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## The Structural Controls of the Kimberley Gold Trend

East Kootenay District, Southeast British Columbia

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Geoscience BC 2015-13  
Digital Data Files

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### *Introduction:*

The Kimberley Gold Trend project (2014-SK06) involved geological mapping and historical data compilation as part of Geoscience BC's Stimulating Exploration in the East Kootenays (SEEK) program. The project was focused in the Purcell Mountains west-southwest of the town of Cranbrook and covered parts of NTS map areas 082F and 082G. The purpose of the project was to identify important structural features that are associated with known gold occurrences and to develop a model for the emplacement of gold within the Kimberley gold trend. A summary of the structural features, and their characteristics, that are believed to be controlling gold mineralization is available on the accompanying Geoscience BC map (GM2015-13-01).

### *Project Objectives:*

The Kimberley gold trend lies within a structural corridor roughly delimited to the northwest and southeast by Proterozoic structures that were reactivated in the Mesozoic, namely the St. Mary's and Moyie faults. Between these, formations of the host Belt-Purcell Supergroup are fractured, folded, altered and mineralized in complex patterns that are not well understood. The purpose of this investigation is to determine:

1. the age of gold mineralization relative to intrusive events and structures;
2. the relationship between gold mineralization and specific fault structures;
3. the potential for certain pre-mineralizing structures to produce either structural traps or conduits for gold mineralization; and
4. categorize the alteration style and mineralogy of structural elements, so they can be readily identified in areas of sparse bedrock.

The program included 40 days of geological mapping, concentrated mainly in three project areas within the Kimberley gold trend. Included in the planned field-mapping days are several days spent touring known gold occurrences outside the mapping areas to compare their characteristics with those of showings in the mapping areas. The field work is augmented by compilation of industry work, including several map programs done by the authors for industry clients between 2011 and 2013. The data from the field program, and the compilation data set, were analyzed to produce the digital geology maps that are included.

## *Methods:*

The 2014 Kimberley Gold Trend project focussed on methods the authors had found to be successful in previous years, and applied those methods to existing gold occurrences and sample locations with anomalous gold content. Many properties were visited at the beginning of the 2014 program in an attempt to determine the potential for success if work was conducted on the property. In most cases, the geological aspects of the property were encouraging, but a combination of degrading road conditions and distance from accommodations limited the project options. The detailed mapping properties selected were the Quartz Mountain, the David, and the Eddy properties.

Standard geological mapping techniques were used over the course of the field program. Detailed descriptions of geological features were entered into a notebook while location data was retrieved and stored on a handheld GPS device. Description information is organized into four categories: lithology, structure, alteration and mineralization. Within each category specific features are described and an attempt is made to quantitatively, or qualitatively, measure features when applicable. For example: veins were described in the mineralization category by mineralogy and composition (quartz (85%), siderite (12%), pyrite(3%)), character (fractures, composite, breccia), widths (<0.5cm to 10cm), and density (very low - very high) as well as keywords for unique features (vuggy, druse, etc). Orientations of planer and linear structural features were measured using a compass and recorded in the notebook. Locations were plotted on 1:2500 scale field map sheets and select information from the detailed description was illustrated at the marked location. This was done for immediate reference in the field which is necessary for identifying structural trends.

The geochemistry portion of the data compilation is sourced primarily from the Ministry of Energy and Mines Assessment Reports available at <http://www.aris.empr.gov.bc.ca>. Locations of sample points, such as rock samples, were obtained by copying the GPS coordinates from a data table within the source report. Where locations were not recorded in a data sheet, coordinates were estimated by digitization of the relevant map in the source report. Assay results were transcribed from assay certificates in the source report and coupled with the location data. The original sample names are preserved in the data compilation for reference, as additional element assay values are available in the source reports.

The data from geological mapping and the compilation were combined to create the map set included in this project (GM2014-13-02 to 04). Map features such as forestry roads and elevation contours were obtained from online public databases such as DataBC and GeoBase. Geological features on the overview map (GM2015-13-01) were adapted from the Höy *et. al.* (1995). The geology maps for each property were created by digitally plotting the mapping data and drawing features using CAD tools. Orientations of major structural features were estimated by obtaining the mean vector of associated structural measurements plotted on a stereonet. Gridding software was used to plot and contour the geochemistry from the data compilation. Grid files from the airborne geophysical data archives were contoured to produce the geophysical maps illustrated on the map sheet.

## *Products Generated:*

### Data Files:

1	Geochemistry	Datasets of soils and rock geochemistry samples with location, assays and analytical methods.	Excel sheet (.xls)
2	Geophysics	Archived data, maps and reports of airborne magnetometer and electromagnetometer surveys.	Geosoft geodatabase (.gdb) Grids (.grd) Maps (.map) Reports (.pdf)
3	Geology	Geological features of the mapping project areas.	Excel sheet (.xls) Shapefiles (.shp) Projection(.prj) Shape index (.shx)

### Map Files:

1	The Kimberly Gold Trend	1:200,000	GM2015-13-01
2	The Quartz Mountain Property	1:10,000	GM2015-13-02
3	The Eddy Property	1:10,000	GM2015-13-03
4	The David Property	1,5,000	GM2015-13-04

### Additional Files:

1	The Kimberly Gold Trend Roundup 2014 poster	<a href="http://www.geosciencebc.com/s/Posters.asp">http://www.geosciencebc.com/s/Posters.asp</a>
2	Minfile occurrence updates: 082FSE108, 082FNE055, 082FSE029, 082FSE065	<a href="http://minfile.gov.bc.ca/searchbasic.aspx">http://minfile.gov.bc.ca/searchbasic.aspx</a>

A presentation on the Structural Controls of the Kimberley Gold Trend was given at Mineral South 2014 in Nelson BC. For information on the data structure of the geochemistry and geology data files please refer to the Appendices of this report. For detailed information on the geophysical surveys, including survey methods and data structure, refer to the included report within each archive. Three geophysical archives are included in the data compilation folder.

## *Acknowledgements:*

The field portion of the program could not have been completed without the assistance of several key individuals. Sean Kennedy and Craig Kennedy provided support by accompanying our team to the properties and indicating both geological and logistical features aiding in the selection of mapping projects. Geological mapping was assisted by Mitchell Baines (a geology student), and Jeremy Seabrook.

The included geophysical archives are privately held data files released by contributing corporations. Klondike Gold Corp. released the archive for the Quartz Mountain property, while PJX Resources Inc. provided the archives for the Zinger and Eddy properties. The combined value of these surveys represents several hundred thousand dollars, months of work investment, and opportunities for future exploration development.

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## Appendix 1 - Soil Geochemistry:

soilgeochemistry.xls

Field	Description	Example
1	ID	14994
2	Master ID	DT29942S114994
3	Property Name	DT
4	ARIS Number	29942
5	Line Number	L100N
6	Station Number	925W
7	UTM Easting (NAD 83)	608305
8	UTM Northing (NAD 83)	5519650
9	Datum	NAD 83
10	Zone	11
11	Au (ppb)	9
12	Lab	
13	Analytical Method	

### Additional assay values:

Field	Description	Field	Description
14	Weight (kg)	33	Ca (%)
15	Mo (ppm)	34	P (%)
16	Cu (ppm)	35	La (ppm)
17	Pb (ppm)	36	Cr (ppm)
18	Zn (ppm)	37	Mg (%)
19	Ag (ppm)	38	Ba (ppm)
20	Ni (ppm)	39	Ti (%)
21	Co (ppm)	40	B (ppm)
22	Mn (ppm)	41	Al (%)
23	Fe (%)	42	Na (%)
24	As (ppm)	43	K (%)
25	U (ppm)	44	W (ppm)
26	Au (ppb)* duplicate of field 9	45	Hg (ppm)
27	Th (ppm)	46	Sc (ppm)
28	Sr (ppm)	47	Tl (ppm)
29	Cd (ppm)	48	S (%)
30	Sb (ppm)	49	Ga (ppm)
31	Bi (ppm)	50	Se (ppm)
32	V (ppm)	51	Te (ppm)
		52	Be (ppm)



## Appendix 2 - Rock Geochemistry:

rockgeochemistry.xls

Field	Description	Example
1	ID	1
2	Master ID	TH33525R100001
3	Property Name	TH
4	ARIS Number	33525
5	Sample Number	MKKG31
6	Sample Description	Mcneil Hanging wall...
7	UTM Easting (NAD 83)	568809
8	UTM Northing (NAD 83)	5464930
9	Datum	NAD 83
10	Zone	11
11	Au (ppb)	39.7
12	Lab	ACME
13	Analytical Method	ICP + AA(Au)

### Additional assay values:

Field	Description	Field	Description
14	Weight (kg)	33	Ca (%)
15	Mo (ppm)	34	P (%)
16	Cu (ppm)	35	La (ppm)
17	Pb (ppm)	36	Cr (ppm)
18	Zn (ppm)	37	Mg (%)
19	Ag (ppm)	38	Ba (ppm)
20	Ni (ppm)	39	Ti (%)
21	Co (ppm)	40	B (ppm)
22	Mn (ppm)	41	Al (%)
23	Fe (%)	42	Na (%)
24	As (ppm)	43	K (%)
25	U (ppm)	44	W (ppm)
26	Au (ppb)* duplicate of field 9	45	Hg (ppm)
27	Th (ppm)	46	Sc (ppm)
28	Sr (ppm)	47	Tl (ppm)
29	Cd (ppm)	48	S (%)
30	Sb (ppm)	49	Ga (ppm)
31	Bi (ppm)	50	Se (ppm)
32	V (ppm)	51	Te (ppm)

### Appendix 3 - Geological Structural Measurements:

#### geosymbols.xls

Field	Description	Example
1	ID	854
2	Master ID	ED20013GS100854
3	Property Name	ED
4	ARIS Number	20013
5	UTM Easting (NAD 83)	564701
6	UTM Northing (NAD 83)	5474762
7	Datum	NAD 83
8	Zone	11
9	Elevation (m)	1827
10	Type	b
11	Strike/Trend	85
12	Dip/Plunge	80

#### *Abbreviations:*

##### Property Name (all data sheets)

ED	Eddy
ZG	Zinger
DT	Dewdney Trail
DV	David
TH	Thea
QM	Quartz Mountain
GR	Gar

##### Type (geosymbols.xls)

b	bedding
bo	overturned bedding
f	foliation
ft	fault
j	joint
fr	fracture
v	vein
d	dike
l	lineation (undifferentiated)
li	intersection lineation
lf	fold hinge lineation
ls	slickenline lineation

##### Lab (soilgeochemistry.xls and rockgeochemistry.xls)

ACME	ACME Analytical Laboratories Ltd.	Now: Bureau Veritas Commodities Canada Ltd.
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Chemex	Chemex Labs Ltd.	Now: ALS Ltd.
Ross	Rosbacher Laboratory Ltd.	Now: Rosbacher Laboratory Ltd.
Loring	Loring Laboratories Ltd.	Now: Loring Laboratories Ltd.
ALS	ALS Ltd.	Now: ALS Ltd.
Echo	Echo Bay Mines Ltd.	Now: Kinross Gold Corp.
BV	Bureau Veritas Commodities Canada Ltd.	Now: Bureau Veritas Commodities Canada Ltd.

Analytical Method (soilgeochemistry.xls and rockgeochemistry.xls)

ICP	Inductively Coupled Plasma
ICP-MS	Inductively Coupled Plasma - Mass Spectrometry
ICP-ES	Inductively Coupled Plasma - Atomic Emission Spectrometry
AA	Atomic Absorption Spectrometry
IG	Assay by ignition (fire assay)