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Ministry of Energy, Mines & Petroleum Resources
Mining & Minerals Division
BC Geological Survey

Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Integration of Geophysical and Geological data in the Me **TOTAL COST:** $13,300.00

AUTHOR(S): Frederick A. Cook **SIGNATURE(S):** Frederick Cook Digitally signed by Frederick Cook DN: cn=Frederick Cook, o, ou, email=fcook@ucalgary.ca, c=CA Date: 2017.03.05 13:04:06 -08'00'

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): **YEAR OF WORK:** 2016-17

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): Event 5632023: Dates July 29, 2016;
Jan 26, 28, Feb 9, 10, Mar 3, 4, Jul 29, Aug 11, 12, Oct 18, 19, 20, 2016

PROPERTY NAME: MB 01-16

CLAIM NAME(S) (on which the work was done): MB 01-16 (1040143)

COMMODITIES SOUGHT: Massive sulphides

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:

MINING DIVISION: Ft. Steele **NTS/BCGS:** 082F

LATITUDE: 49 ° 33 ' 30 " **LONGITUDE:** 116 ° 22 ' 11 " (at centre of work)

OWNER(S):
1) D. E. Lavoie 2)

MAILING ADDRESS:
2290 DeWolfe Ave.
Kimberley, BC V1A1P5

OPERATOR(S) [who paid for the work]:
1) D. E. LaVoie 2)

MAILING ADDRESS:
2290 DeWolfe Ave.
Kimberley, BC V1A1P5

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):

Metasedimentary rock; Proterozoic; Aldridge Formation, sedex deposits

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: Kennedy, AR29315; Magrum&Crowe, AR12825
McCartney, AR23049; Ransom, AR25177

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TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic	VLF-EM	1041043	$ 2,600.00
Induced Polarization			
Radiometric			
Seismic	Seismic reprocessing	1041043	$ 7,200.00
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for...)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other	Report		$3,500.00
		TOTAL COST:	$13,300.00

Assessment Report:

Integration of Geophysical and Geological Data in the Meachen Creek Area: Meachen Bend (MB 01-16) Property

MTO event 5632023

Approximate centre of property:

North 49° 33' 30"; West 116° 22' 11"

UTM Zone 11 545580E, 5489710N

NTS map sheet 082F

Fort Steele Mining Division

by

F. A. Cook, Ph.D., P.Geo.
Salt Spring Imaging, Ltd.
128 Trincomali Heights
Salt Spring Island, B.C.

Property Owner:

D. E. Lavoie
2290 DeWolfe Ave.
Kimberley, B.C. V1A1P5

March, 2017

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1.0 Summary

Integration of geological and geophysical data in the Meachen Creek area of southeastern British Columbia has led to the delineation of a suite of geophysical anomalies that are spatially associated with surface showings of polymetallic veins and stratigraphically controlled sulphides and metals. These include: 1) a prominent seismic amplitude anomaly on seismic reflection data that is located at the same stratigraphic position as the Sullivan deposit approximately 25 km to the northeast; 2) a prominent (~500 nT over background) magnetic anomaly that is spatially associated with the seismic amplitude anomaly as well as surface showings; 3) an airborne EM anomaly that is partly offset slightly to the southeast, and, 4) a series of near-surface conductors delineated on a reconnaissance VLF-EM profile.

2.0 Introduction and Terms of Reference

The purpose of this report is to describe results of integrating a variety of geophysical and geological data in the region of the Meachen Creek drainage south of St. Mary Lake (Figure 1). A central feature of the analysis is the inclusion of a regional seismic reflection profile (line 5.25) that was recorded in the mid-1980's in an effort to delineate the stratigraphy and structures of the Purcell anticlinorium in the hangingwall of the St. Mary fault. Seismic images have been enhanced to facilitate correlations to surface structures and stratigraphy that are visible in outcrop and in exploration drill holes.

The area has been a focus of exploration activities for many decades, largely because it is near the Sullivan mine (about 25 km to the northeast of the property), because the area has similar rocks to those of the Sullivan deposit, including exposed (meta-) sedimentary and igneous rocks of the Mesoproterozoic Middle and Lower Aldridge Formations, and because a number of strong showings with elevated Cu, Pb, and Zn have been found in veins at and near the surface. Primary access is available from the Meachen Creek road that diverges from the St. Mary Lake road near St. Mary Lake (Figures 1 and 2).

This report is a description of geological and geophysical analyses undertaken in 2016.

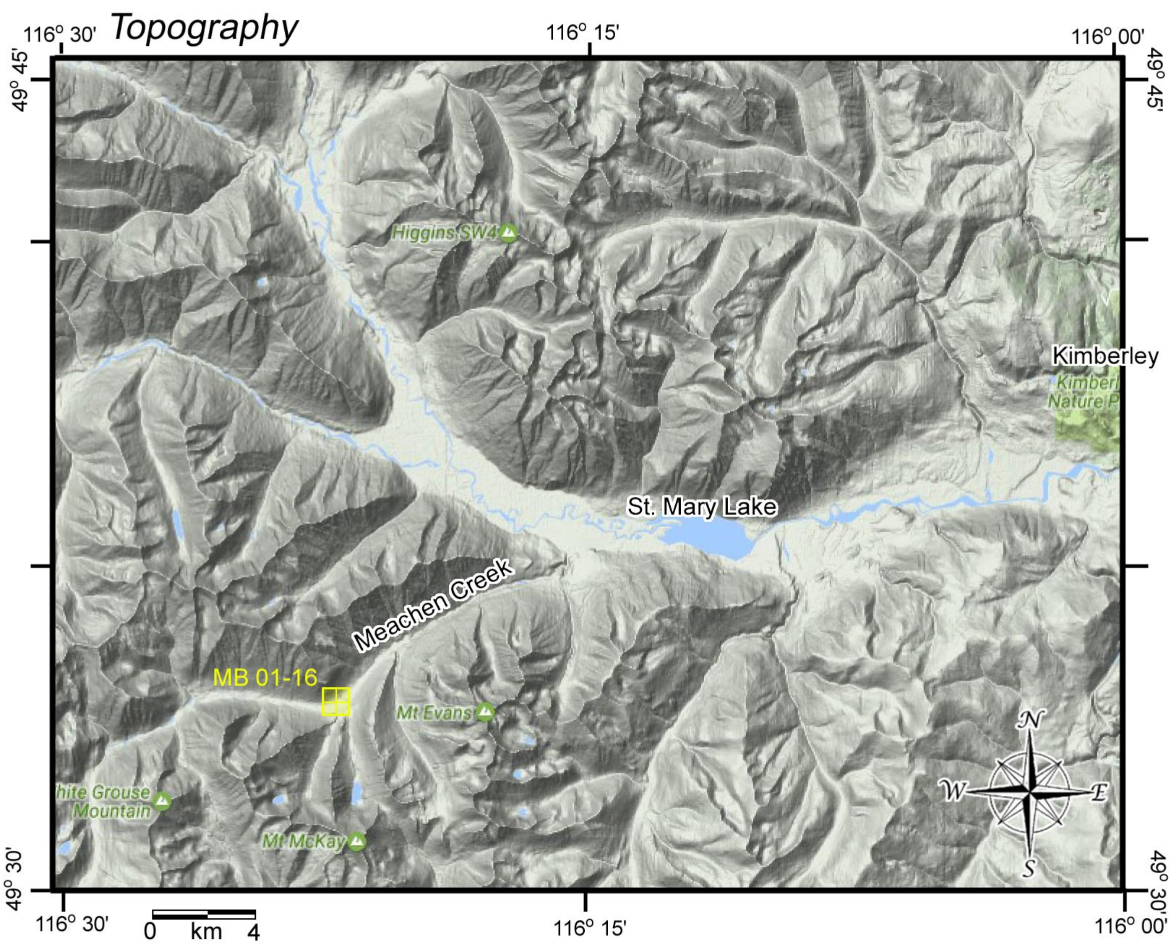

Figure 1. Satellite image of St. Mary Lake area with the MB 01-16 property indicated in yellow.

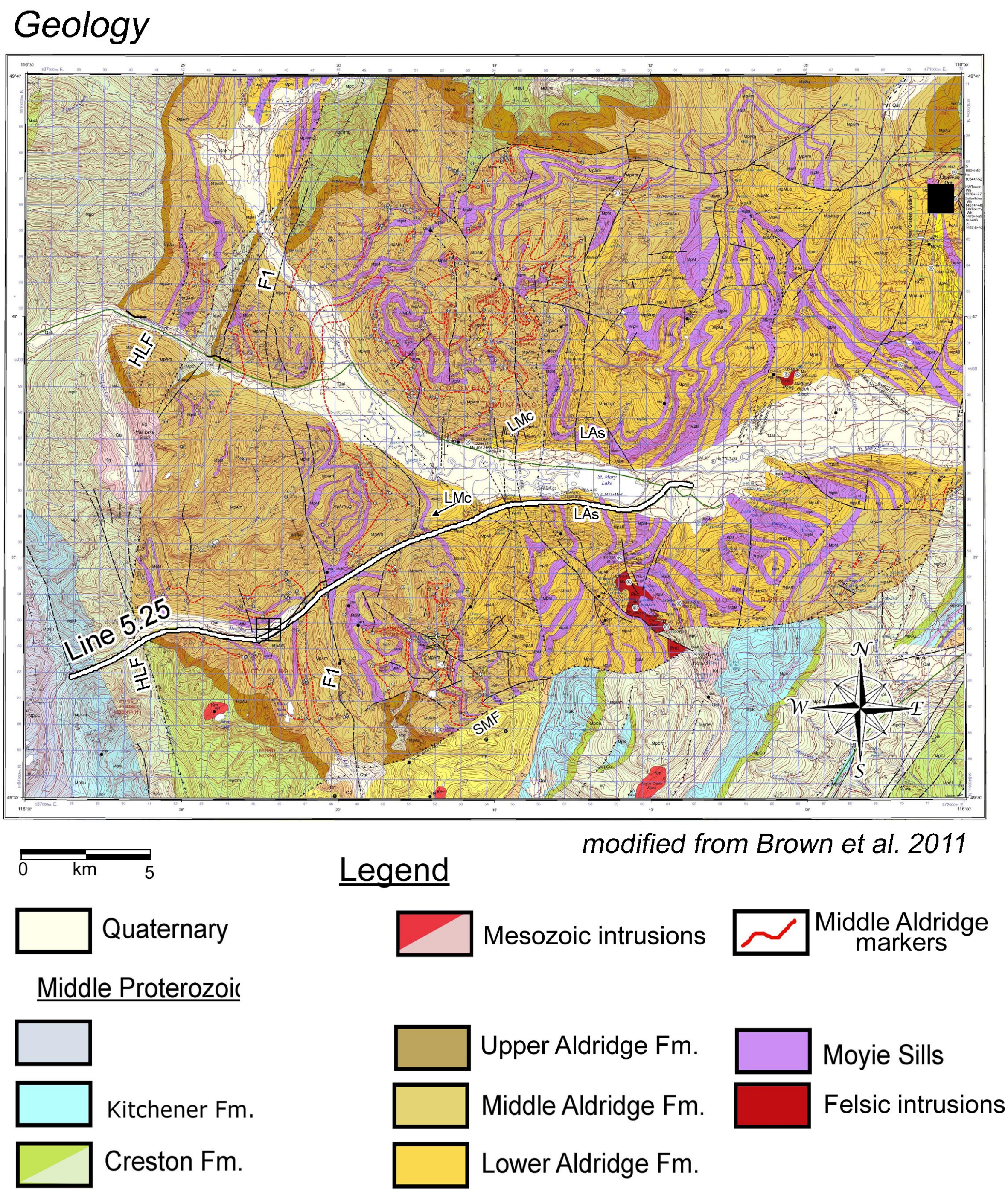

Figure 2. Geological map of the St. Mary Lake area (modified from Brown et al. 2011). The location of seismic line 5.25 is shown as are a number of faults and formations. Abbreviations used are:: SMF, St. Mary fault; HLF, Hall Lake fault, F1, Fiddler Creek fault and extension; LMC, Lower-Middle Aldridge contact; LAs, Lower Aldridge sills, The black rectangle in the northeast is the location of the Sullivan mine.

2.1 Terms of Reference

Included in this report are a description of the general geological setting of the Property, a description and analysis of geophysical data and results, an interpretation and reinterpretation of geological and geophysical relationships, and an evaluation of the merits of the relevant parts of the property. Reports reviewed by the author are listed in the reference section at the end of this report.

The author is familiar with the geology and geophysics of the region, having been responsible for acquiring geophysical data in British Columbia since 1983 and as the transect leader for the Lithoprobe Southern Canadian Cordillera transect from 1985-1995 and Transect co-leader for the Lithoprobe Slave-Northern Cordillera transect from 1995-2005.

All measurement units used in this report are metric. The coordinate system in use on the Property and on all maps is UTM zone 11 (NAD83).

3.0 Mineral Tenure Description and Location

The MB 01-16 property is located in southeastern British Columbia approximately 25 km southwest of Kimberley, BC (Figures 1 and 2). The property consists of a single mineral tenure containing approximately 83.83 hectares in four cells (Table I). The mineral cell titles were acquired online and as such there are no posts or lines marking the location of the property on the ground. The claims are owned by D. Lavoie of Kimberley, BC.

Table 1: Description of the MB 01-16 mineral title.

Title Number	Claim Name/Property	Issue Date	Good To Date	New Good To Date	# of Days For-ward	Area in Ha	Applied Work Value	Sub-mission Fee
1041043	MB 01-16	2016/JAN/06	2017/JAN/06	2027/Jan/06	3652	83.83	$ 11735.58	$ 0.00

4.0 Accessibility and Physiography

The MB 01-16 property is a small, rectangular block of cells that are located along Meachen creek south of St. Mary Lake (Figures 1 and 2). The property is located approximately 25 km southwest of Kimberley, B. C. (Figures 1 and 2). Access to the property is along the St. Mary lake road from Maryville and then south along the Meachen Creek road.

In this area, the terrain is mountainous with elevation differences of as much as 1000m from the Meachen Creek valley to the higher elevations.

5.0 Exploration History

The area in the vicinity of the property has been prospected since the Sullivan deposit was found and subsequently exploited. Although the author could not find information that suggests the specific area of the MB 01-16 claim has been staked previously, there have been a number of claims in the vicinity with anomalous metals. These include the Whitefish and Goodhope claims near Fiddler creek (rock sampling; Magrum, 1984), the MEA claims (soil geochemistry; McCartney, 1993), the Tow property (soil geochemistry; Ransom, 1997) and the Whopper claims (rock geochemistry; Kennedy, 2007).

Regional airborne magnetic data and electromagnetic data that were acquired in the St. Mary Lake area were recorded for the BC Geological Survey and the Geological Survey of Canada by GeoTerrex (McConnell, 1997). These data were gridded to 100m. Gravity data in the vicinity gravity survey were compiled by Sanders (2012), although there are very few stations in the vicinity of the MB 01-16 property.

6.0 Geological Setting

The area of this study is in the central part of the Purcell anticlinorium in Canada southwest of Kimberley, B. C. (Figure 3). The Purcell anticlinorium in this area can be subdivided into three major blocks that are separated from one another by transverse contractional faults. The lowest structural panel is the Moyie block that is dominated by the Moyie anticline, a structure that plunges to the northeast in Canada and to the southeast in Montana (Figure 3). In Canada, its western and northern boundary is the Moyie fault, an east/southeast verging transverse contractional structure with a minimum of 8-10 km of displacement. The St. Mary block is delineated on the southeast by the Moyie fault and on the northwest by the St. Mary fault. The northern most block in this area is the Hall Lake block, which is located in the hangingwall of the St. Mary's fault and the footwall of the Hall Lake fault. The MB 01-16 property is located in the Hall Lake block in the hangingwall of the St. Mary fault (Figure 2).

The study area is included in Geological Survey of Canada open file 6308 (Brown et al. 2011) which is reproduced in Figure 2. The map area contains three distinct regions that are separated by major faults: 1) a triangular area in the southeast that is delimited in the northwest by the St. Mary fault (SMF), 2) a large area that dominates the map north of the St. Mary fault and east of the Hall Lake fault (HLF) and in which the MB 01-16 property is located, and 3) the area west of the Hall Lake fault. The St. Mary fault emplaces metasedimentary and igneous rocks of the Lower and Middle Aldridge formations and younger formations onto the rocks as young as Devonian and thus represents a major structural break. All of the rocks of interest here are in the hangingwall of the St. Mary fault, with the stratigraphic level generally rising to the west-northwest. Thus, the oldest rocks in the panel are the Lower Aldridge strata in a panel adjacent to the St. Mary fault and extending to the vicinity of the Sullivan mine.

Faults confined to the hangingwall block of the St. Mary fault include the north-striking F1 fault that is located along Fiddler Creek in the vicinity of Meachen creek, but then projects more than 15 km northward across Redding Creek and the St. Mary river (Figure 2).

Exploration efforts have been focused on finding:

1) Stratabound deposits similar to the Sullivan deposit, primarily in the same stratigraphic interval (Lower-Middle Aldridge contact, or LMc; Figure 2), or in fragmental black smoker type deposits at other stratigraphic positions (e.g., Middle Aldridge), and
2) Polymetallic vein deposits associated with joints, fractures or faults.

Although numerous metalliferous quartz-carbonate veins have been found at the surface, stratabound deposits similar to the Sullivan are elusive.

7.0 Work Accomplished in 2016

There are four types of geophysical data that were analysed in this study: seismic reflection, airborne magnetics, airborne electromagnetics and VLF-EM. No advanced processing has been applied to the airborne magnetic and electromagnetic data but such work could be undertaken in the future if desired. Nevertheless, as will be shown, the available magnetic and EM data provide a view of anomalies that stimulated interest and led to the acquisition of the MB 01-16 property. When combined with a newly reprocessed seismic reflection profile, these data provide new perspectives on the subsurface stratigraphy, structure and thus the exploration potential. We begin with a description of the results from seismic reflection data.

7.1 Seismic Reflection Data

More than 1000 km of seismic reflection data were recorded in the Purcell anticlinorium in Canada in the early and middle 1980's by Duncan Energy Corporation during exploration activities for hydrocarbons. Recording was accomplished with typical industry-standard parameters for that time period (early 1980's) and are listed in Cook and van der Velden (1995). The data have been processed and interpreted for regional studies (e. g., Cook and Van der Velden, 1995; Van der Velden and Cook, 1996); here we focus on one of the lines that traverses part of the area of Figure 2, and that crosses the MB 01-16 property (Line 5.25 in Figure 2).

7.11 Data Processing

Although the data were processed initially in the mid-1990's (Figure 3a), examination of the results of that processing indicates that the structures are poorly imaged along this line. As is apparent in Figure 3a, there are numerous crossing reflections that indicate the structures are narrow, complex and not well imaged such that additional effort is warranted in order to enhance the image. A major factor in the complex image is that the original processing included only a single velocity (5000 m/s) for the migrations.

Reprocessing has consisted of filter tests, post-stack migration with variable velocities, and coherency filtering tests. The results are shown in Figure 3b. For this result, the reprocessing efforts were concentrated in the western half of the profile, between the Sinclair fault on the east and the Hall Lake fault on the west. There are two reasons for this focus: 1) the MB01-16 property is located in the western part of the line (Figures 3a and 3b), and, 2) the Lower Aldridge – Middle Aldridge contact (LMc) is located at the surface near the Sinclair fault and dips westward.

In both Figures 3a and 3b, the locations and attitudes of a number of key structures, contacts and markers at the surface are shown to facilitate interpretations. These include: 1) the Hall lake fault, F1 (Fiddler Creek) fault, and Sinclair fault, 2) the position of the Lower Aldridge – Middle Aldridge contact (LMc) east of the Sinclair fault, and 3) a narrow syncline west of the F1 fault, along with the location and attitude of the Sundown marker in the Middle Aldridge.

The position of the elevation profile is also shown. The data were processed with a datum of 1200m (1.2 km) so that elevations that are above 1200m on the western end of the line are above the datum, whereas those to the east are below 1200m.

The migrations and filtering produce a dramatically different image (Figure 3b) compared to the original processed version (Figure 3a). The reason is clear: the narrow syncline produced a 'bow-tie' effect in the poorly migrated data due to the crossing ray paths of normally incident signals in the subsurface. In addition, features such as the narrow syncline have clear counterparts in the subsurface on the new image. This fact allows the new image to be correlated to the surface features and thus to produce an improved understanding of the subsurface variations of stratigraphy and structures.

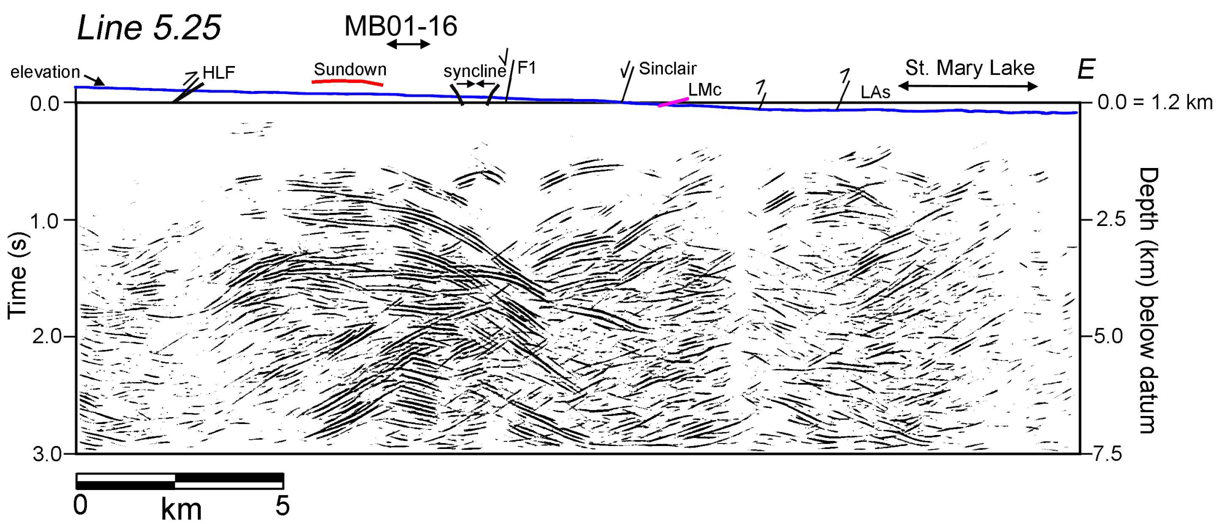

Figure 3a. Original processed version of the line 5.25. Note the complex geometry of the criss-crossing reflections, particularly between the Sinclair fault and the Hall Lake fault. Abbreviations used are: LAs, Lower Aldridge sills; LMc, Lower-Middle Aldridge contact; F1, Fiddler Creek fault; HLF, Hall Lake fault. The line labeled 'Sundown' is the position of the Middle Aldridge Sundown marker and sill and 'MB 01-16' is the location of the MB 01-16 property.

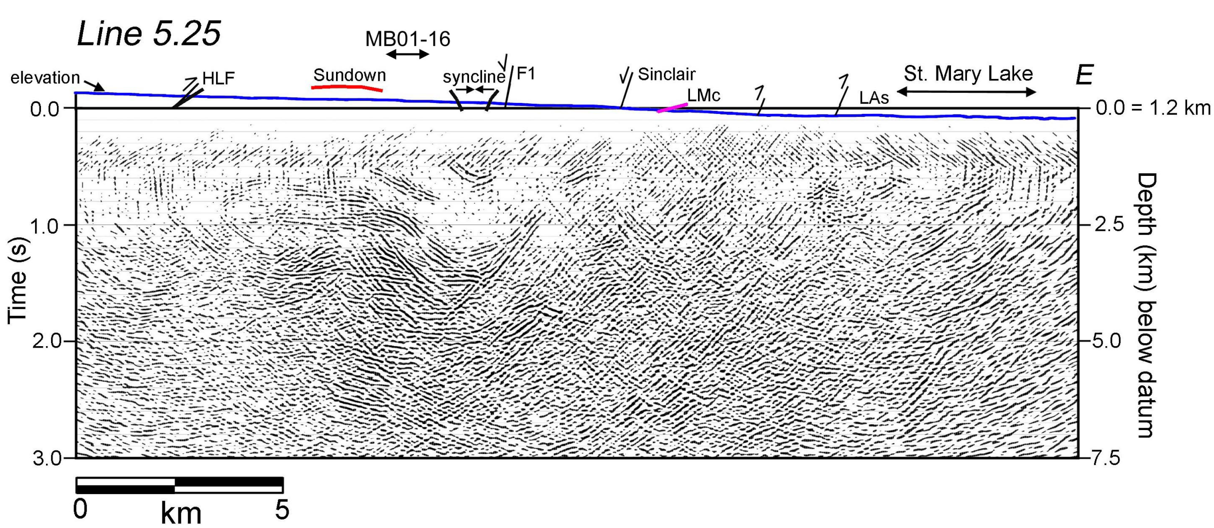

Figure 3b. Reprocessed version of line 5.25. This result includes variable velocities for the migration as well as additional filtering, gain and coherency filtering. Abbreviations are the same as used in Figure 3a. For this plot, an average velocity of 5.5 km/s is assumed.

7.12 Interpretation

Interpretation of the enhanced version of line 5.25 is facilitated by two important constraints: 1) the positions and attitudes of contacts and faults at the surface, and 2) the consistent seismic character of the Sundown (Middle Aldridge) to Lower Aldridge/Middle Aldridge contact to Lower Aldridge sills. Specifically, as described in Cook and van der Velden (1995), the Sundown sill is a prominent and regionally extensive seismic marker, and sills in the Lower Aldridge (LAs; probably equivalent in part to the Bootleg sills near the Sullivan deposit), also produce a zone of regionally extensive and prominent seismic reflections approximately 1300-1400m (approximately 0.4-0.5 s two-way travel time) below the Sundown reflection (Figure 4). The zone between the Sundown sill and the Lower Aldridge sills is largely seismically transparent (i.e., non-reflective). The LMc, or Lower Aldridge – Middle Aldridge contact, is located within this seismically transparent zone a few hundred meters above LAs (Figure 4).

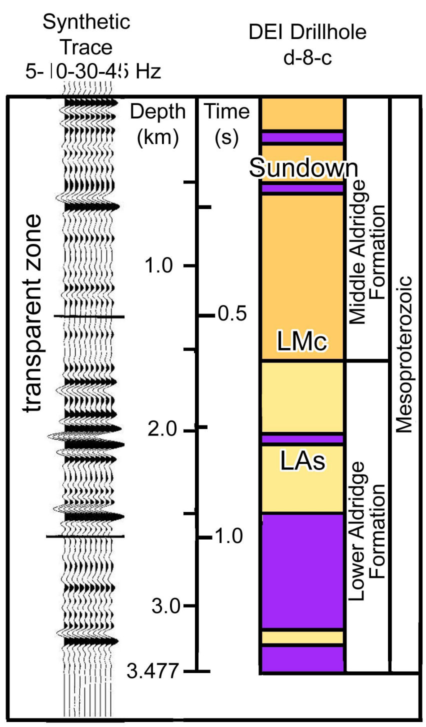

Figure 4. Stratigraphic section (right) and synthetic seismic trace (left) calculated for the DEI drill hole near Moyie (Cook and van der Velden, 1995). Note that the zone between the Lower Aldridge sills (LAs) and the Middle Aldridge Sundown sill is comparatively seismically transparent. The Lower Aldridge – Middle Aldridge contact (LMc) is located within the transparent zone about 900m-1000m below the Sundown sill.

This seismic-stratigraphic information is valuable for projecting the surface contacts to depth, and thus delineating the structure in the subsurface. The results are shown in Figure 5.

The newly migrated version of the data provides a much clarified view of the subsurface structure and stratigraphy and allows the faults, contacts and overall geometry to be correlated from the surface into the subsurface. Some specific features include: 1) the presence of a narrow syncline west of the F1 fault. The synclinal axis on the surface is located directly above the synclinal axis in the subsurface at about 0.6 s travel time; 2) the anticline between the Hall Lake fault and the syncline that manifests as flattening of the Middle Aldridge strata and sills (e.g., Sundown sill) and that can also be observed as anticlinal reflectors in the subsurface, and 3) the position of the LMc at the surface east of the Sinclair fault that can be followed into the subsurface.

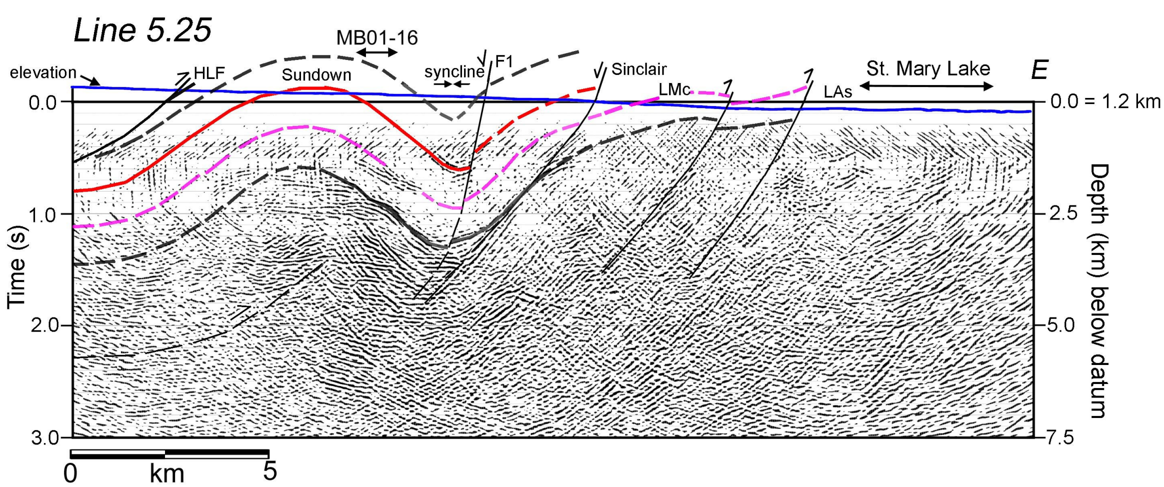

Figure 5a. Reprocessed seismic line 5.25 with the contacts and faults projected into the subsurface.

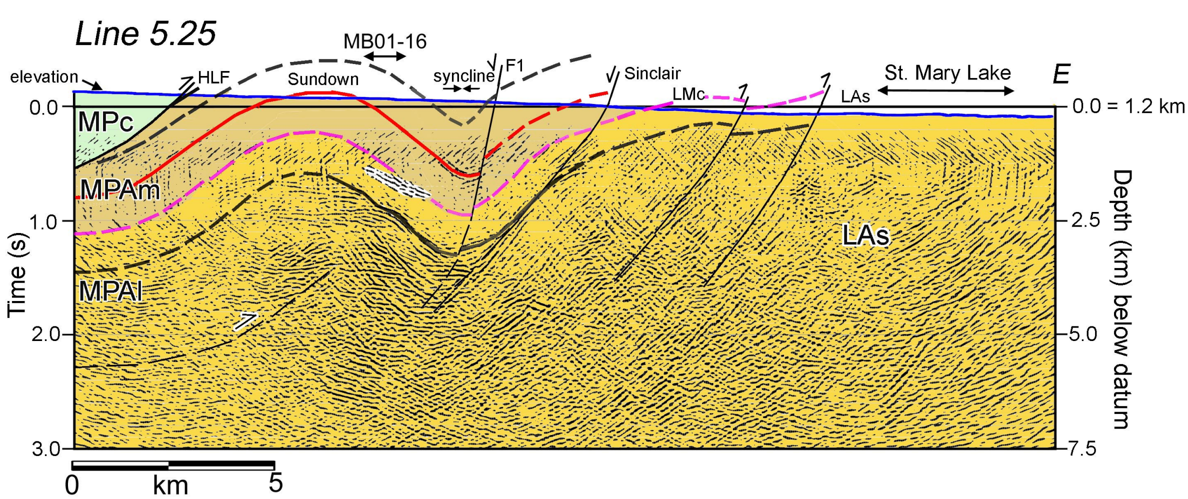

Figure 5b. Coloured version of the interpretation of seismic line 5.25. The colours are the same as those used in Figure 2, although the sills have not been coloured individually and are included in the formation colours.

7.13 A Seismic Amplitude Anomaly

In the course of projecting the formation boundaries, faults and markers into the seismic section, a prominent seismic amplitude anomaly was observed beneath the area of the MB 01-16 and is highlighted in Figure 6. The anomaly is situated within the relatively non-reflective zone beneath the Sundown sill reflection and above the Lower Aldridge sills. In other words, it is located at or close to the LMc (Sullivan zone).

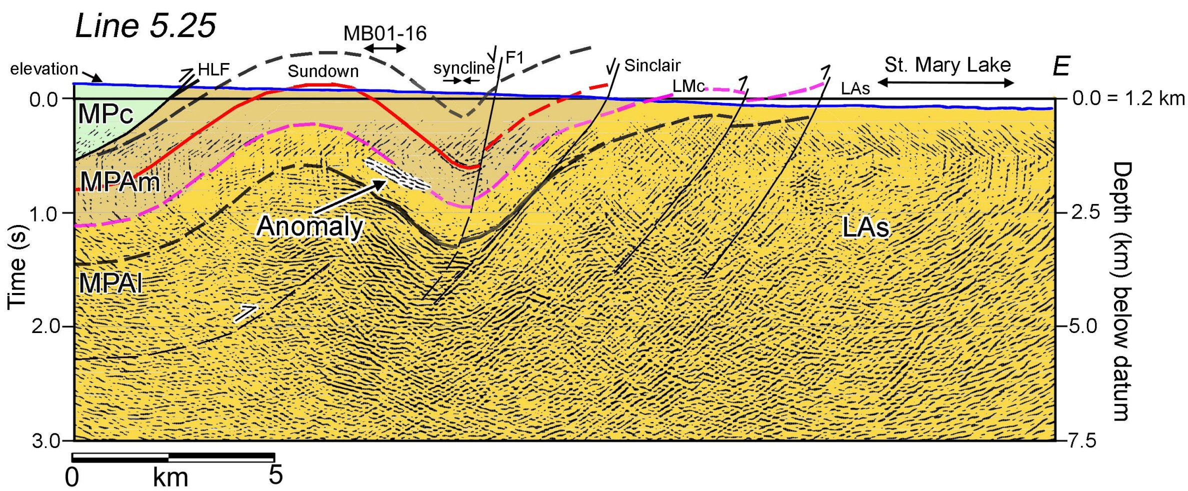

Figure 6. Interpretation of reprocessed seismic line 5.25 from Figure 5b with a seismic amplitude anomaly highlighted.

One approach to analysing the significance of this anomaly is to compare it to the well known Sullivan deposit. This can be accomplished by constructing a seismic model of the Sullivan deposit and comparing it to the line 5.25 anomaly. Figure 7 shows the procedure. In Figure 7a, a composite cross section of the Sullivan deposit from Freeze (1966) shows the stratigraphic and geometric relationships. For ease of comparison with other interpretations here, this section has been generalized and coloured in Figure 7b.

At the Sullivan deposit, the Sundown sill and most of the Middle Aldridge rocks are above the erosion surface, but the zone from the LMc to the Sundown sill can be projected into the section as the Sundown is known to be approximately 900-1000m above the LMc; this has been accomplished by rotating the strata to horizontal (to be consistent with a horizontal Sundown). The result is a slightly expanded section (Figure 7c).

Figure 7c also shows parameters that were assigned to the various units in the cross section. Specifically, the sedimentary rocks typically have a p-wave velocity of 5200 m/s and densities of 2600 kg/m^3 and the sills have a velocity of 6000 m/s and a density of 3000 kg/m^3. Sulphides typically have velocities that are similar to felsic rocks (about 5500 m/s), but of course also have very high densities. Here, an average density of 4100 kg/m^3 has been assigned for the sulphides. The resulting seismic model is shown in Figure 7d assuming that processing has accounted for geometric variations (i.e., equivalent to migrated). The Sullivan ore body produces a prominent reflection.

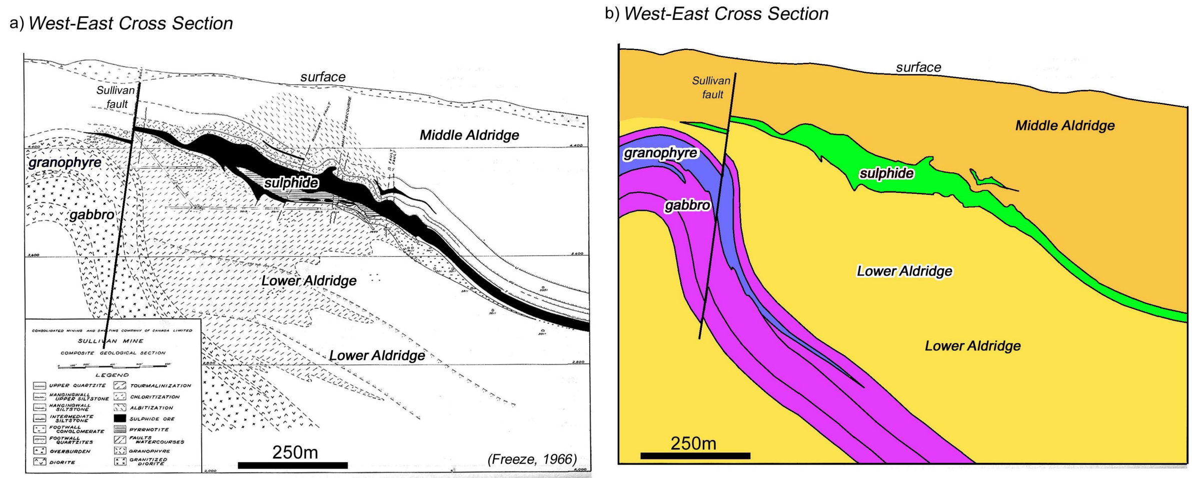

Figure 7. a) Cross section of the Sullivan deposit (Freeze, 1966); b) Coloured version of the cross section in (a) to match colours on the geological map (Figure 2). The sulphide is shown as green in this image.

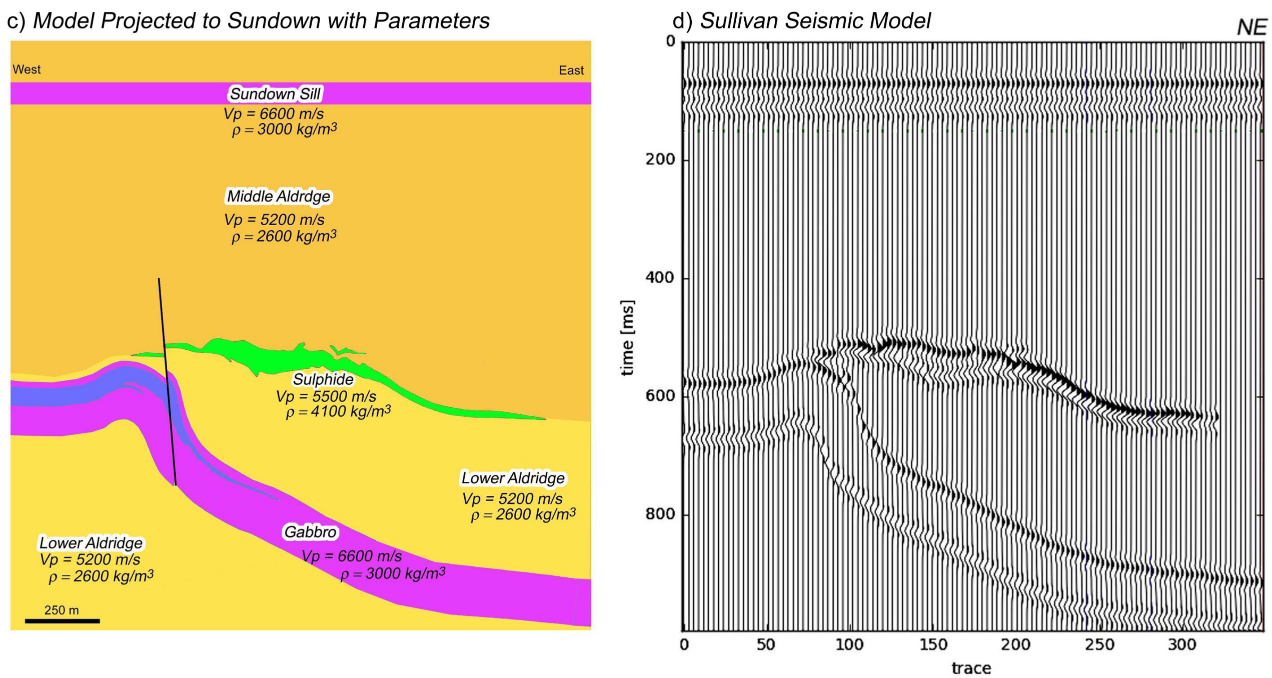

Figure 7 (continued). c) For this cross section, the stratigraphic section has been projected upward to the Sundown sill and rotated slightly to flatten the overlying strata. Also shown are assigned velocity and density properties for the various layers; d) seismic model based upon the properties in (c). Note that the Sullivan sulphides produce prominent seismic reflections due to the high densities of the metals.

In order to compare the resulting seismic model (Figure 7d) to line 5.25, the model was arched so that the Sundown reflection matches the geometry of the Sundown reflection on line 5.25 (Figure 6). The comparison of the model results with the interpreted line 5.25 show the following similarities: 1) the lower Aldridge sill reflections appear to correlate with the sills beneath the Sullivan deposit, and, 2) the amplitude anomaly on the line 5.25 is in the same stratigraphic position as the Sullivan deposit (Figure 8).

Alternative interpretations for the anomaly include a local intrusive (e.g., sill) or some type of reflection from out of the plane of the sections ('sideswipe'). In the absence of drilling information, testing of these possibilities would require additional seismic and other geophysical data.

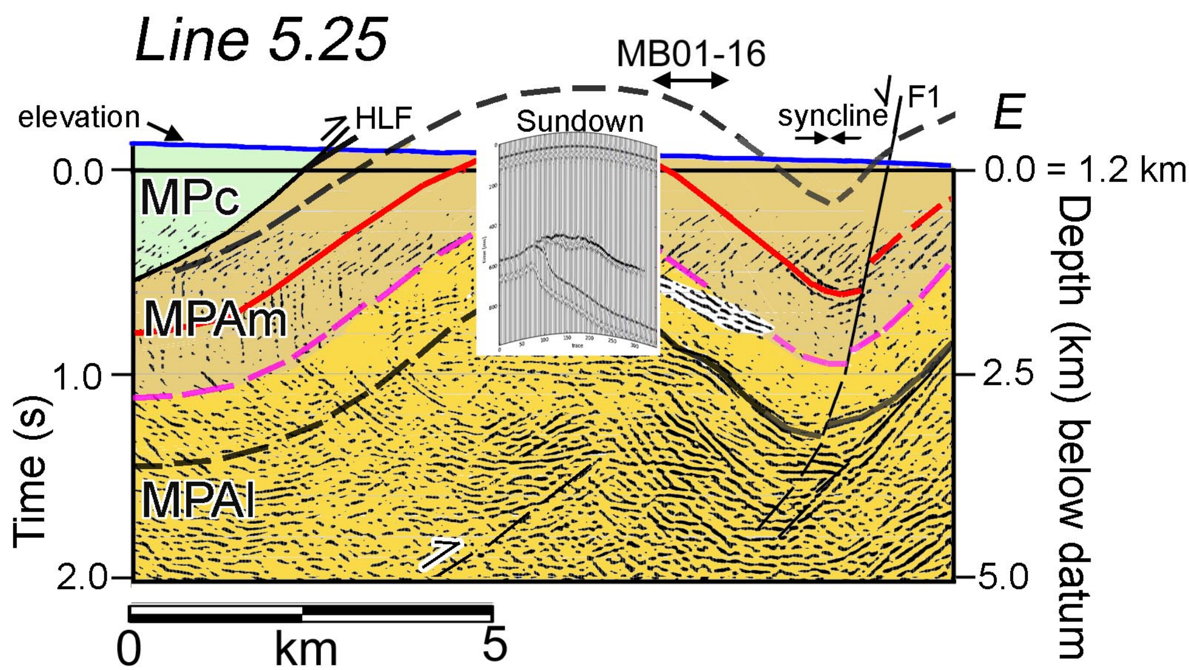

Figure 8. Enlargement of seismic line 5.25 in the vicinity of the MB01-16 property and the seismic amplitude anomaly with the Sullivan seismic model scaled and inserted into the cross section. Note that the seismic anomaly occurs at the same stratigraphic and seismic interval as the Sullivan deposit does.

7.2 Potential Field Data

In 1996 a large airborne magnetics, EM and radiometric survey that included the St. Mary River (and thus the Meachen Creek) area was run for the Geological Survey of Canada and the British Columbia Geological Survey (McConnell, 1996). To illustrate the regional context of the results from work on the MB 01-16 property, versions of the magnetic anomalies and the electrical conductivity are shown in Figures 9 and 10, respectively.

The magnetic anomaly map is shown in Figure 9. As noted previously, no advanced processing, depth calculations or modeling was undertaken for these data at this time. However, the data provided from the survey had been reduced for both diurnal and Earth's field variations, and thus represent residual magnetic anomalies. The gridded results were here calculated for reduction to the North Pole in an attempt to adjust the geometry of the anomalies to represent source positions at depth.

The reduced to pole (RTP) map (Figure 9) shows a series of positive anomalies including: 1) a large anomaly near the Sullivan deposit, 2) a series of anomalies in the southeast that are partly in the footwall of the St. Mary fault, and 3) a magnetic high over the seismic amplitude anomaly along seismic line 5.25. The magnetic high near seismic line 5.25 is located on the east end of the seismic amplitude anomaly and appears to be part of an extensive north-south series of anomalously high values that may extend almost to the northern edge of the map.

A similar pattern is visible in the EM map (Figure 10) in that an EM anomaly appears to be located about 1.5-2.0 km east of the seismic amplitude anomaly. The EM high then appears to project northwards in a series of highs almost to the north edge of the map.

Figure 11 shows the interpreted seismic line 5.25 with curves of the coincident magnetic and EM anomalies positioned above the cross section. This view provides a more detailed view of the spatial relationship between the potential field anomalies and the seismic anomaly.

Specifically, the magnetic high appears to be located directly above the eastern part of the seismic anomaly, whereas the EM anomaly appears to be offset from the magnetic high about 1.5-2 km to the east. While it is uncertain what the source of the magnetic anomaly may be, it is likely that the EM anomaly is related to surface and near-surface veins that contain high percentages of metals (e.g., Magrum and Crowe, 1984).

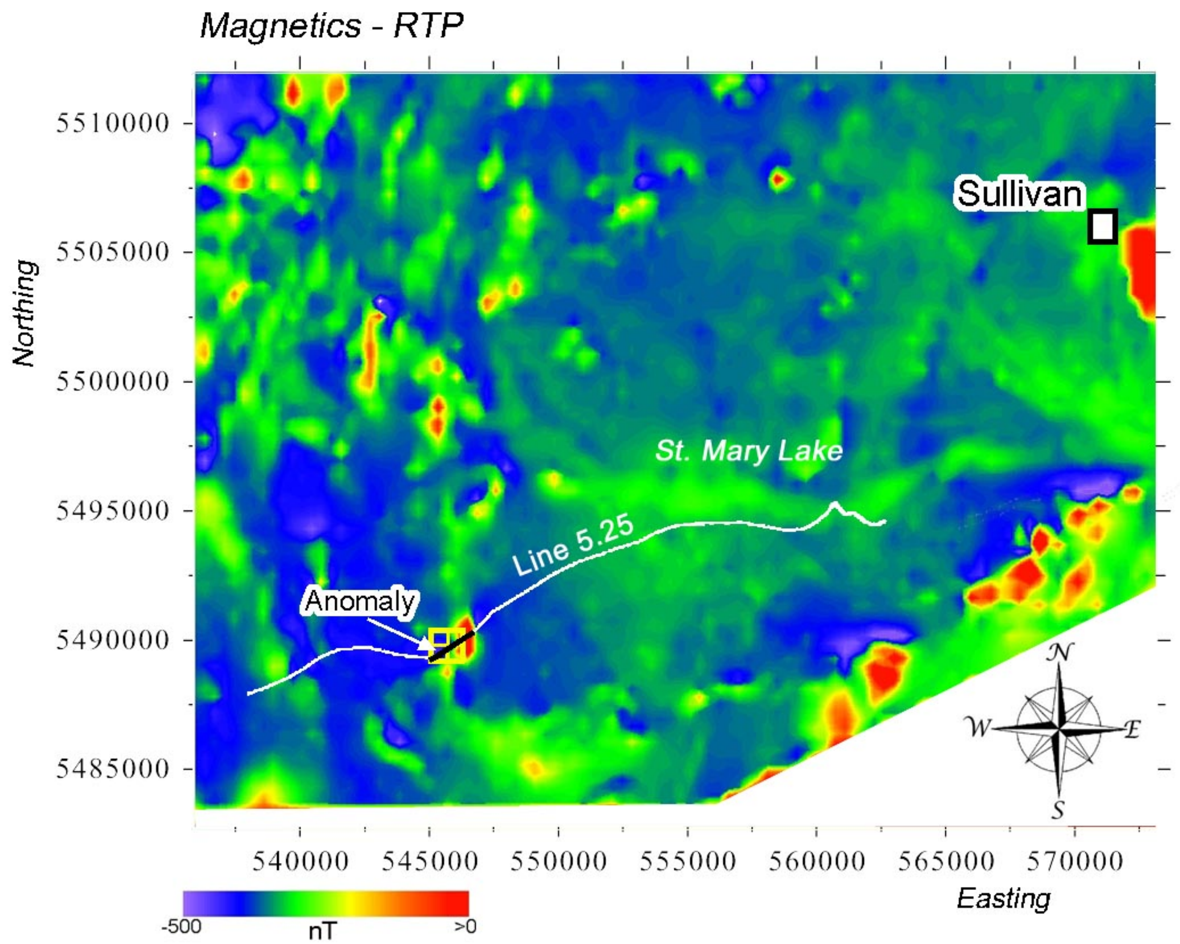

Figure 9. Magnetic anomaly map for the same area as in Figure 2 (gridded data from McConnell, 1996). Note that there is a strong (>500 nT over background) magnetic anomaly that is spatially related to the seismic amplitude anomaly (labeled 'Anomaly').

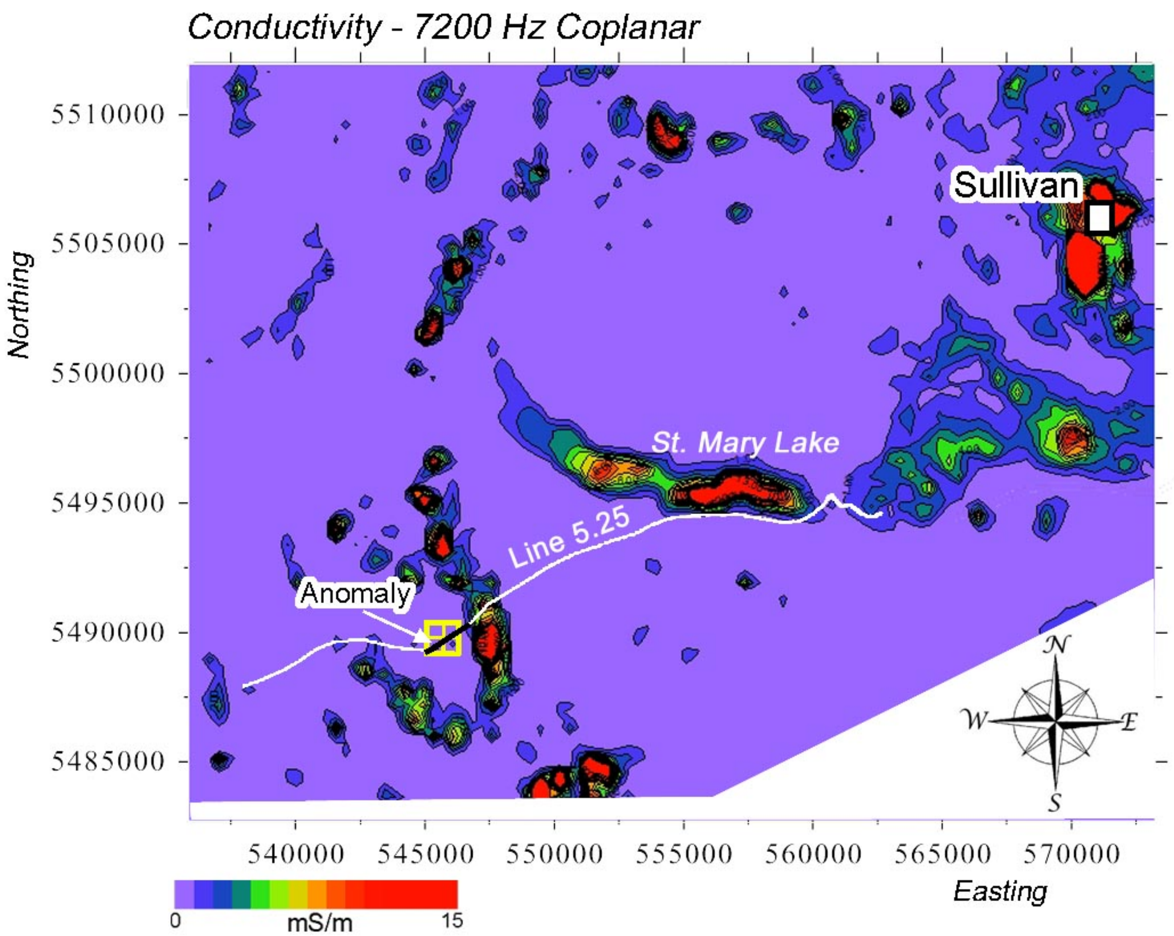

Figure 10. Map of airborne EM (gridded data from McConnell, 1996). The Sullivan deposit produces a strong EM anomaly as do the saturated rocks near St. Mary Lake. Other than these, the EM anomaly near the MB01-16 property is one of the largest anomalies and appears to be part of a more-or-less north-south trend of anomalies that extends almost to the northern limit of the map.

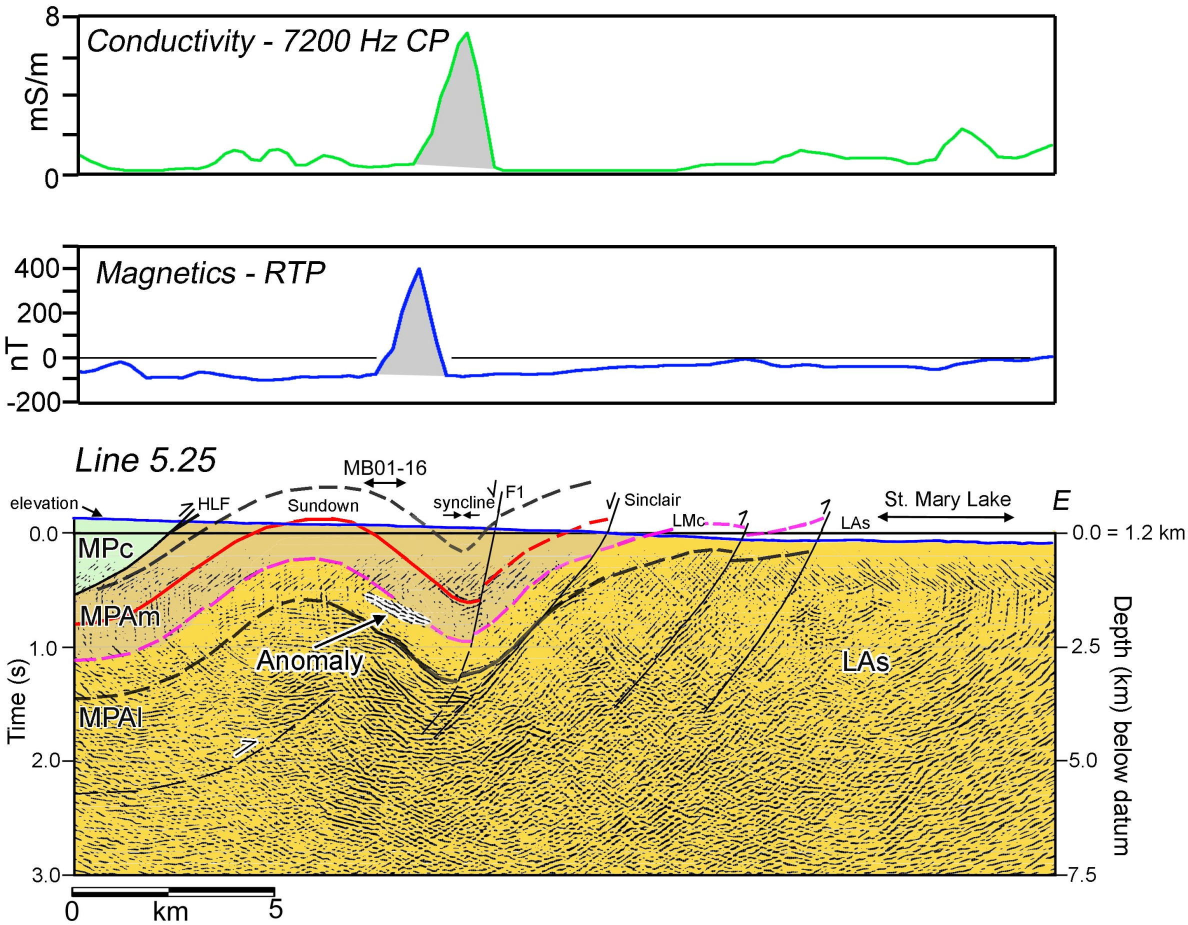

Figure 11. Interpreted seismic line 5.25 with profiles of the magnetic anomalies and conductivity anomalies shown above.

7.3 VLF-EM Survey

7.31 Data Acquisition and Processing

In July, 2016, a reconnaissance VLF-EM profile was acquired across the MB01-16 property (Figure 12). The data were recorded with a Geonics EM-16 instrument that measured signals from two distant transmitters: Seattle Washington (NLK, 24800 Hz) and LaMoure, North Dakota (NML, 25200 Hz). Readings were taken at 25 m station intervals and GPS measurements were made for elevation and horizontal control at 100m intervals. The GPS results were then interpolated to the station locations. The recorded data for the two transmitters are shown in Figure 13.

A key characteristic of the two responses is that, although the curves are similar, they appear to be reversed in polarity relative to one another. This is caused by the orientation of the transmitter relative to the instrument. Accordingly, prior to applying inversion, it is necessary to reverse the signal for the data recorded for the LaMoure, North Dakota (NML) transmitter.

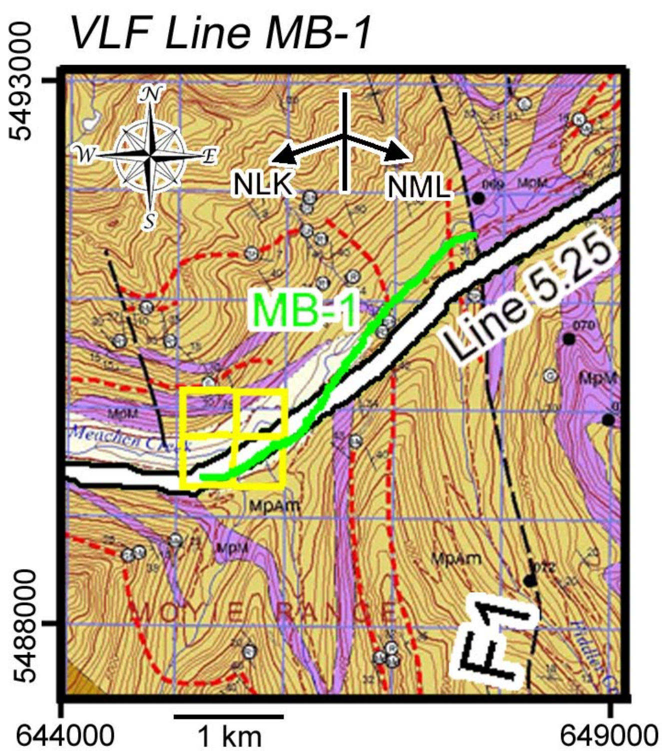

Figure 12. Map of the geology near the MB01-16 property extracted from the map in Figure 2 showing the location of VLF line MB-1. Note that it does not coincide exactly with the seismic line 5.25. The reason for that is that the seismic line is delineated by the locations of depth points, which can be positions slightly off of the road due to road curvature.

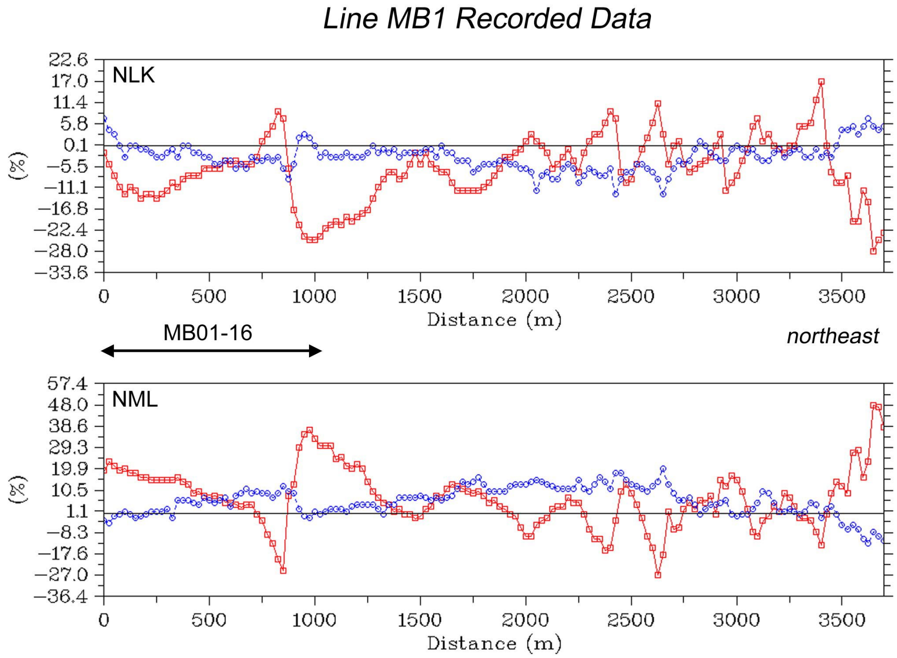

Figure 13. Recorded data for VLF line MB-1; (upper) data from the Seattle transmitter (NLK); (lower) data from the LaMoure, North Dakota transmitter (NML). Red lines are the in-phase components and the blue lines are the quadrature.

Filtering of the data was applied to attenuate noise and accentuate desired signal. Because VLF data are non-stationary and non-linear, the Empirical Mode Decomposition technique has been used (Jeng et al. 2007). In applying this technique, the signal is separated into a series of components (called Intrinsic Mode Functions, or IMFs) which are then recombined with one or more of the IMFs removed if that IMF is considered to be dominated by noise. Figures 14a-14f shows the result of filtering. Figure 14a and 14d are the recorded data for the Seattle (NLK) and North Dakota (NML) transmitters.

In these data the IMFs were recombined without the lowest, or highest frequency, signal. This effectively minimizes the ‘chatter’ within the signal. Figure 14b and 14e show that removal of the lowest order IMF results in a smoothed signal for both the in-phase and quadrature components. The inversion procedure is then applied to the filtered versions of the data and the response for each of the models derived from the inversion are shown in Figures 14c and 14f. In most cases it is preferable that the RMS misfit be near 2% or less and. In these results, the inversion of the NLK data produced and RMS misfit of 1.7%, whereas inversion of the NML data produced a slightly higher RMS value (2.5%).

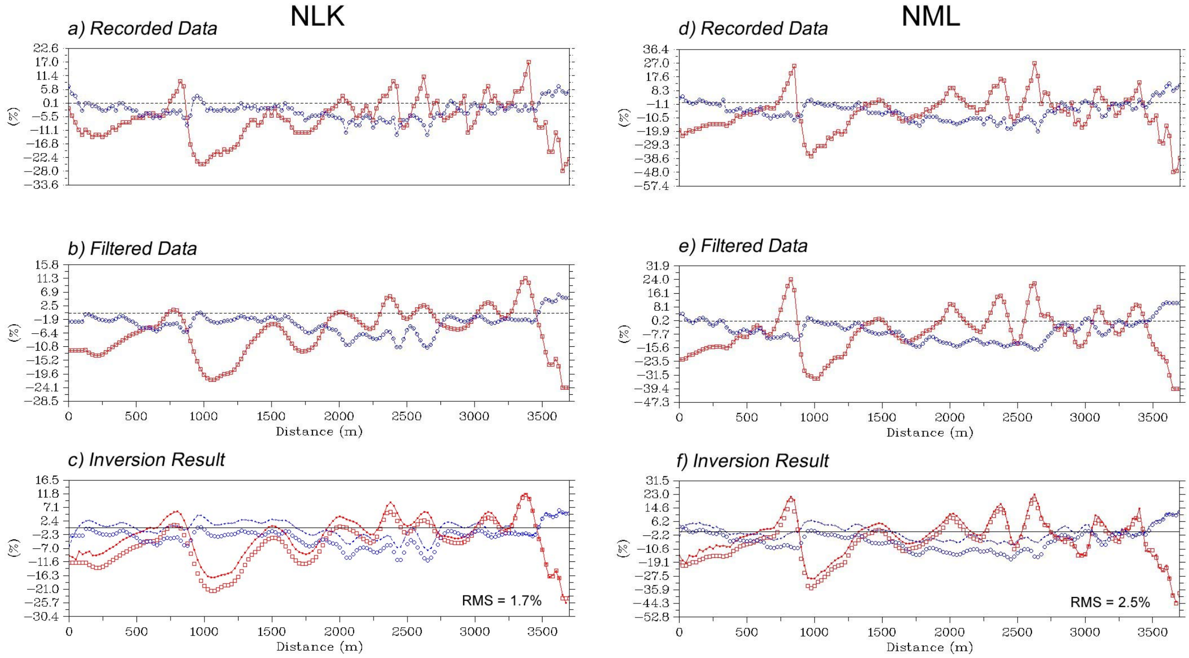

Figure 14. Filter test for the VLF data: a) recorded data from the Seattle (NLK) transmitter; b) Filtered using the EMD approach after removal of high frequency 'chatter'; c) comparison of the calculated response from the inversion (dots) to the filtered data (lines); d) recorded data from NML; e) Filtered using after removal of high frequency 'chatter'; f) comparison of the calculated response from the inversion (dots) to the filtered data (lines).

7.32 Inversion Results

The inversion models for each transmitter are shown in Figure 15. For these results, the inversions were attempted to about 400m depth. This is unusually deep to investigate VLF signals. The depth of signal penetration is usually described by a quantity known as the 'skin depth'. The skin depth is the depth at which the signal drops to a value of 1/e of the signal at the surface. It is dependent on the signal frequency and electrical conductivity of the near-surface rocks. In this area, the near-surface conductivity is typically 1000 Ohm-m or more (Gupta and Jones, 1995), so that for these frequencies (about 25 khz), the skin depth is about 100m. For the inversions presented here, the background resistivity is set at 1000 Ohm-m. However, many parts of the anticlinorium have near-surface conductivities that are much greater, so that signals may be detected from deeper sources. The results of the inversion are contoured in values of conductivity (in milli-Siemens per meter, or mS/m).

The inversions show similar geometry and conductors on each of the transmitter versions. In the east, near the Fiddler Creek fault, a group of apparent conductors are located close to the surface (0-100m depth). These correlate spatially with exposed polymetallic veins (e.g., Magrum and Crowe, 1984; Kennedy, 2007), geochemical anomalies in soils (McCartney, 1993; Ransom, 1997) and large airborne EM anomalies (Figures 9 and 10). Thus, they are likely responses to near-surface metallic concentrations.

To the west, near the center of the profile, inversions from both transmitters indicate a broad, weak conductor at about 200m depth which may represent a downdip continuation of the near-surface conductive zone on the east. The apparent strength of the deep conductors tends to be weak relative to the near-surface conductors. This may be caused by the deep conductors having lower conductivity contrasts with the background, or they may appear weak because the signal decreases with depth. Between about 100 and 1200m there are few apparent conductors, but a conductor appears to be present near 200m depth on the west end of the profile.

Although VLF results can not be expected to provide information as deep as the seismic amplitude anomaly, the presence of near-surface conductors eastward and up dip from the seismic anomaly may be significant.

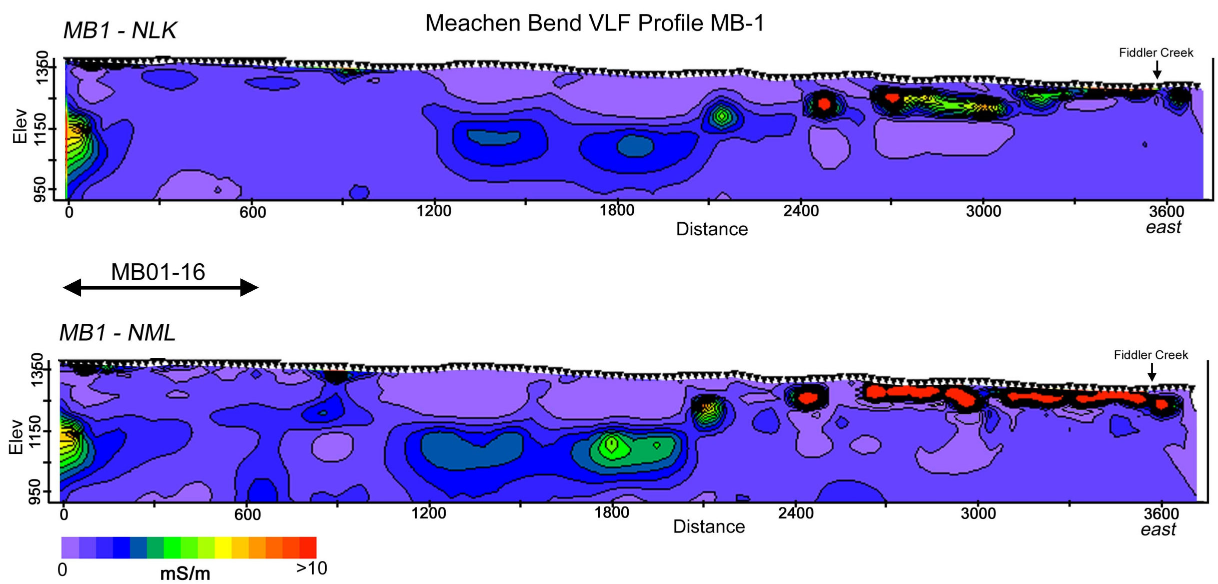

Figure 15. Inversions of the Meachen Bend MB-1 VLF profile for the Seattle, Washington (NLK) transmitter (upper) and the LaMoure, North Dakota (NML) transmitter (lower).

8.0 Summary and Conclusions

Integration of geophysical (seismic reflection, magnetics and EM, both airborne and ground-based VLF, data) with geological data (mapping, rock samples, and soil anomalies) in the Meachen Creek area southwest of Kimberley has led to a number of findings that are relevant to the potential for the area. They are:

1. Reprocessing of the seismic reflection profile has delineated the subsurface structure and stratigraphy in much greater detail than was previously possible;
2. The reprocessing has brought out a seismic amplitude anomaly at the Lower Aldridge – Middle Aldridge contact, the stratigraphic interval in which the Sullivan deposit formed;
3. The seismic amplitude anomaly appears to be spatially related to a strong airborne magnetic anomaly as well as a prominent airborne EM anomaly;
4. A reconnaissance VLF-EM profile indicates that that there are strong conductors in the eastern 1/3 of the line that are spatially associated with exposures of metallic veins, anomalous metal values in soils and a prominent airborne EM anomaly.

9.0 References

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10.0 Statement of Costs

Property:	MB 01-16	
Event #	5632023	
Start - End Date:	Jan 26 – Oct 20, 2016	
Tenure work done on:	1041043	
Type of work done:	Geophysical – Seismic, VLF	
Craig Kennedy	Fieldwork-VLF July 29	
	1 man day @ 500/day	500.00
	1 truck day @ 100/day	100.00
Fred Cook - seismic	Jan 26, 28, Feb 9, 10, Mar 3, 4, Jul 29, Aug 11, 12, Oct 18, 19, 20, 2016	
	11.5 Man days @ 800/day	9,200.00
	Report & Maps	3,500.00
Total		**$ 13,300.00**

Note: The property is partially located on the seismic line and on the VLF line. As noted in the text, the seismic processing concentrated on the west half of line 5.25, and the property is about 1.3 km (about 1/8) of that distance. Thus the data processing for the seismic (January 26, 28, February 9) does not include an additional 20 days that were used for processing and interpretation.

Similarly, only about 1/3 the VLF profile is on the property, so only about 1/3 of the processing and interpretation costs in August-September are included.

11.0 Statement of Qualifications

I, **Frederick A. Cook** do hereby certify that:

I attained the degree of Doctor of Philosophy (Ph.D.) in geophysics from Cornell University in Ithaca, New York in 1981.
I have a B.Sc. in geology (1973) and an MSc. in Geophysics (1975) from the University of Wyoming in Laramie, Wyoming.
I am a registered member of the Association of Professional Engineers and Geoscientists of British Columbia (P. Geo. 2009). Previously, from 1984-2009, I was registered with the Association of Professional Engineers, Geologists and Geophysicists of Alberta as both a P. Geol. and a P. Goph.
I am a member of the American Geophysical Union and the Geological Society of America.
I have worked as a geophysicist/geologist for a total of 40 years since my graduation from university. I have worked for the Continental Oil Company (1975-1977) and the University of Calgary (1982-2010).
I was the Director of the Lithoprobe Seismic Processing Facility at the University of Calgary from 1987-2003.
I have recently (2011) been appointed an International Consultant for the Chinese SinoProbe project.
I have a thorough knowledge of the geology and geophysics of southern British Columbia based on extensive geological and geophysical fieldwork.
I have authored more than 125 scholarly publications in peer-reviewed journals and books.
I am the author of this report.
I am not aware of any material fact or material change with respect to the subject matter of this report, which is not reflected in this report.

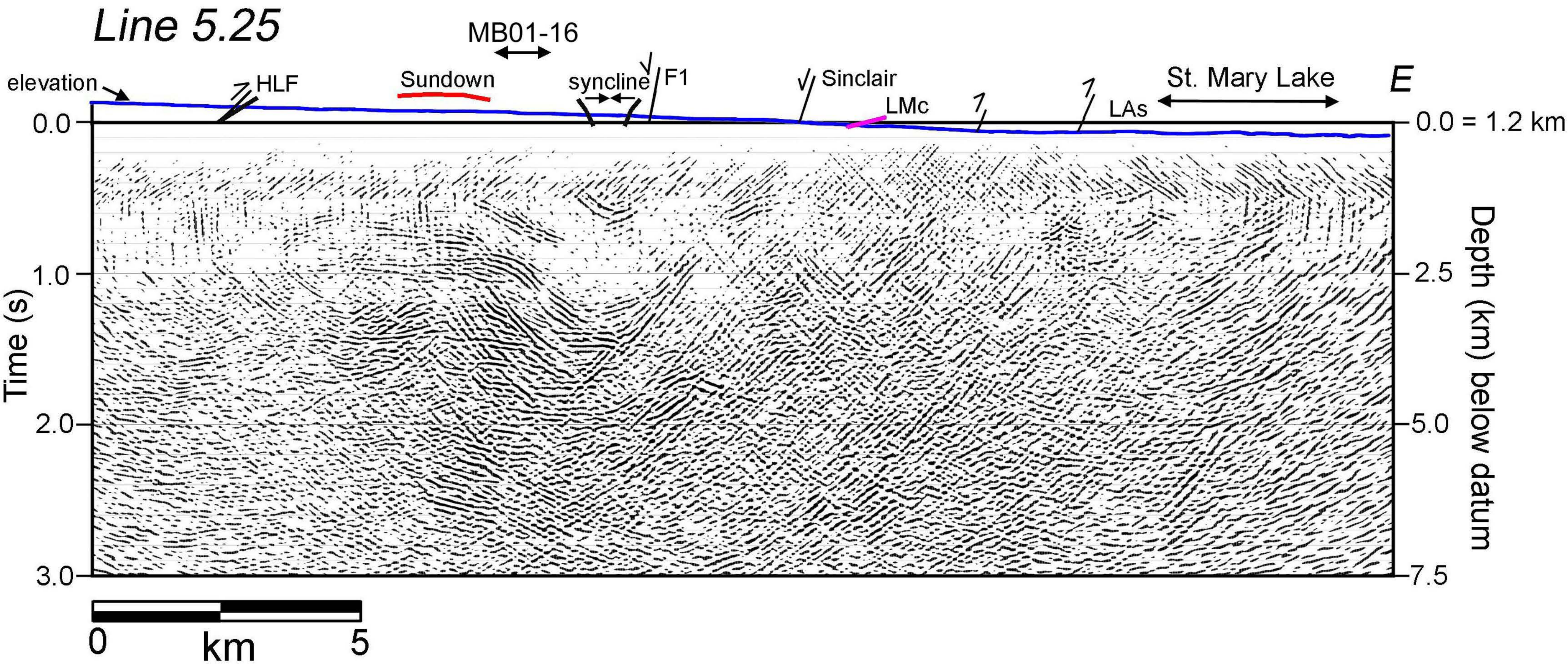
“signed and sealed” at Salt Spring Island, B.C.

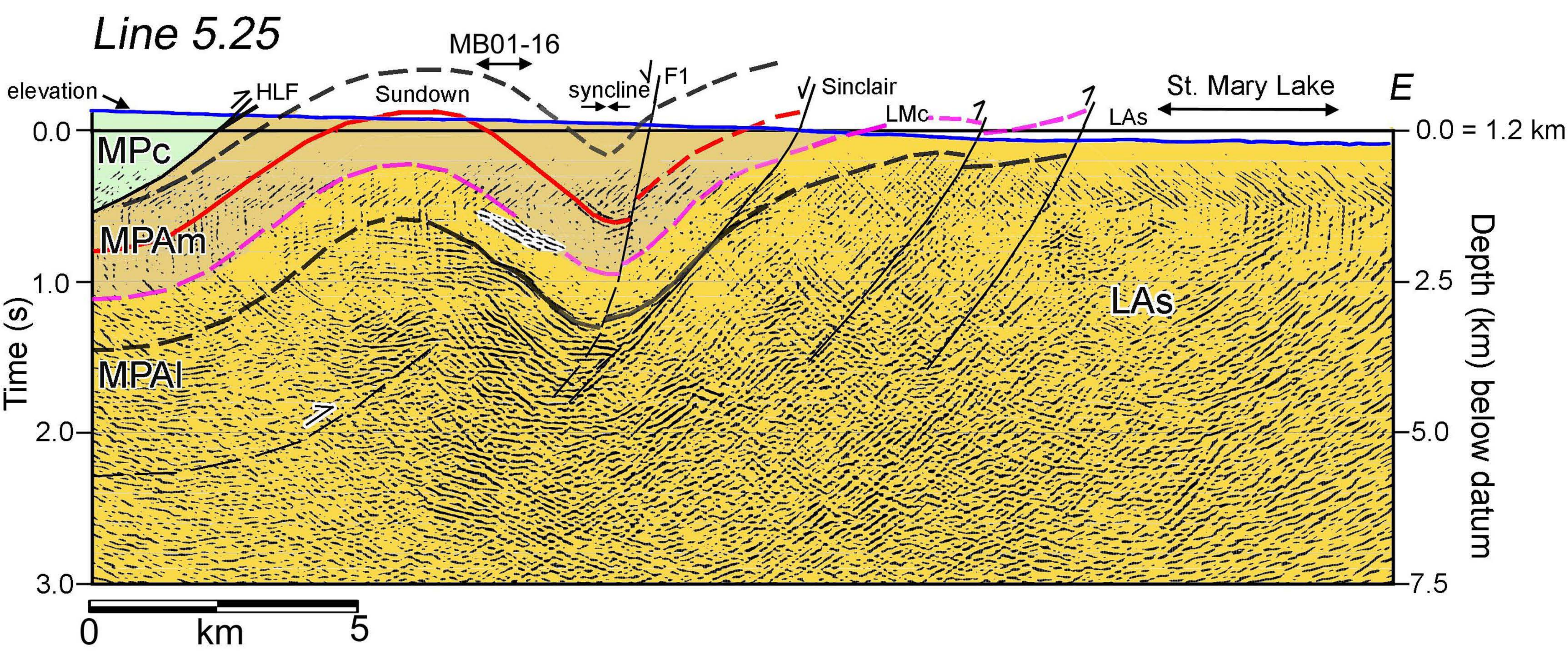
Frederick A. Cook, P. Geo.
Salt Spring Imaging, Ltd
128 Trincomali Heights
Salt Spring Island, B.C. V8K1M8
Dated at Salt Spring Island, B.C. this 21st day of March, 2017

Registration License No. 34585
Association of Professional Engineers and Geoscientists of British Columbia

Appendix 1. Seismic Line 5.25

Scale 1:50000

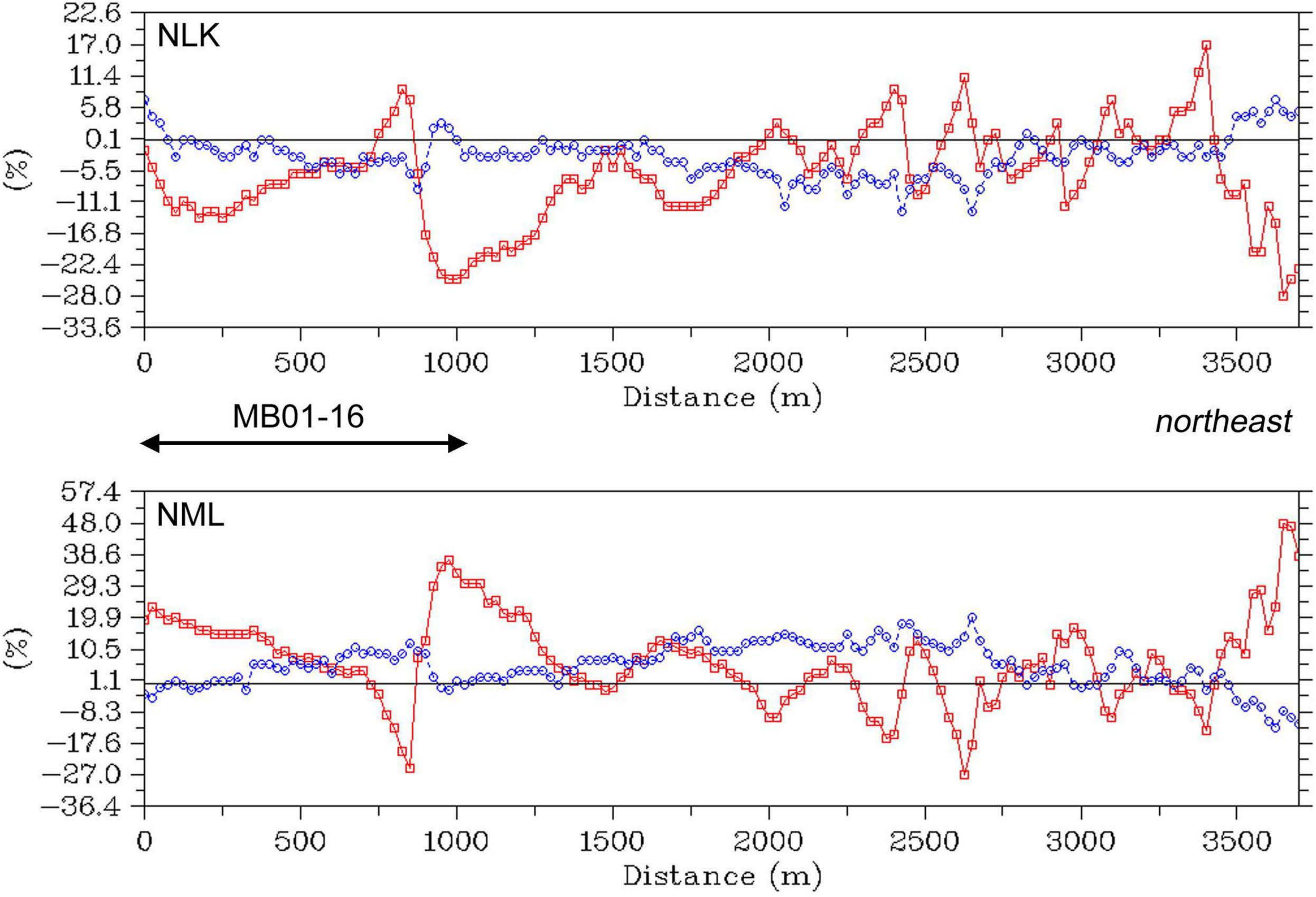

Line 5.25
MB01-16
elevation
HLF
Sundown
syncline
F1
Sinclair
LMc
LAs
St. Mary Lake
E
0.0
1.0
2.0
3.0
Time (s)
0.0 = 1.2 km
2.5
5.0
7.5
Depth (km) below datum
0
km
5


Line 5.25
MB01-16
elevation
HLF
Sundown
syncline
F1
Sinclair
LMc
LAs
St. Mary Lake
E
MPc
MPAm
MPAl
LAs
0.0
1.0
2.0
3.0
Time (s)
0.0 = 1.2 km
2.5
5.0
7.5
Depth (km) below datum
0
km
5

Appendix 2. Recorded VLF Data

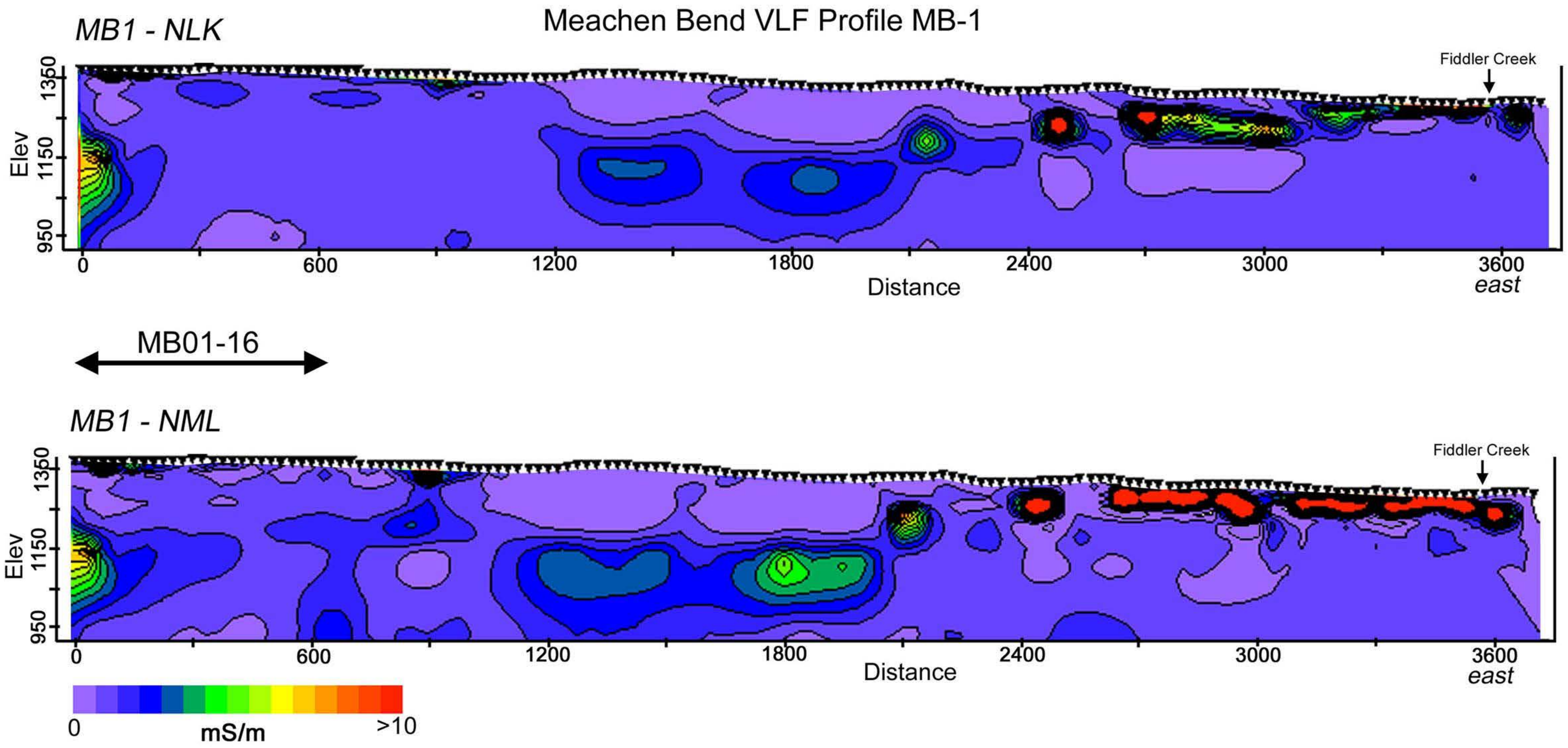
Scale 1:10000

Line MB1 Recorded Data



Appendix 3. VLF Inversions

Scale 1:10000



Meachen Bend VLF Profile MB-1
MB1 - NLK
Fiddler Creek
Elev
1350
1150
950
0
600
1200
1800
2400
3000
3600
east
Distance
MB01-16
MB1 - NML
Fiddler Creek
Elev
1350
1150
950
0
600
1200
1800
2400
3000
3600
east
Distance
0
mS/m
>10