BC Geological Survey Assessment Report 34146

Assessment Report:

Acquisition and Analyses of VLF Geophysical Data:

Silver Fox Property,

Southern British Columbia

MTO events 5446539 & 5458228

North 49° 09' 18"; West 115° 41' 25" UTM Zone 11 595500E, 5445500N NTS map sheet 82G

Fort Steele Mining Division

by

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

and

Brian A. Belton, B.A. Box 2061 Rossland, B.C., V0G 1Y0

For

Property Operator: Kootenay Silver Inc. Suite 1820-1055 W. Hastings St. Vancouver, B.C. V6E 2E8

Property Owners: D. E. Lavoie, J. S. Kennedy 2290 DeWolfe Ave. Kimberley, B.C. V1A1P5

Table of Contents			Page
1.0	Summ	ary	
2.0	Introd	luction	
3.0	Prope	rty Description and Location	5
4.0	Geolo	gical Setting	7
5.0	VLF (Geophysical Data	
	5.1	Data Acquisition	
	5.2	Data Processing	
	5.3	Grid 1	11
	5.4	Grid 2	
	5.5	Grid 3	19
	5.6	Three-dimensional geometry	21
6.0	Interp	retations	
7.0	Conclu	sions	24
8.0	Recom	mendations	24
9.0	Referei	nces	25
10.0	Staten	nent of Costs	
11.0	Staten	nent of Qualifications	27

. <u>Figures</u>

Figure 1.	Digital satellite map with the Silver Fox property indicated	. 4
Figure 2.	Regional geological map in the vicinity of the Silver Fox property	. 5
Figure 3.	Local geological map in the vicinity of the property	8
Figure 4a.	Inversion of data from station NLK	10
Figure 4b.	Inversion of data from station NML	10
Figure 5a.	Topography of Grid 1	11
Figure 5b.	Magnetic anomalies of Grid 1	12
Figure 6a.	Inversion of Lines 5300-5900, Grid 1	13
Figure 6b.	Inversion of Lines 6000-6600, Grid 1	14
Figure 7a.	Topoggraphy of Grid 2	15
Figure 7b.	Magnetic anomalies of Grid 2	15
Figure 8a.	Inversion of Lines 2250-2700, Grid 2	16
Figure 8b.	Inversion of Lines 2750-3300, Grid 2	17
Figure 9a.	Topography of Grid 3	18
Figure 9b.	Magnetic anomalies of Grid 3	19
Figure 10.	Inversion of six profiles of Grid 3	20
Figure 11a	Block diagram of Grid 1 – view to northeast	21
Figure 11b	• Block diagram of Grid 1 – top view	22
Figure 12.	East-West cross section of Grid 1	23
-		

<u>Table</u>

Table 1. Description of Silver Fox property mineral titles.	6
--	---

1.0 Summary

Acquisition and processing of Very Low Frequency (VLF-EM) geophysical data in three grids that are located on the Silver Fox property in southeastern British Columbia has allowed three-dimensional imaging of subsurface electrical conductors to approximately 200 m depth. Grids were recorded in three regions of the property and were processed using two-dimensional finite element inversion. The results from each of the inverted profiles were plotted to provide cross sections of the near-surface conductivity structures. The information from the largest grid was then displayed in a three dimensional representation of key conductivity isosurfaces.

2.0 Introduction

Salt Spring Imaging Ltd. was retained by Kootenay Silver Inc., a British Columbia company, to analyse VLF data on the Silver Fox property on the east flank of the Purcell anticlinorium in southeastern British Columbia (Figure 1). The objective of the work is to evaluate information bearing on the subsurface physical properties in this case the electrical conductivity. The approach has been novel in a number of ways, including application of two-dimensional finite element inversion, and projection into three-dimensional images. This report provides a brief description of the geological setting, a description of the field procedures, data processing and interpretation.

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

Metric units are used throughout the report.



Figure 1. Digital satellite map with the Silver Fox property indicated in yellow.

3.0 Property Description and Location

The Silver Fox Property is a collection of claims that are located in southeastern British Columbia (Figure 1) on the east flank of the Purcell anticlinorium (Figure 2). The approximate geographical limits of the property are the following: (degrees; UTM): North (49° 11' 22"; 5955555); east (118° 25' 33"; 456000); south (49° 00' 00"; 5550000); west (120°22'33"; 460000).

The Silver Fox property comprises thirty eight (38) mineral tenures containing approximately 18063 hectares (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.



Figure 2. Geological map of the Purcell anticlinorium in southeastern British Columbia. The Silver Fox property is shaded and labeled 'SF'. The boxed area is enlarged in Figure 3.

	Tenure Number	Claim Name	Map Number	Orig. Stake Date	Good To Date	Status	Area
1.	515408	SP	082G.022	Jun-27-2005	Jan-11-2014	GOOD	126.5350
2.	519022	KRL	082G.022	Aug-13-2005	Jan-11-2014	GOOD	527.4060
3.	519048	KRL 2	082G.022	Aug-14-2005	Jan-11-2014	GOOD	400.8020
4.	519679	KRL 3	082G.022	Sep-04-2005	Jan-11-2014	GOOD	189.9460
5.	704424	KRL 04-10	082G.022	Jan-23-2010	Jan-11-2014	GOOD	527.5704
6.	704425	KRL 05-10	082G.012/022	Jan-23-2010	Jan-11-2014	GOOD	379.9387
7.	835422	KRL 06-10	082G.012	Oct-08-2010	Jan-11-2014	GOOD	527.935
8.	835423	KRL 07-10	082G.012	Oct-08-2010	Jan-11-2014	GOOD	528.1 525
9.	835424	KRL 08-10	082G.012	Oct-08-2010	Jan-11-2014	GOOD	528.3202
10.	835425	KRL 09-10	082G.012	Oct-08-2010	Jan-11-2014	GOOD	528.4385
11.	835426	KRL 10-10	082G.012/013	Oct-08-2010	Jan-11-2014	GOOD	528.4733
12.	835427	KRL 11-10	082G.012	Oct-08-2010	Jan-11-2014	GOOD	464.8987
13.	835948	KRL 12-10	082G.022	Oct-14-2010	Jan-11-2014	GOOD	527.3183
14.	835949	KRL 13-10	082G.022	Oct-14-2010	Jan-11-2014	GOOD	506.4601
15.	835951	KRL 14-10	082G.012	Oct-14-2010	Jan-11-2014	GOOD	527.8481
16.	835952	KRL 15-10	082G.012	Oct-14-2010	Jan-11-2014	GOOD	507.0073
17.	835953	KRL 16-10	082G.022	Oct-14-2010	Jan-11-2014	GOOD	527.1879
18.	835954	KRL 17-10	082G.022	Oct-14-2010	Jan-11-2014	GOOD	421.6778
19.	835955	KRL 18-10	082G.012	Oct-14-2010	Jan-11-2014	GOOD	524.5569
20.	835956	KRL 19-10	082G.012	Oct-14-2010	Jan-11-2014	GOOD	528.0383
21.	835958	KRL 20-10	082G.013	Oct-14-2010	Jan-11-2014	GOOD	422.7 539
22.	835960	KRL 21-10	082G.022	Oct-14-2010	Jan-11-2014	GOOD	484.9516
23.	836264	KRL 22-10	082G.022	Oct-19-2010	Jan-11-2014	GOOD	526.9818
24.	836265	KRL 23-10	082G.022	Oct-19-2010	Jan-11-2014	GOOD	526.9791
25.	836267	KRL 24-10	082G.012/022	Oct-19-2010	Jan-11-2014	GOOD	527.6424
26.	836268	KRL 25-10	082G.022	Oct-19-2010	Jan-11-2014	GOOD	316.3192
27.	836269	KRL 26-10	082G.002/012	Oct-19-2010	Jan-11-2014	GOOD	528.7888
28.	836270	KRL 27-10	082G.002/012	Oct-19-2010	Jan-11-2014	GOOD	483.4412
29.	836272	KRL 28-10	082G.003/013	Oct-19-2010	Jan-11-2014	GOOD	507.5639
30.	836273	KRL 29-10	082G.002/003	Oct-19-2010	Jan-11-2014	GOOD	528.9604
31.	836275	KRL 30-10	082G.002/003	Oct-19-2010	Jan-11-2014	GOOD	524.2431
32.	836276	KRL 31-10	082G.003	Oct-19-2010	Jan-11-2014	GOOD	529.1933
33.	837422	KRL 100-10	082G.012	Nov-03-2010	Jan-11-2014	GOOD	527.0675
34.	851684	KRL 111-11	082G.022	Арг-13-2011	Jan-11-2014	GOOD	527.3772
35.	898049	KRL 113-11	082G.002/012	Sep-19-2011	Jan-11-2014	GOOD	528.7672
36.	986834	KRL 114-12	082G.022	May-16-2012	Jan-11-2014	GOOD	337.4181
37.	986838	KRL 115-12	082G.022	May-16-2012	Jan-11-2014	GOOD	50 5.999
38.	999062	KRL 116-12	082G.022	Jun-19-2012	Jan-11-2014	GOOD	400.3609

Table 1. Description of Silver Fox property mineral titles.

4.0 Geological Setting

The property is situated on the eastern flank of the Moyie anticline in southeastern British Columbia (Figure 2). The Moyie anticline is the easternmost large anticline in a series of north-plunging structures that together are known as the Purcell anticlinorium. In this region, mineral targets include lead-zinc-silver (SedEx-type), as well as copper and gold (possibly SedEx, or shear-hosted). Regional studies indicate that the area is underlain by as much as 15-20 km of structurally telescoped strata of the Mesoproterozoic Belt-Purcell Supergroup. In the subsurface, these rocks are dominated by the Aldridge Formation with an uncertain stratigraphic thickness; the base of these strata is delineated seismic reflection data as the top of autochthonous North American basement near 15-20 km depth (Cook and van der Velden, 1995).

In the vicinity of the Silver Fox property, the Aldridge and younger strata (including prominent gabbroic sills that were intruded at about 1468 Ma) are disrupted by a series faults (Figure 3); the largest of these appears to be the northeast-striking Teepee creek fault, which is likely a high angle structure. A set of smaller, northwest-striking faults in the vicinity of some of the showings (e.g., the Jake copper showing) may be syndepositional.

The Silver Fox property has a number of mineral showings; the area of the Jake showing is enriched in copper, whereas the Silver Pipe includes a number of base metals. Most of these showings are associated with fracturing and/or faulting, leading to the possibility that there are larger zones of enrichment at depth. Applications of geophysical techniques have the possibility of identifying properties, such as electrical conductivity, that are associated with elevated concentrations of metals. VLF is one such technique and is applied here.



Figure 3. Geological map of the area in the vicinity of the VLF surveys.

5.0 VLF Geophysical Data

5.1 Data Acquisition

Each of the VLF grid data sets was recorded with a GEM Systems GSM-19 magnetometer/VLF in a series of parallel lines. For these grids, the data were recorded in north-south lines, spaced 100 m apart, with a station spacing along each line of 12.5 m. GPS location and elevation readings were made every 100 m, and intervening GPS values were calculated. Total field magnetic data were recorded along with the VLF data. A stationary base station provided a drift correction for each of the magnetometer readings. The GPS, VLF and magnetic data were uploaded as text files for data processing.

5.2 Data Processing

The data were processed in the following manner. First the 100 m GPS measurements were converted to UTM (zone 11) coordinates. UTM values and elevations were then calculated for each of the 12.5 m stations. Following this, the magnetic data were reduced using calculated values of the International Geomagnetic Reference Field (IGRF) for the dates and locations (centre point) of each grid. For the small time range (typically 3-4 days) and small sizes of the grids the values of the IGRF varied by a small amount, typically less than 1.0 nT over each grid, whereas the magnetic anomalies varied by several hundred nT. The magnetic data were then reduced to pole. Results from the elevation and magnetic calculations were plotted with the station locations for quality control and if any errors were found, they were remedied.

The data for each profile were then inverted using a finite element program based on Monteiro-Santos et al. (2006). The program has recently been modified to include elevation variations – a necessary addition for the variable topography in the Purcell Mountains. For each inversion calculation, the background resistivity is assumed to be 1000 ohm-m to be consistent with regional magnetotelluric data and drill hole logs (Cook and Jones, 1995). The results of the inversion were a series of parallel profiles so that it is relatively easy to follow zones of anomalous conductivity from one profile to another.

Data processing methods included examining the Karous-Hjelt transform and taking appropriate action to minimize noise. An example is shown in Figure 4a. Here, the raw in-phase data from Line 6000 (Grid 1) are shown above a Karous-Hjelt transform of the data. Although it appears that there is a concentration of high current density near the centre of section, prominent linear trends in the transformed results are clearly related to noise, so that some filtering is appropriate. Figure 4b illustrates the same data after application of an equivalent mode decomposition filter (Jeng et al, 2007). Here, the high current density zone near the center of the profile is much clearer.

Readings were taken for two VLF stations simultaneously. Typically, the readings were for Seattle (24.8 kHz, NLK) and North Dakota (25.2 kHz, NML). The azimuths for these stations are shown in Figure 2. Although there are some similarities, the large high that is observed on the signal from the Seattle station is not obvious on the

9

results for the data from North Dakota. This is likely due to the strike of the conductive feature being more appropriate for the signal with an azimuth from Seattle.



Figure 4a. Inversion results from Line 5900 (Grid 1) using the data from the Seattle (NLK), Washington VLF station.



Figure 4b. Inversion of data from Line 5900 (Grid 1) for the LaMoure (NML), North Dakota VLF station. Note that, although there is a small high beneath the center of the line, it is not as clear as it is in Figure 4a.

5.3 Grid 1

The layout for Grid 1 is shown in Figure 5a superimposed on the topography calculated from the GPS measurements. Lines 5300 through 6200 were recorded in January, 2013, and, after a preliminary evaluation, it was decided to return and extend the grid to the east, to Line 6600. Magnetic data are shown in Figure 5b. These data have been corrected for an average IGRF value and were then reduced to pole.



Figure 5a. Topography of the Grid 1 area calculated from the GPS measurements. The black dots are the station locations and the numbers along the top of the diagram (e.g., 5300, 6000...) are line numbers for the north-south VLF traverses.





The inversion results from each of the 14 profiles are shown in Figures 6a and 6b. Results for each line were calculated using the procedure of Monteiro-Santos et al (2006) with a background resistivity of 1000 ohm-m. Some of the profiles appeared noisy with high frequency (e.g., station to station) variations, so some smoothing was applied to several of the profiles. Other than near-surface 'chatter', a zone of relatively high conductivity (exceeding 10 mS/m) persists between ~1500 m and ~ 1650 m elevation on most of the profiles east of 5300. Indeed, along almost all of the profiles, the high conductivity zone occurs beneath the crest of the topographic high. Possible causes for the elevated conductivity include fluids (e.g., groundwater) or metals.



Figure 6a. Display of Lines 5300 to 5900 after inversion for the data in Grid 1. The westernmost line (Line 5300) is in the upper left. All of these sections are for data recorded from station NLK (Seattle).



Figure 6b. Display of Lines 6000 to 6600 after inversion for the data in Grid 1. The easternmost line (Line 6600 is in the lower right. All of these sections are for data recorded from station NLK (Seattle).

5.4 Grid 2

Grid 2 was recorded near as showing known as the 'Silver Pipe' (Figure 3). As with Grid 1, the data were recorded with 12.5 m station spacing and 100 m line spacing. However, the line lengths were irregular as indicated on the map of the topography in the area (Figure 7a). Inversion of the data was accomplished in the same way as for Grid1. Smoothing, either by averaging along the line or by empirical mode decomposition, was applied as necessary.



Figure 7a. Topography of the Grid 2 area calculated from the GPS measurements. The black dots are station locations and the numbers at the bottom of the diagram (e.g., 2250, 2700...) are line numbers for the north-south VLF traverses.



Figure 7b. Magnetic data for the Grid 2 area shown in Figure 7a. The data have had the IGRF value removed, and have been reduced to pole, but no smoothing has been applied.



Figure 8a. Display of the ten western profiles after inversion for the data in Grid 2. The westernmost line (Line 2250) is in the upper left. All of these sections are for data recorded from station NLK (Seattle). The scale for the anomalies is shown in Figure 8b.



Figure 8b. Display of the 12 eastern profiles after inversion for the data in Grid 2. The easternmost line (Line 3300) is in the lower right. All of these sections are for data recorded from station NLK (Seattle).

5.5 Grid 3

Grid 3 was acquired in area between the Jake showing and the Silver pipe (Figure 3). Topography (Figure 9a) varies substantially in this grid both along and across the profiles, making the field effort more challenging. Magnetic data are shown in Figure 9b.



Figure 9a. Topography of the Grid 3 area calculated from the GPS measurements. The black dots on this image are the station locations and the line numbers are the last four digits of the easting coordinates (e.g., 42000, 4600).



Figure 9b. Magnetic data for the Grid 3 area shown in Figure 9a. The data have had the IGRF value removed, and have been reduced to pole.

Inversions of the data were accomplished on a line-by-line basis as with the other grids. The data from this grid tended to have significant short wavelength variations that were minimized with some curve smoothing using a running average. The results for the six lines are shown in Figure 10.

The inversions indicate that there are a number of high conductivity zones of varying sizes. In most lines, some of the anomalies appear to be located at or very close



to the surface. In addition, however, a large zone of high conductivity is present on the southern end of most of the lines near 100 m depth.

Figure 10. Display of all six profiles after inversion for the data in Grid 3. The westernmost line (Line 4200) is at the top of the diagram and the easternmost line (Line

4700) is in the lower left. All of these sections are for data recorded from station NLK (Seattle).

5.6 Three-Dimensional Geometry

The systematic regular geometry of Grid 1 is conducive to calculating the geometry in quasi-three dimensions. To accomplish this, the calculated results from each of the profile inversions were added into a 3D volume so that contours of isosurfaces for different values of conductivity could be calculated. The results are considered quasi-3D because the inversion calculations were made for two-dimensional profiles, and the results were then extended into a 3D volume space. A true 3D image would require three-dimensional inversion.



Figure 11a. Quasi-three dimensional view of the results of the inversion for Grid 1. The view is to the northeast. The black lines running N-S are the traverse lines (e.g., numbers 5300, 6000, 6600)



Figure 11b. Quasi-three dimensional view of the results of the inversion for Grid 1. The view is from above.

In both Figures 11a and 11b, two isosurfaces are shown – one for 10 mS/m and one for 25 mS/m. Although there is some north-south elongation in the anomalies (likely caused by the two-dimensionality of the inversion), there is a clear east-west trend in the major anomaly between lines 5700 and 6100. At about line 6100, the anomalous zone appears to dip, or be offset, to the east. This is discussed more below in the interpretations.

6.0 Interpretations

The observations of zones of elevated electrical conductivity in the near subsurface that are in the vicinity of anomalous concentrations of metals at the surface is encouraging. However, as with most remote sensing geophysical techniques, there are several possible interpretations. These zones could have high levels of fluids (particularly saline water), carbon (e.g., graphite, coal), or metals. While it seems unlikely that graphite or coal is the cause of the conductive zones, saline fluids can not be ruled out at this time.

One approach to enhancing the interpretation is to correlate the results presented here to the geological information in the depth domain. Figure 12 is a cross section that is drawn along the west-east (W-E) section line shown in Figure 3. The geological information is projected down dip to the east, and the conductivity information is taken from the 3D calculations used to create the diagrams in Figures 11a and 11b.



Figure 12. Cross section drawn along 5454600N. The geological information is taken from the map in Figure 3, and the conductivity information is taken from the 3D contoured values used to calculate the results in Figure 11. The dotted line is the elevation information taken from the grid survey; the dashed line is the projected elevation to the west of 595300E. Anomalies 1 and 2 are described in the text.

The cross section graphically illustrates that the highest levels of conductivity are concentrated in a subhorizontal zone about 100 m below the surface (labeled '1' on Figure 12). These anomalies are within the Creston strata that contain quartzite layers and, on the surface, the quartzite layers are the zones with the elevated metal values (Hoy et al. 2012). In addition, however, near 596100E, there is a smaller anomaly (labeled '2' on Figure 12) that appears to be offset from zone 1. As there is a fault that projects into the subsurface between anomalies 1 and 2, it is possible that anomaly 2 is a continuation of zone 1, but offset to a deeper level on the east side of the fault.

7.0 Conclusions

Application of the VLF electromagnetic method for mapping subsurface variations of electrical properties in three areas of the Silver Fox property in southeastern British Columbia has produced evidence of significant zones of high electrical conductivity. The data were processed using newly developed inversion and mapping techniques, and the results were combined with 3D graphics to provide some quasi - three-dimensional information of conductivity variations. Although VLF has been a popular geophysical tool for many years, the ability to enhance the results with images of high conductivity zones at depth makes it an attractive tool for reconnaissance exploration.

8.0 Recommendations

As with most geophysical data, the interpretations of the VLF sections are enhanced by detailed knowledge of the geology. For rocks such as these, elevated conductivity may be caused by fluids, carbon (e.g., graphite, coal) or metals. The origin(s) of these conductive zones will not likely be known until tested by drilling.

9.0 References

- Cook, F. A., and Jones, A. G. 1995. Seismic reflections and electrical conductivity: A case of Holmes' curious dog? Geology, 23, 141-144.
- Cook, F. A., and van der Velden, A. G. 1995. Three-dimensional crustal structure of the Purcell anticlinorium in the Cordillera of southwestern Canada. Geological Society of America Bulletin, 107, 642-664.
- Hoy, T., Anderson, D., and Seabrook, M. 2012. Geology of the Silver Fox Property, Purcell Mountains, southeastern British Columbia. British Columbia Minstry of Energy and Mines, Assessment report 32645, 42 pp.
- Jeng, Y., Lin, M. J., Chen, C. S., and Wang, Y. H. 2007. Noise reduction and data recovery for a VLF-EM survey using a non-linear decomposition method. Geophysics, v. 72, 223-235.
- Monteiro Santos, F.A., Mateus, A. Figueiras, J., and Gonçalves, M. A. 2006. Mapping groundwater contamination around a landfill facility using the VLF-EM method a case study. Journal of Applied Geophysics, 60, 115-125.

10.0 Statement of Costs

Event #	5446539	
Start - End Date:	Jan 20 - Mar 29, 2013	
Tenure work done on:	519048, 835948, & 835953	
Type of work done:	Geophysical	
Sean Kennedy VLF/Mag Survey	Jan 21 - Feb 20, 2013 15 Man days @ 350 15 Truck days @ 150	\$ 5,250.00 2,250.00
BA Belton VLF/Mag Survey	Jan 20 - Feb 20, 2013 17.5 Man days @ \$400/day 4 Truck days @ \$100/day	7,000.00 400.00
Travel & L/O Snowmobile Rentals		2,388.87 3,709.00
Fred Cook	Data Interpretation & Analysis Report <i>Total Event# 5446539</i>	11,600.00 2,800.00 \$35,397.87
Event #	5458228	
Start - End Date:	Jun 10 - 12, 2013	
Tenure work done on:	835948	
Turne of works down		
Type of work done:	Geophysical	
Sean Kennedy VLF/Mag Survey	Geophysical Jun 11, 12 2 Man days @ \$350/day 2 Truck days @ \$150/day	\$ 700.00 300.00
Sean Kennedy VLF/Mag Survey BA Belton VLF/Mag Survey	Geophysical Jun 11, 12 2 Man days @ \$350/day 2 Truck days @ \$150/day Jun 10, 11, 12 3 Man days @ \$400/day 2 Truck days @ \$100/day	\$ 700.00 300.00 1,200.00 200.00
Sean Kennedy VLF/Mag Survey BA Belton VLF/Mag Survey Travel & L/O	Geophysical Jun 11, 12 2 Man days @ \$350/day 2 Truck days @ \$150/day Jun 10, 11, 12 3 Man days @ \$400/day 2 Truck days @ \$100/day	\$ 700.00 300.00 1,200.00 200.00 314.00

11.0 Statement of Qualifications

I, Frederick A. Cook do hereby certify that:

- 1) I attained the degree of Doctor of Philosophy (Ph.D.) in geophysics from Cornell University in Ithaca, New York in 1981.
- 2) I have a B.Sc. in geology (1973) and an MSc. in Geophysics (1975) from the University of Wyoming in Laramie, Wyoming.
- 3) 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.
- 4) I am a member of the American Geophysical Union and the Geological Society of America.
- 5) I have worked as a geophysicist/geologist for a total of 36 years since my graduation from university.
- 6) I have worked for the Continental Oil Company (1975-1977) and the University of Calgary (1982-2010).
- 7) I was the Director of the Lithoprobe Seismic Processing Facility at the University of Calgary from 1987-2003.
- 8) I have recently (2011) been appointed an International Consultant for the Chinese SinoProbe project.
- 9) I have a thorough knowledge of the geology of southern British Columbia based on extensive geological and geophysical field work.
- 10) I have authored more than 125 scholarly publications in peer-reviewed journals and books.
- 11) I was retained by Kootenay Silver Inc. to undertake analyses of the geophysical data in the vicinity of the Silver Fox property.
- 12) I am one of the authors of this report.
- 13) 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.
- 13) I have no interest, direct or indirect, in the Silver Fox property.

"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.

Dated at Salt Spring Island, B.C. this 22nd day of July, 2013 Registration License No. 34585 Association of Professional Engineers and Geoscientists of British Columbia I, Brian Alexander Belton, hereby do declare that:

- 1. I graduated with a Bachelor's degree in Geography (Environmental Studies, Resource Management, Regional Development) from the University of Victoria, Victoria, British Columbia in 1996.
- 2. I graduated with a Bachelor of Education degree (Environmental Studies) from the University of British Columbia, Vancouver, British Columbia in 1998.
- 3. I have completed course work in the Geographic Information Systems program (covering GIS Applications I, Cartography and Mapping Fundamentals, Remote Sensing, GIS Professional Development, Multimedia, GPS) at Selkirk College, Castlegar, British Columbia, 2003.
- 4. I have worked in geological exploration and geoscience as an independent consultant and contractor since 2002.
- 5. I was in charge of both running and cutting grid lines for the geophysical survey and conducted the geophysical survey in the field.

Dated this 23rd day of July, 2013

B. A. Belton