there are several major reflectors within the Proterozoic and further study may be of interest to Bernie MacLean at the Natural Resources Canada, 3303 33 Street North West, 1st Floor, Room 141, Calgary, AB, T2L 2A7. Some preliminary discussions with Mr. MacLean were conducted about an event at 1800 – 2000 ms. (Fig. GI12) which shows offsets of 300 ms. +. Although no absolute conclusions were reached, the most likely explanation for this feature is a sill.

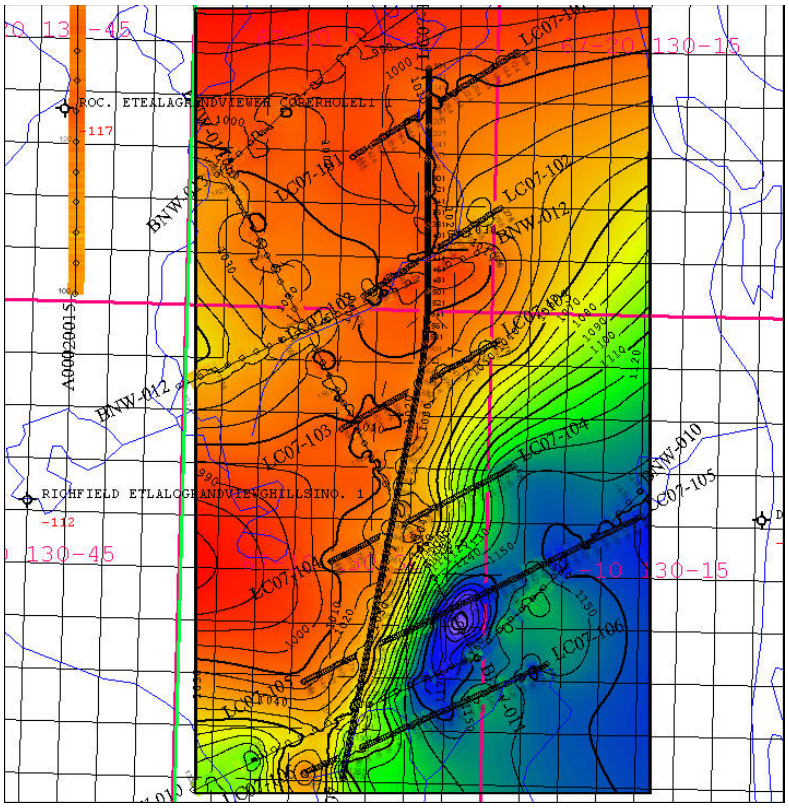

Figure GI10 - Time structure – Top Proterozoic

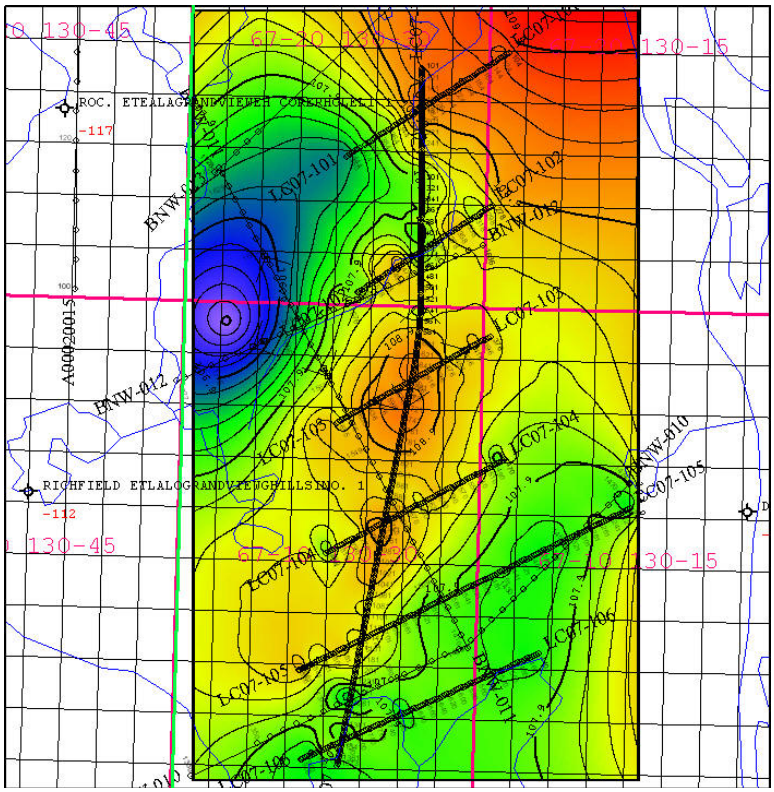

Figure GI11 – Bouguer Gravity

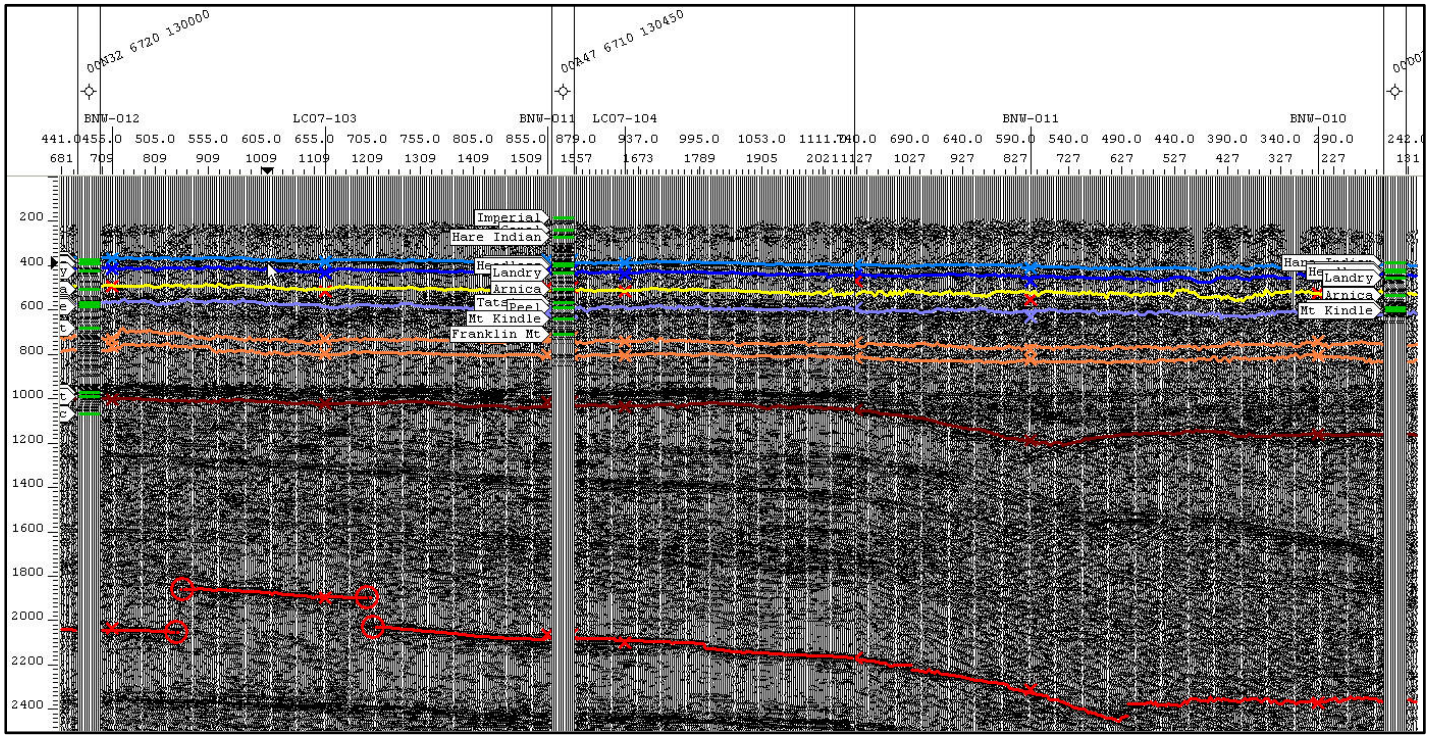

Figure GI12 – Line LC07-107 and Line LC07-105 showing Top of Proterozoic (1000 ms. in Brown) and deeper Proterozoic structure (sill?-1800-2000 ms. in Red)

Deeper Paleozoic Section (Silurian/Ordovician/Cambrian)

Of more interest for oil and gas potential, is the deeper section of the Paleozoic. As shown in figures GI10 and GI12, a localized low (3000 to 4000 hectres) at the top of the Proterozoic (1000 – 1200 ms.) exists in the south eastern portion of EL 413. This low is filled with a clastic wedge that is terminated against the Proterozoic high to the west and possibly north (addition seismic will be needed to define the exact geometry of this wedge). See figures GI13 and GI14. The exact lithology (and reservoir characteristics) of the wedge are not known, but depending on the ultimate geometry, hydrocarbons may be trapped in an up-dip position near the pinch out edge (assuming further closure to the north).

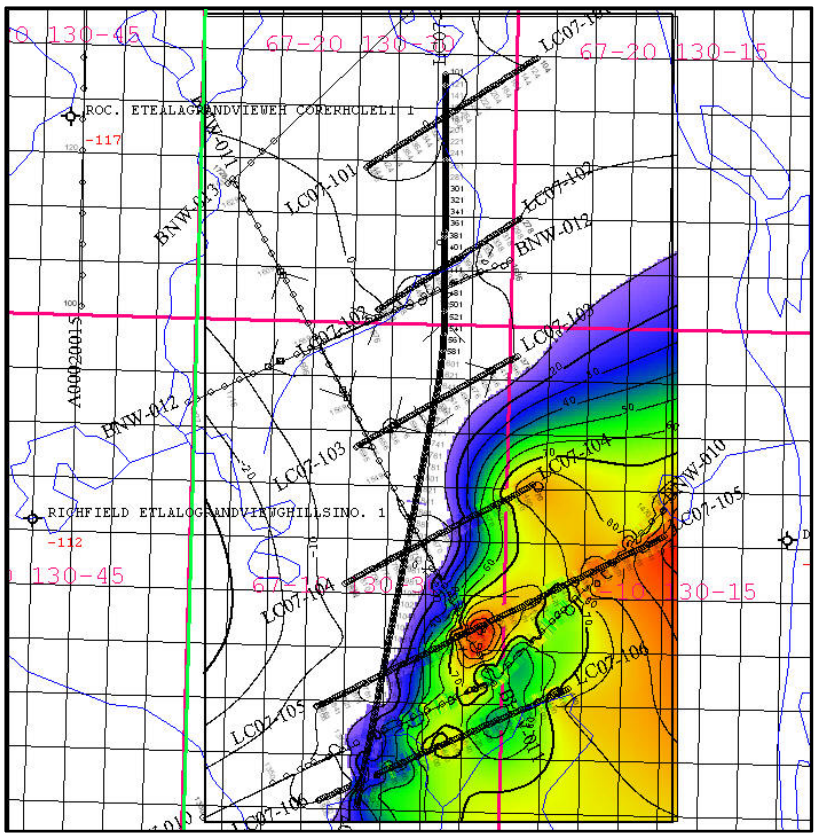

Figure GI13 – Map showing isochron of potential clastic wedge which is truncated against Proterozoic high. Lithology and reservoir characteristics are not defined, and further seismic is required to define northern geometry and extent.

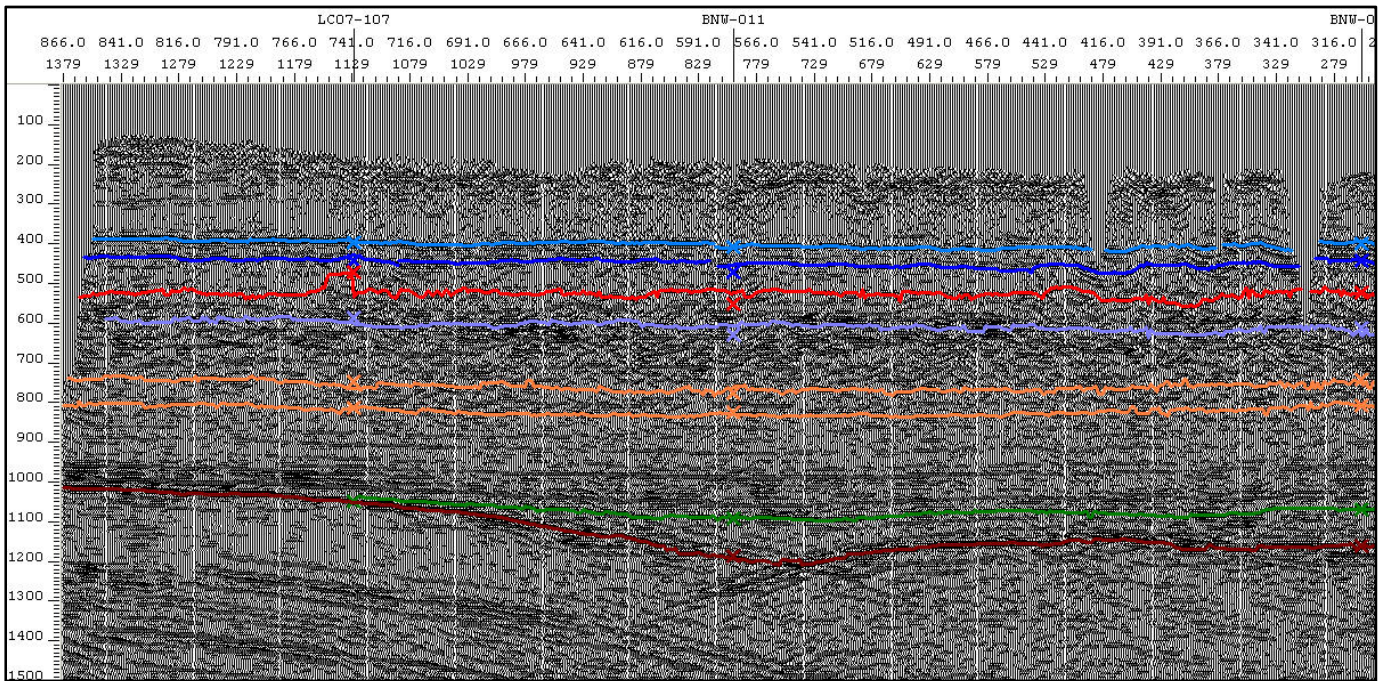

Figure GI14 – LC07-105 showing wedge (Green horizon) and its termination against the Proterozoic high (Brown horizon) to the west side of EL413.

Shallow Paleozoic Section (Devonian)

Both the Hume and the Landry (Nahanni and Headless) are very well imaged on the Little Chicago seismic program, however, show little evidence of structure or reef development (stratigraphic) over the concession. The Arnica is a very poor seismic reflector due to the low impedance contrast between the limestones of the Landry and the dolomites of the Arnica. Interpretation of the Arnica was done by first picking the Landry and then datuming down 80 ms. (based on the area synthetics) and applying a phantom pick. Once the phantom pick was produced, the data was manually inspected and adjusted where necessary and possible. No major deviations from the phantom pick were found. There is some evidence on the dip lines of the seismic program which would suggest some compressional faulting through this Devonian section, however the throws across these faults can be measured in 10's of milliseconds and is of no apparent significant to set up trapping mechanisms throughout the section. See figures GI15, GI16, and GI17.

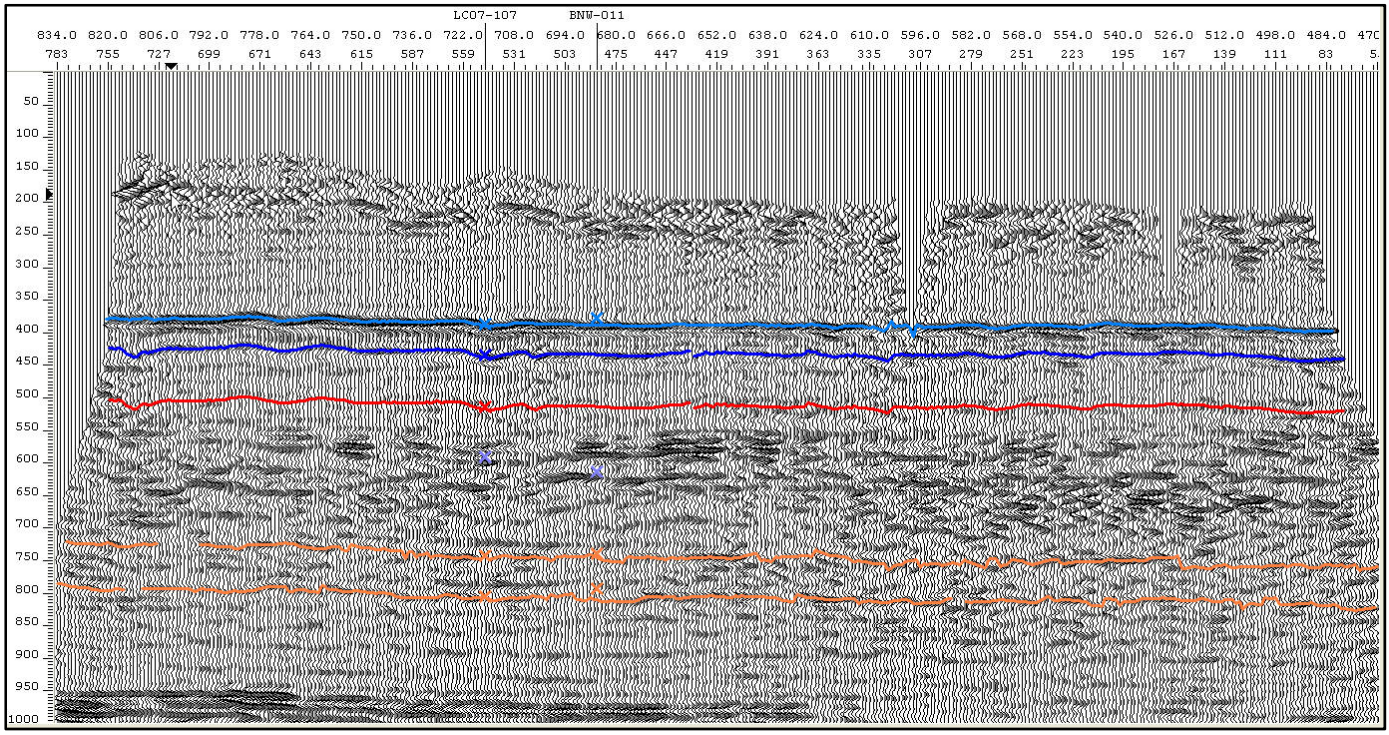

Figure GI15 – LC07-104 showing the Hume (Blue horizon), Landry (Purple horizon) and the calculated Arnica (Red horizon). LC07-104 is a dip line and shows very little evidence of either significant structure or stratigraphic (reef) development.

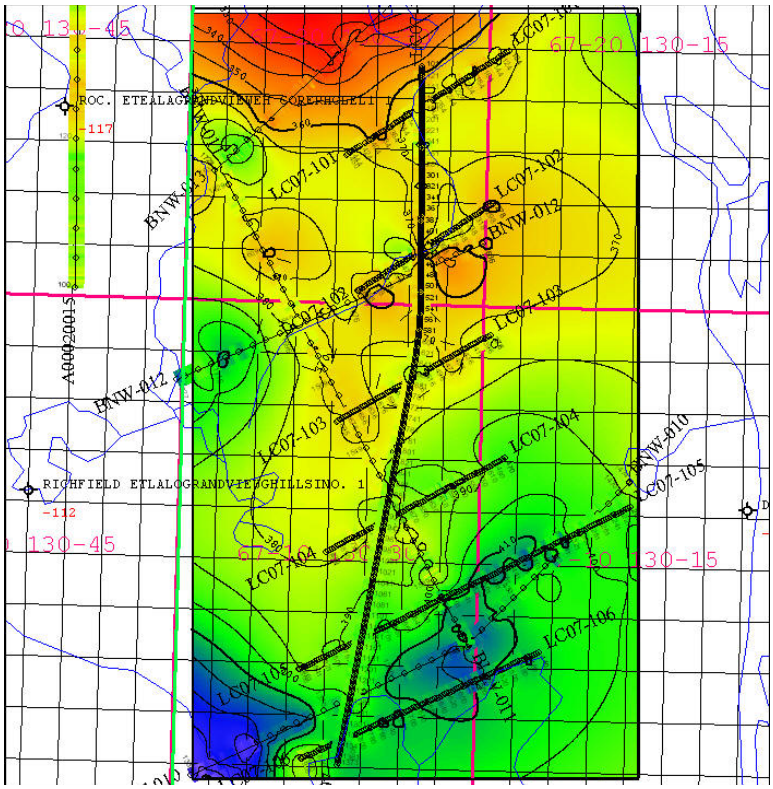

Figure GI16 – Hume time structure (both Landry and Arnica time structures are very similar).

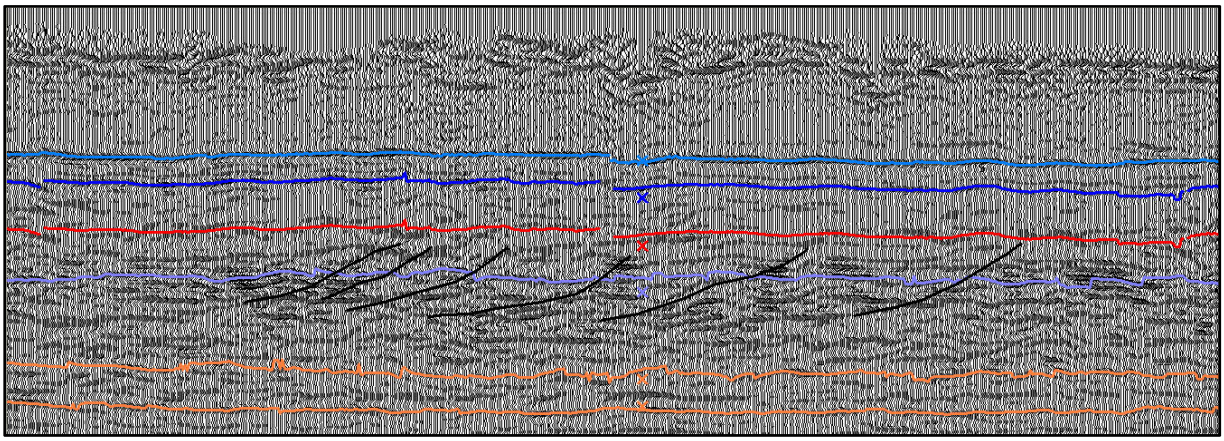

Figure GI17 – LC07-105 (portion) showing possible compressional faults at the Peel/Arnica level. Notice that offsets on faults is minor (10 ms.) and is not considered enough to create any significant traps.

Conclusion

The quality of the Little Chicago seismic reflection data is very good to exceptional. Follow up seismic using the same parameters could be conducted over the north and east portion of the block to further evaluate the clastic wedge which is truncated against the Proterozoic high defined by both the seismic and the gravity data.

Although there seems to be little evidence of either structural or stratigraphic traps in the Hume to Arnica interval of the Devonian, future drilling activity in the area may help to re-define this future potential.

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July 2007

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