MT COPELAND PROJECT-
GEOCHEMICAL AND PETROLOGY REPORT

COPELAND CREEK, JORDAN RIVER, B.C.

REVELSTOKE MINING DIVISION

FOR
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1.0 SUMMARY

Mineral tenure 501827 (and adjacent tenures 546342, 706490, 706491, 834169, 837784), 'Copeland REE & Mo' are within the Revelstoke Mining Division, located 30 km northwest of Revelstoke at the headwaters of Hiren Creek (Fig. 1 & 2). Access to the property is by helicopter (Selkirk Helicopters Ltd., Westside Road, Revelstoke) or by hiking 11 km up Hiren Creek valley (north side) on the abandon mine access road to the south portal (6,100 ft, 1,859.3 m elevation), built by King Resources in 1968.

Mount Copeland nepheline syenite complex geologically correlates with the west flank of the Frenchman's Cap gneiss dome, which includes REE enriched deposits located along the Perry River/Ratchford Creek and Mount Grace areas. Rare Earth Elements, Yttrium, Niobium & Zirconium bearing mineralization have been recently reported from Mt Copeland. Marble Breccia, West Basin, East Glacier and Glacier Zone East Extension Zones were the focus of 2010 fieldwork, consisting of 34 rock chip, and 72 soil samples (Fig 4 & 8). Soil and rock chip samples were analyzed by lithium borate fusion with ICP-MS finish, and Mo assay (Pioneer Labs, Richmond, BC certificate 2102718). A total of 8 select rock chip samples were re-analyzed by lithium borate fusion with ICP-MS finish ME-MS61 (ALS Chemex Labs, N Vancouver, BC certificate VA10144345). A compilation of geochemical analysis (and assays for Mo), is listed as follows:

rock no	% Mo	ppm Ce	ppm La	ppm Nd	ppm Pr	ppm Sm	ppm Y	ppm Dy	ppm Nb	% Ti	Ppm Zr
10AR-1	**0.63**	165.2	79.7	49	15.1	7.1	31.3	5.7	94.9	0.058	4
10AR-2	0.49	132.1	44.3	36.2	12	4.1	8.2	1.8	74.2	0.094	3
10AR-3	**0.95**	**1855**	**1105**	**531.2**	**165.5**	47.4	113	24.5	**3760**	**0.966**	**979**
10AR-4	**1.33**	297.8	187.3	80.3	26.6	10.4	39.1	7.5	**3450**	**2.587**	19
10AR-5	**0.56**	142.9	79.7	45.1	14.2	6.7	18.6	4	**18500**	**1.396**	11
10AR-9	**0.77**	103.3	51.8	36.2	10.7	6.2	32.3	5.4	**641.9**	**0.771**	5
10AR-10	**1.2**	116.3	66	33.5	11.2	4.7	11.7	2.2	43.9	0.037	16
10AR-11	0.1	396.1	170.1	128.8	39.8	23.1	**101.1**	18.5	84.2	0.287	5
10AR-12	0.01	**1110**	**638**	**241**	92.6	23.2	66.1	12.1	255	0.287	**638**
10AR-14	0.19	35.5	20.1	11.3	3.5	1.7	4.1	0.8	18.2	0.055	1
10AR-15	0.21	96.3	47.4	39.4	10.7	6.3	19.5	3.9	23.8	0.117	8
10AR-19	0.01	**754**	**742.5**	**175.5**	61.2	22	76.5	11.8	**236**	**1.466**	**1865**
10AR-20	0.01	**13100**	**10200**	**17650**	**7700**	**1200**	**623.8**	**284.1**	**527.4**	**2.928**	**6190**
10AR-22	0.01	**18450**	**18200**	**2550**	**1185**	**209.6**	**414.8**	**80.1**	31.4	0.277	136
10AR-23	0.01	**1270**	**1205**	**176.3**	87.1	23.1	**103.8**	16.7	73.5	0.361	484

10AR-24	0.21	183	164.1	37.4	13.3	4.6	23.2	3.7	22.1	0.171	6
10AR-25	0.01	593	**722.3**	99.9	43.3	13.7	**106.9**	17.2	147.1	0.566	219
10AR-26	0.22	**1440**	**1520**	**166.8**	89.2	24.6	**152.4**	20.6	35.3	0.254	95
10AR-27	**0.92**	23.5	15	7.5	2.3	1.3	3.4	0.7	32.1	0.227	6
10AR-28	0.43	191.4	129.7	45.8	15.8	6.7	25.3	4.4	89.6	0.486	12
10AR-30	**3.4**	175.1	99.4	70	20.6	12.6	38.5	8.5	126.8	0.06	7

rock no	width cm	elev m	strike	dip	zone name	comments
10AR-1	100	2056	100	45 S	Glacier Mine	K-spar, kaol, chlorite, trace pyo
10AR-2	120	2053	105	48 S	Glacier Mine	K-spar, kaol, chlorite, trace pyo
10AR-3	60	2046	100	45 S	Glacier Mine	K-spar, kaol, chlorite, trace pyo
10AR-4	100	2076	103	47 S	Glacier Mine	450 cm wide peg-aplite zone
10AR-5	100	2079	100	39 S	East ext, Glacier	K-spar, chlorite
10AR-9	200	2059	114	52 S	East ext, Glacier	K-spar, kaol, chlorite, trace pyo
10AR-10	100	2055	112	50 S	East ext, Glacier	K-spar, kaol, chlorite, trace pyo
10AR-11	52	2032	115	51 S	East ext, Glacier	K-spar, kaol, chlorite, trace pyo
10AR-12	float	1980			Sub-portal	angular float, 1% magnetite
10AR-14	200	1939	140	62 SW	J-5	increased limonite-chlorite with Mos2
10AR-15	20	1977	135	20 S	Sub-portal	3 m north is open cut
10AR-20	18	2270	110	48 S	Glacier East	red-yellow-brown gossan in cliff
10AR-22	70	2170	101	30 S	West Marble Ridge	350 cm wide py-pyo-ank skarn band
10AR-23	180	2169	100	30 S	West Marble Ridge	275 cm wide py-pyo-ank skarn band
10AR-24	280	2181	100	50 S	West Marble Ridge	limonitic aplite-carbonate breccia contact
10AR-25	25	2204	100	34 S	West Marble Ridge	limonitic aplite-carbonate breccia contact
10AR-	30	2218	100	34 S	West Marble	limonitic aplite-carbonate breccia

26				Ridge	contact
10AR-27	25	2212	115 62 S	West Marble Ridge	limonitic aplite-carbonate breccia contact
10AR-28	22	2203	105 63 S	West Basin	K-spar, kaol, chlorite, trace pyo
10AR-30	float	2171		West Basin	K-spar, kaol, chlorite, trace pyo

Petrographic descriptions were done by Vancouver Petrographics Ltd on 3 rock chip samples; COPE10AR-3, 20 & 22 (Appendix C). These 3 samples consist of leucocratic syenite, unknown and syeno-monzonite gneiss host rock (respectively). The REE bearing minerals include:

COPE10AR-3: monazite? (pyrite-green biotite-chlorite-carbonate-phlogopite-sphene-magnetite gangue).

COPE10AR-20: REE oxides? Columbite? Allanite? (iddingsite?-amphibole-carbonate-quartz-plagioclase-sphene gangue).

COPE10AR-22: REE oxides (K-feldspar-plagioclase-pyrrhotite-pyrite-marcasite-limonite-carbonate-sphene gangue).

Mean average values for elements listed, from 72 soil samples geochemically analyzed:

Ce	Dy	Er	La	Nd	Pr	Sm	U	Y	Nb	Ti
519.0 ppm	19.0 ppm	11.0 ppm	389.6 ppm	170.5 ppm	60.0 ppm	29.0 ppm	21.5 ppm	104.7 ppm	323.3 ppm	0.98 %

:

Anomalous REE, Y, Nb, Ti, Zr values in soil samples are widespread. The areas that have the highest concentrations of REE, Y, Nb, Ti, Zr values in soil include Glacier East extension (especially where the soil grid terminates to the east up against the steeper portions of the receding glacier, where COPE10AR-3, 4 & 5 are located), Sub-Portal (La and Ti in soil is elevated, and Ti anomaly extends uphill to Glacier Zone), West Basin/Marble Breccia Ridge (elevated Zr, Ce, La, Nd & Nb in soil where COPE10AR-22 is located) and the East Glacier Zones (the steep cliff area on the east side of the glacier is where COPE10AR-20 is located)

The Marble Breccia Ridge Zone contains 4 positive total field anomalies identified by a magnetometer survey carried out in 2008. These positive total field magnetic anomalies (moderate strength 200-500 nT increase, strong >500 nT increase) are listed as follows:

Easting	Northing	Elevation	Relative strength	Zone Name
397350	5665500	2320 m	Moderate	West Basin
397500	5665350	2340 m	Strong	Marble Bx Ridge
397550	5665350	2335 m	Moderate	Marble Bx Ridge
397650	5665300	2340 m	Strong	Marble Bx Ridge
397600	5665250	2410 m	Moderate	Marble Bx Ridge
397690	5665250	2395 m	Moderate	W Glacier

The magnetometer survey strong anomalies are located in an area of marble with extensive zones of pyrrhotite and/or magnetite/ilmenite replacement mineralization which coincides with elevated REE geochemical analysis of rock chips 10AR-22 to 28 from Marble Bx Ridge.

Anomalous REE (La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu), yttrium (Y), zirconium (Zr), and niobium (Nb) values may be related to granitic intrusions that are associated with molybdenite-pyrite-pyrrhotite-ilmenite-magnetite-chalcopyrite mineralization. Mount Copeland nepheline syenite has high background values of rare earth elements such as Nb, Rb, Nd, Ce, La, and Y (with significant values of Zr, Sr, and Ti). REE bearing minerals monazite-columbite-tantalite (and other complex unidentified minerals) are hosted in marble, calc-silicate, and syenite (pegmatite and aplite phases). REE mineralization at Mt Copeland occurs in a tabular zone (as defined by highly anomalous REE samples COPE10AR-20 & 22) that occur roughly parallel to and approximately 100 meters uphill from the (110 trending, 25-50 degree south dipping), Copeland Glacier Zone Mo deposit (King Res underground workings, 1970-73). This mineral zone appears to be a stratabound (layercake metamorphic rocks), and is laterally extensive, however the distribution of REE minerals in this horizon is poorly understood. There does seem to be a correlation with REE's and magnetite/illmenite/pyrrhotite, and pegmatitic/aplitic phases of the nepheline syenite gneiss.

REE bearing mineralization occurs in the East Glacier Zone (e.g. rock chip sample COPE10AR-20). The East Glacier and Marble Bx Ridge Zones are about 500 meters apart, but they occur on the same stratigraphic horizon and may be part of an extensive REE bearing mineral zone that extends under the glacier. In addition to REE bearing mineralization, a zone of elevated molybdenum and coincident niobium occurs in the east extension of the Copeland underground workings. This area has been targeted for possible extensions of Mo bearing mineralization, but this zone appears to have elevated Mo-Nb-Ti (e.g. rock chip sample COPE10AR-4 & 5). Also, directly adjacent to the underground workings there is a rock chip sample that contains elevated Mo-REE-Nb-Ti (rock chip sample COPE10AR-3).

The geological setting for the Copeland molybdenite-REE occurrence is within concordant bodies of nepheline syenite gneiss that occur adjacent to the calc-silicate gneiss and marble unit. The syenite has locally developed an augen texture with large porphyryblasts of K-feldspar in a fine-grained groundmass. Calc-silicate assemblages contain diopside, garnet and actinolite. Carbonates and carbonatites are re-crystallized to medium and locally coarse-grained granoblastic marbles. Lithologies present are summarized as follows:

PROTEROZOIC (PRE-CAMBRIAN)
8- Syenite Aplite/Syenite Pegmatite: K-feldpsar, kaolinite, sericite, calcite, biotite, fluorite, garnet, sphene, specularite, pyrrhotite, pyrite, molybdenite, ilmenite, chalcopyrite, scheelite, tourmaline, apatite, riebeckite, poikilitic aegirine, zircon, zeolite, cancrinite, and analcite

7- Hangingwall Syenite Gneiss, Nepheline Syenite: K-feldspar, green/brown phlogopite, calcite, chlorite, accessory apatite, zircon, sphene, tourmaline, sphene, apatite, riebeckite, poikilitic aegirine, zircon, fluorite, zeolite, cancrinite and analcite

6- Biotite-Amphibole Marble: weathered and deeply pitted appearance, biotite, hornblende, chlorite, marble (granoblastic), actinolite, diopside

5- Black Biotite Amphibole Gneiss: biotite, hornblende, chlorite, oligoclase, and magnetite

4- Quartzite Gneiss:feldspar, granular, interbedded marble bands, actinolite & diopside

Unit 6 (biotite-amphibole marble) has extremely high soda and potash content, and this is likely attributed to fenitization, caused by peralkaline fluids. These fluids are thought to complex and transport REE, associated with minerals such as apatite, zircon, pyrochlore, allanite, monazite and bastnaesite.

The East Glacier and Marble Breccia Ridge zones do not have Mo & Cu values associated with REE minerals, but the Glacier East Extension and J-5 6,300' zones that are elevated in Mo & Cu values are spatially related to above average REE, yttrium, niobium & titanium values.

In order to complete follow-up exploration work on REE, Y, Nb, Ti, Zr and molybdenum bearing mineral zones, and to a lesser extent tungsten bearing mineralization present on the subject property, a 2 phase fieldwork program is recommended. Phase 1 recommendations include 3,000 feet of core drilling (914.4 m), geological, geophysical and geochemical core and rock chip sampling with a proposed budget of $300,000.00. Contingent on the results of phase 1, a second phase of core drilling, rock sampling and geological/geochemical surveys is recommended. The estimated total budget for phase 2 is $500,000.00. The total recommended core drilling for phase 2 is 5,000 feet (1,524 m). The total recommended expenditures to complete proposed two phase program are about $800,000.00. This recommendation of expenditures is intended as a general guideline for further exploration and is not compliant to National Instrument 43-101.

2.0 INTRODUCTION AND TERMS OF REFERENCE

This report summarizes geological fieldwork carried out on the Copeland claim and evaluates economic mineral potential of REE, Y, Nb, Ti, Zr and molybdenum-tungsten bearing mineral zones as well as nepheline syenite (industrial mineral with numerous commercial applications) situated within the subject property. The purpose of the report is to qualify targets for future exploration/development on the subject property, and compliance with requirements of assessment reports.

This report is partly based on geological fieldwork carried out by the author, who was present on the subject property between August 18-23, 2010. This report is partly based on published and unpublished fieldwork reports carried out by various private sector mining company personnel and public sector government personnel as well as fieldwork carried out by the author on the Copeland claim. Geological and geochemical data compilation has identified numerous areas of interest. Potential exists for the discovery of economic concentrations of REE, Y, Nb, Ti, Zr and molybdenum-tungsten bearing mineralization.

3.0 DISCLAIMER

This report is comprised of a compilation of data based in part on documents and technical reports prepared by various authors. The portions of this report that give information gathered from various authors are referenced. The documents and technical reports from various authors were used to compile the Copeland Molybdenum property history.

4.0 PROPERTY DESCRIPTION AND LOCATION

The Copeland claim group is located about 30 km northwest of Revelstoke.
Details of the claim are listed in the table as follows:

Claim Name	Mining Division	Area	Tenure Number	Issue Date	Expiry Date
No Name	Revelstoke	405.633 Ha	501827	Jan 12, 2005	Oct 16, 2018
Mt Copeland 4	Revelstoke	324.479 Ha	546342	Dec 2, 2006	Dec. 2, 2018
Copeland 2	Revelstoke	142.01 Ha	706490	Feb 17, 2010	Feb. 17, 2017
Copeland 3	Revelstoke	121.68 Ha	706491	Feb 17, 2010	Feb. 17, 2017
Copeland 4	Revelstoke	324.43 Ha	834169	Sept 23, 2010	Sept 23, 2011
Mt Copeland 20	Revelstoke	162.18 Ha	837784	Nov 6, 2010	Nov. 6, 2011
Mt Copeland 5	Revelstoke	223.23 Ha	546342	Nov 24, 2010	Nov 24, 2011

Note- extended expiry date based on filing a statement of qualified assessment work
Note- The last 3 tenures listed were acquired after the work was done and are not part of qualified work reported in this document.

The claims are registered to William E Pfaffenberger (President, Torch River Resources Ltd). The total area of the mineral tenures is approximately 1,703.642 hectares. The claims are 100% owned by Torch River Resources Ltd, with an underlying royalty to original title holders.

The abandon mine access road is in need of repair at approximately 12 creek crossings where

washouts and snow-slides have taken out parts of the roadbed that was constructed in 1969 by King Res Co. To the knowledge of the writer, the pre-existing mining and related exploration activity (published work and unpublished activity) that has occurred on the Copeland property from 1966 to 2007 would not adversely affect exploration and development on the mineral tenures owned by Torch River Resources Ltd.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Access to the property is by helicopter from Revelstoke or by hiking up the abandon road that follows Hiren Creek to the south facing slope of Copeland Ridge.

The Copeland property has cool/cold moderately wet winters and warm relatively dry summers. Total yearly rainfall on the property is estimated at between 35-55 inches (88.9-137.5 cm). At higher elevations of 1,900-2,400 meters (6,232-7,872 ft) above sea level, work could be carried out between June and October. Snowfall, avalanche hazard and cold weather would hamper activity in the winter months.

The primary vegetation is mixed fir-hemlock-cedar-spruce. The landforms are typical alpine terrain of the Selkirk Mountains which contain uplifted, foliated and folded intrusive, meta-sedimentary and meta-volcanic rocks.

6.0 COPELAND PROPERTY HISTORY

During 1964, several claims (Joan and Knox) were staked on the north side of Copeland Ridge in the vicinity of the existing claim. These claims were purchased by King Resources Company from Gulliver Mining and Exploration in January 1965. Additional staking in the area of the existing workings was accomplished during the summer of 1965. In 1966, the "Glacier Zone" was discovered, channel samples were taken, the zone was mapped, and a bulk sample was shipped to Colorado School of Mines Research Foundation for analysis and preliminary metallurgical testing. A short field season did not allow time for further work on the property until 1967 when 6 diamond drill holes were collared on the Glacier Zone. Encouraging drill results led King Resources to initiate an underground operation on the north side only. In 1967, approximately 700 feet of cross-cutting and drifting took place on the north side (Glacier Zone), and Interior Engineering Services Ltd provided a geodetic and astronomic survey of the Glacier Zone. In 1968, King Resources excavated a 6,000 ft (1,828.8 m) adit cross-cut and 600 ft (182.9 m) raise. Access to the site was via an 11 km long road along the north side of Hiren Creek valley and a camp was erected near the south portal.

The following consultants and contractors have prepared various reports and/or worked on certain aspects of the Copeland molybdenum mine: 1) George Wilson – geology, 2) M.C.

Robinson – geology, 3) Interior Engineering Services Ltd. – Surveying, Road, Power, and Water, 4) Colorado School of Mines Research – Ore Beneficiation, 5) Versatile Engineering – General Contractors, 6) Rupert Drilling – Underground drilling contractors, 7) Chapman, Wood, & Griswold Ltd. – General Advisory, 8) E.H. Robinson – Mill Design.

Recorded production from 1970 to 1973 comprised 191,126 tonnes. A total of 169,729 tonnes of ore was milled produced 1,190,713 kilograms (2,622,715 pounds) of molybdenum (source: MINFILE).

In 1996, Discovery Consultants staked the Copeland claim and completed a program of whole rock sampling of the nepheline syenite body located south of the molybdenite occurrence. A total of 8 different sites were sampled and results indicated that sampling of nepheline syenite and nepheline syenite gneiss on the property shows that several samples fall within the range of commercial deposits exploited for the use as an industrial mineral and recommended detailed mapping and sampling on the property to define the grade and assess the extent of high-purity grade nepheline syenite on the Copeland claim.

In 2008, Torch R Res Ltd carried out diamond drilling (see section 11), and soil geochemical analysis and magnetometer geophysics. Soil geochemistry identified a 150 X 100 m area which averaged 673.4 Mo in soil located near the old workings. This Mo in soil anomaly extends east of the adit and suggests there are extensions of the old workings to the east. Also, a new Mo in soil zone was identified in the West Basin where 3 samples returned anomalous Mo (average value 190.1 ppm Mo). The West Basin Zone is located 450-550 m west of the adit. Additional anomalous Mo in soil (501 ppm Mo) was detected directly below the Sub-Portal Zone (located 100 m NE of adit), and can be considered an additional target for future exploration.

In 2008, Torch R Res magnetometer surveys were carried out on E-W surveyed tie lines. A well defined 1000-2000 nT (high intensity) positive total field anomaly (about 300 m in length) was identified. This magnetometer anomaly is associated with the marble bands located in the Marble Breccia Ridge Zone. This positive magnetometer anomaly suggests the presence of massive magnetite (and/or pyrrhotite) and related skarn type mineralization. There are some old trenches in this area, but a reconnaissance soil geochemical analysis of this area in 2005 resulted in little or no anomalous Mo values (Note-REE, Y, Nb, Th was not analyzed).

The Marble Breccia Ridge Zone contains 4 positive total field anomalies identified by a magnetometer survey carried out in 2008. These positive total field magnetic anomalies (moderate strength 200-500 nT increase, strong >500 nT increase) are listed as follows:

Easting	Northing	Elevation	Relative strength	Zone Name
397350	5665500	2320 m	Moderate	West Basin
397500	5665350	2340 m	Strong	Marble Bx Ridge
397550	5665350	2335 m	Moderate	Marble Bx Ridge
397650	5665300	2340 m	Strong	Marble Bx Ridge
397600	5665250	2410 m	Moderate	Marble Bx Ridge
397690	5665250	2395 m	Moderate	W Glacier

The magnetometer survey strong anomalies are located in an area of marble with extensive zones of pyrrhotite and/or magnetite/ilmenite replacement mineralization which coincides with elevated REE geochemical analysis of rock chips taken in 2010 for Torch R Resources (COPE10AR-22 to 26 are from Marble Bx Ridge). These geophysical anomalies represent potential for buried sulphide/oxide REE bearing mineralization and are high priority follow-up drill targets.

7.0 GEOLOGICAL SETTING

The Copeland claim lies within the Shuswap Metamorphic Complex, a narrow belt of high grade (amphibolite-granulite facies) metamorphic rocks flanked to the north and south by the Aphebian (i.e. Canadian, Proterozoic orogeny) 'Frenchman's Cap' gneiss dome. This 'migmatitic core gneiss' is considered to be the center of the Shuswap Metamorphic Complex with fringes containing meta-sedimentary and meta-volcanic rocks that are intruded by syenite (pegmatite/aplite phases present suggesting >10 km depth of burial), and subsequently folded and displaced by at least 3 different phases of deformation. The metasedimentary rocks comprise a series of rock units comprised of biotite schist, grey schist, white quartzite, calc-silicate gneiss, marble and grey gneiss. Concordant bodies of nepheline syenite gneiss occur within the calc-silicate gneiss and marble unit. The margins of the syenite bodies are nepheline-free, which may be the result of reaction with enclosing rocks. Amphibolite grade metamorphism occurring on a regional scale at the margins of the Frenchman's Cap gneiss dome has produced sillimanite-kyanite, sillimanite, and sillimanite-potassic feldspar bearing assemblages in pelitic rocks. Calc-silicate assemblages contain diopside, garnet & actinolite. Carbonates are re-crystallized to medium and locally coarse-grained granoblastic marbles.

The following lithologies (distinct rock units) are present on the Copeland claim:
PROTEROZOIC (PRE-CAMBRIAN)
8- Syenite Aplite/Syenite Pegmatite: K-feldpsar, kaolinite, sericite, calcite, biotite, pyrrhotite, pyrite, molybdenite, ilmenite, chalcopyrite, scheelite
7- Hangingwall Syenite Gneiss, Nepheline Syenite: microcline/oligoclase, green/brown mica, chlorite, accessory apatite, zircon, & sphene
6- Biotite-Amphibole Marble: weathered and deeply pitted appearance, biotite, hornblende, chlorite, marble, actinolite, diopside
5- Black Biotite Amphibole Gneiss: schistose, biotite, hornblende, chlorite, oligoclase, magnetite
4- Quartzite Gneiss: massive feldspar, granular texture, interbedded marble bands with actinolite and diopside
3- Footwall Schist: massive biotite, minor feldspar, chlorite
2- Footwall Syenite Gneiss: brown weathering, microcline/oligoclase, green/brown mica, chlorite
1- Green Diopside Gneiss: 50% feldspar, 10-35% biotite, 2-10% green diopside,

The 8 listed and physically distinct rock units have been subjected to 3 phases of deformation. The oldest folds are recumbent and isoclinal with deformed axial surfaces and shallow easterly

or westerly plunging axes. Second phase of folds have overturned axial surfaces which dip steeply to the southwest and south. A broad curvature of foliation around the southwest portion of the Glacier Zone is referred to as a phase 3 fold.
Lenses of syenite pegmatite or syenite aplite are common along the northern border of the nepheline syenite unit, and because of their concentrations of molybdenum, are the main focus of economic interest. Characteristically, the syenite aplite/pegmatite is parallel with foliation, but locally they cross it. Massive disseminated molybdenite occurs randomly in the aplite and pegmatite lenses, and to a lesser extent in calc-silcate gneisses adjacent to the syenite-gneiss contact. During the life of the Copeland moly mine, almost all the production was from the aplite-pegmatite bodies within the syenite gneisses; more specifically the Glacier Zone, which is 1-10 meters thick and exposed for 121 meters along strike. The Glacier Zone occurs in a digitation of either a fold limb or a sill of syenite gneiss in the calc-silcate gneiss unit. In these digitations, the syenite gneiss appears to be free of nepheline.

8.0 DEPOSIT TYPES

The 6950 Glacier Zone (2030-2075 m elevation) consists of vein/replacement molybdenite mineralization that is hosted in metamorphosed soda syenite. Sulphide mineralization is associated with late-stage differentiates including sugary textured aplite and very coarse-grained microcline megacrysts (pegmatite). In addition to aplite/pegmatite veins, zones of pyrite-pyrrhotite-magnetite mineralization are associated with abundant calcite and inter-layered marble suggesting this deposit type can also be classified as a metamorphosed skarn.

In the 7000 Glacier West Zone (2120-2160 m elevation), calcite (marble) occurs as 1-5 cm wide lenses, streaks, granoblasts, and massive 5-15 m wide layers. The calcite is present in small amounts and locally prominent in the syenite gneiss. The distribution of calcite-diopside-epidote in the syenite/gneiss contact zone suggests a skarn fluid metasomatic process of mineral emplacement (i.e. calcic skarn mineralization); however the environment of formation i.e. replacement ‘exoskarn’ versus within intrusion ‘endoskarn’ or replacing earlier skarn alteration ‘retrograde skarn’ is still in question. The 7000 Glacier West Zone is the location of a 1000-2000 nT positive magnetometer anomaly, suggesting the presence of massive magnetite and/or pyrrhotite associated with this marble band.

Mount Copeland nepheline syenite complex geologically correlates with the west flank of the Frenchman’s Cap gneiss dome, which includes REE enriched deposits located along the Perry River/Ratchford Creek and Mount Grace areas. The Glacier Zone geochemical survey indicates there is anomalous Nb and Ce near the adit and may be related to granitic intrusions that are associated with molybdenite-pyrite-ilmenite-magnetite-chalcopyrite mineralization Mount Copeland nepheline syenite has high background values of rare earth elements such as Nb, Rb, Nd, Ce, La, and Y (with significant values of Zr, Sr, and Ti). REE bearing minerals monazite-columbite-tantalite (and other complex unidentified minerals) are hosted in marble, calc-silicate, and syenite (pegmatite and aplite phases). REE mineralization occurs in a tabular zone roughly parallel to and approximately 100 meters uphill from the (110 trending, 25-50 degree south dipping), Copeland Glacier Zone Mo deposit (King Res underground workings, 1970-73)

9.0 MINERALIZATION

In the syenite gneisses, feldspars are clouded by kaolinite alteration or stained pink by sericite-calcite alteration. Biotite is locally chloritized. The pegmatite-aplite zones are similarly altered. Epidote and chlorite coat late-stage fractures in the rocks. Veinlets commonly consist of calcite, potassium feldspar or rarely, quartz. Minor constituents of the syenite gneiss include zircon, sphene, apatite, magnetite and minor fluorite, pyrite, pyrrhotite, magnetite, ilmenite, molybdenite, & chalcopyrite. Lenses of molybdenite-bearing syenite aplite and syenite pegmatite have been folded into tightly compressed, overturned (phase 2) folds plunging 15 degrees southeast. The axial surfaces dip at moderate angles to the south. The contacts between aplite, pegmatite, and/or syenite gneiss may be either sharp or gradational. Pegmatite and aplite have similar mineralogies. Both are leucocratic relative to the enclosing gneisses but both have mafic-rich folia and lenses. Potassium feldspar is the dominant mineral. Locally, the pegmatite matrix consists of masses of calcite that contain clusters of biotite, pyrrhotite, pyrite, ilmenite. Minor amounts of zircon are present; quartz is rare but occurs interstitially or as vug fillings. The iron oxide minerals magnetite and ilmenite are common, locally forming equant grains and blebs to 2 cm across. Sulphide minerals present include pyrite, pyrrhotite, molybdenite, and rare chalcopyrite. The sulphide mineral trends (including the 6950 Glacier, 7000 Glacier West, 6420 Pegmatite, 6400 Quartz-Gneiss, 6,300 J-5, 6650 East Basin) are all roughly sub-parallel, and trend at 110 degrees, dipping 30-70 degrees to the south.

Molybdenite has a number of habits; it may be disseminated, form clumps and rosettes of crystals along hairline cracks, fill vugs, or occur as intergrowths in calcite, sericite, and/or potassium feldspar. Large crystals of molybdenite contain inclusions of potassium feldspar, calcite and zircon. Molybdenite also occurs in potassium feldspar crystals, and commonly concentrated around potassium megacrysts in the syenite pegmatites as well as aplitic texture syenite. Pyrite and pyrrhotite are distributed as disseminations, fracture fillings and vug infillings adjacent to molybdenite mineralization. Molybdenite mineralization in rock chip samples COPE10AR-3, 4 & 5 contains significant Nb values:

rock no	% Mo	ppm Ce	ppm La	ppm Nd	ppm Pr	ppm Sm	ppm Y	ppm Dy	ppm Nb	% Ti	Ppm Zr
10AR-3	**0.95**	**1855**	**1105**	**531.2**	**165.5**	47.4	113	24.5	**3760**	**0.966**	**979**
10AR-4	**1.33**	297.8	187.3	80.3	26.6	10.4	39.1	7.5	**3450**	**2.587**	19
10AR-5	**0.56**	142.9	79.7	45.1	14.2	6.7	18.6	4	**18500**	**1.396**	11

Elevated REE, Y, Nb, Ti and Zr geochemical values are associated with mineralized pegmatitic, aplitic, and breccia textured nepheline syenite gneiss. Petrographic descriptions were done by Vancouver Petrographics Ltd on 3 rock chip samples; COPE10AR-3, 20 & 22, that contained the highest REE values (Appendix C). These 3 rock chip samples consist of leucocratic syenite, unknown and syeno-monzonite gneiss host rock (respectively). The REE bearing minerals include: COPE10AR-3: monazite? (pyrite-green biotite-chlorite-carbonate-phlogopite-sphene-magnetite gangue).
COPE10AR-20: REE oxides? Columbite? Allanite? (iddingsite?-amphibole-carbonate-quartz-plagioclase-sphene gangue). COPE10AR-22: REE oxides (K-feldspar-plagioclase-pyrrhotite-pyrite-marcasite-limonite-carbonate-sphene gangue).

10.0 DRILLING (HISTORIC AND RECENT)

Eight diamond drill holes were located in the area of the 6950 Glacier Zone by King Resources Company in 1970. These drill holes intersected significant Mo values as indicated below:

DDH No. (year drilled, s-surface	DIP	AZIMUTH	END OF HOLE m. (ft.)	FROM m. (ft.)	TO m. (ft.)	INTERVAL m. (ft.)	% Mo
S701 (s-1970)	-80	0	30.17 (99)	7.32 (24)	21.64 (71)	14.32 (47)	0.14
S702 (s-1970)	-80	75	36.88 (121)	23.16 (76)	27.13 (89)	3.96 (13)	0.095
S703 (s-1970)	-45	15	42.06 (138)	16.46 (54)	19.51 (64)	3.05 (10)	0.15
S704 (s-1970)	-80	315	38.71 (127)	21.34 (70)	35.05 (115)	13.72 (45)	0.218
S705 (s-1970)	-70	15	36.58 (120)	17.37 (57)	23.32 (76.5)	5.94 (19.5)	0.083
S706 (s-1970)	-80	15	57.61 (189)	26.82 (88)	36.88 (121)	10.06 (33)	0.235
S707 (s-1970)	-65	35	50.29 (165)	31.39 (103)	35.97 (118)	4.57 (15)	0.187
S708 (s-1970)	-45	320	63.40 (208)	58.52 (192)	61.11 (200.5)	2.59 (8.5)	0.454

Source- King Resources 1970 diamond drill core sampling data, BC Ministry of Energy & Mines, Property File

Torch River Resources Ltd completed a program of diamond drilling, geological, geochemical and geophysical fieldwork on mineral tenure 501827 during August and September, 2008. Fieldwork consisted of 2,212.8 m (7,258 ft) of NQTW core drilling, 2.8 km grid lines for magnetometer survey, and a total of 53 soil (talus fines) samples were collected. Diamond drilling carried out on 2008 identified several new molybdenite bearing mineral zones located in the East Basin and West Glacier Zones.
Highlights of geochemical analysis from the East Basin and Glacier West Zones are summarized from diamond drill hole data in the following table:

DDH No.	Zone Name	FROM (m)	TO (m)	WIDTH (m)	Sample ID No.	% Mo
COP08-2	Glacier W	37.39	39.53	2.14	071	**0.068**
COP08-4	Glacier W	38.7	39.1	0.4	173	**0.061**
COP08-8	East Basin	116.8	117.2	0.4	414	**0.137**
COP08-8	East Basin	127.6	128	0.4	424	**0.086**
COP08-8	East Basin	161.55	161.85	0.3	446	**0.416**
COP08-9	East Basin	151.3	154	2.7	519, 520,	**0.214**

					521	
COP08-9	East Basin	152.4	153.1	0.7	520	**0.527**

Previous drilling has focused on the molybdenum bearing aplitic phases nepheline syenite complex. The new area of attention is the marble ridge (pyrrhotite-magnetite) breccia zone (rock chip samples COPE10AR-22 to 26), located approximately 100 meters uphill from the Glacier Mo zone. The area represents a significant REE, Y, Nb, Ti, Zr bearing mineral potential, and the east and west extension of this mineral trend are high priority diamond drill targets.

11.0 FIELDWORK RESULTS, AUGUST, 2010

11.1 ROCK GEOCHEMISTRY SURVEY (2010)

1) Rock chip sampling- A total of 34 rock chip samples were taken on the Glacier, East Glacier and West Basin mineral zones (Fig. 4-7). The samples were collected from outcrop exposures of 18-250 cm in length. .

Significant Mo, REE, Y, Nb, Ti & Zr (2010 Rock Chip Samples)

rock no	% Mo	ppm Ce	ppm La	ppm Nd	ppm Pr	ppm Sm	ppm Y	ppm Dy	ppm Nb	% Ti	Ppm Zr
10AR-1	**0.63**	165.2	79.7	49	15.1	7.1	31.3	5.7	94.9	0.058	4
10AR-2	0.49	132.1	44.3	36.2	12	4.1	8.2	1.8	74.2	0.094	3
10AR-3	**0.95**	**1855**	**1105**	**531.2**	**165.5**	47.4	113	24.5	**3760**	**0.966**	**979**
10AR-4	**1.33**	297.8	187.3	80.3	26.6	10.4	39.1	7.5	**3450**	**2.587**	19
10AR-5	**0.56**	142.9	79.7	45.1	14.2	6.7	18.6	4	**18500**	**1.396**	11
10AR-9	**0.77**	103.3	51.8	36.2	10.7	6.2	32.3	5.4	**641.9**	**0.771**	5
10AR-10	**1.2**	116.3	66	33.5	11.2	4.7	11.7	2.2	43.9	0.037	16
10AR-11	0.1	396.1	170.1	128.8	39.8	23.1	**101.1**	18.5	84.2	0.287	5
10AR-12	0.01	**1110**	**638**	**241**	92.6	23.2	66.1	12.1	255	0.287	**638**
10AR-14	0.19	35.5	20.1	11.3	3.5	1.7	4.1	0.8	18.2	0.055	1
10AR-15	0.21	96.3	47.4	39.4	10.7	6.3	19.5	3.9	23.8	0.117	8
10AR-19	0.01	**754**	**742.5**	**175.5**	61.2	22	76.5	11.8	**236**	**1.466**	**1865**
10AR-20	0.01	**13100**	**10200**	**17650**	**7700**	**1200**	**623.8**	**284.1**	**527.4**	**2.928**	**6190**
10AR-22	0.01	**18450**	**18200**	**2550**	**1185**	**209.6**	**414.8**	**80.1**	31.4	0.277	136
10AR-23	0.01	**1270**	**1205**	**176.3**	87.1	23.1	**103.8**	16.7	73.5	0.361	484
10AR-24	0.21	183	164.1	37.4	13.3	4.6	23.2	3.7	22.1	0.171	6

10AR-25	0.01	593	**722.3**	99.9	43.3	13.7	**106.9**	17.2	147.1	0.566	219
10AR-26	0.22	**1440**	**1520**	**166.8**	89.2	24.6	**152.4**	20.6	35.3	0.254	95
10AR-27	**0.92**	23.5	15	7.5	2.3	1.3	3.4	0.7	32.1	0.227	6
10AR-28	0.43	191.4	129.7	45.8	15.8	6.7	25.3	4.4	89.6	0.486	12
10AR-30	**3.4**	175.1	99.4	70	20.6	12.6	38.5	8.5	126.8	0.06	7

2010 Rock Chip Sample Descriptions

rock no	width cm	elev m	strike	dip	zone name	comments
10AR-1	100	2056	100	45 S	Glacier Mine	K-spar, kaol, chlorite, trace pyo
10AR-2	120	2053	105	48 S	Glacier Mine	K-spar, kaol, chlorite, trace pyo
10AR-3	60	2046	100	45 S	Glacier Mine	K-spar, kaol, chlorite, trace pyo
10AR-4	100	2076	103	47 S	Glacier Mine	450 cm wide peg-aplite zone
10AR-5	100	2079	100	39 S	East ext, Glacier	K-spar, chlorite
10AR-9	200	2059	114	52 S	East ext, Glacier	K-spar, kaol, chlorite, trace pyo
10AR-10	100	2055	112	50 S	East ext, Glacier	K-spar, kaol, chlorite, trace pyo
10AR-11	52	2032	115	51 S	East ext, Glacier	K-spar, kaol, chlorite, trace pyo
10AR-12	float	1980			Sub-portal	angular float, 1% magnetite
10AR-14	200	1939	140	62 SW	J-5	increased limonite-chlorite with Mos2
10AR-15	20	1977	135	20 S	Sub-portal	3 m north is open cut
10AR-20	18	2270	110	48 S	East Glacier	red-yellow-brown gossan in cliff
10AR-22	70	2170	101	30 S	West Marble Ridge	350 cm wide py-pyo-ank skarn band
10AR-23	180	2169	100	30 S	West Marble Ridge	275 cm wide py-pyo-ank skarn band
10AR-24	280	2181	100	50 S	West Marble Ridge	limonitic aplite-carbonate breccia contact
10AR-25	25	2204	100	34 S	West Marble Ridge	limonitic aplite-carbonate breccia contact
10AR-26	30	2218	100	34 S	West Marble Ridge	limonitic aplite-carbonate breccia contact

10AR-27		25	2212	115 62 S	West Marble Ridge	limonitic aplite-carbonate breccia contact
10AR-28		22	2203	105 63 S	West Basin	K-spar, kaol, chlorite, trace pyo
10AR-30	float		2171	float	West Basin	K-spar, kaol, chlorite, trace pyo

REE bearing mineralization occurs in the East Glacier Zone (e.g. rock chip sample COPE10AR-20). The East Glacier and Marble Bx Ridge Zones are about 500 meters apart, but they occur on the same stratigraphic horizon and may be part of an extensive REE bearing mineral zone trending east under the glacier and/or west (towards the west basin). In addition to REE bearing mineralization, a zone of elevated molybdenum and coincident niobium occurs in the east extension of the Copeland underground workings. This area has been targeted for possible extensions of Mo bearing mineralization, but this zone appears to have elevated Mo-Nb-Ti (e.g. rock chip sample COPE10AR-4 & 5). Also, directly adjacent to the underground workings there is a rock chip sample that contains elevated Mo-REE-Nb-Ti (rock chip sample COPE10AR-3).
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In 2008, Torch R Res carried out magnetometer surveys on the Marble Breccia Ridge Zone where 4 positive total field anomalies were identified. These positive total field magnetic anomalies (moderate strength 200-500 nT increase, strong >500 nT increase) are listed as follows:

Easting	Northing	Elevation	Relative strength	Zone Name
397350	5665500	2320 m	Moderate	West Basin
397500	5665350	2340 m	Strong	Marble Bx Ridge
397550	5665350	2335 m	Moderate	Marble Bx Ridge
397650	5665300	2340 m	Strong	Marble Bx Ridge
397600	5665250	2410 m	Moderate	Marble Bx Ridge
397690	5665250	2395 m	Moderate	W Glacier

The magnetometer survey strong anomalies are located in an area of marble with extensive zones of pyrrhotite and/or magnetite/ilmenite replacement mineralization which coincides with elevated REE geochemical analysis of rock chips 10AR-22 to 28 from Marble Bx Ridge.

The geological setting for the Copeland molybdenite-REE occurrence is within concordant bodies of nepheline syenite gneiss that occur adjacent to the calc-silicate gneiss and marble unit. The syenite has locally developed an augen texture with large porphyryblasts of K-feldspar in a fine-grained groundmass. Calc-silicate assemblages contain diopside, garnet and actinolite. Carbonates and carbonatites are re-crystallized to medium and locally coarse-grained granoblastic marbles. Lithologies present are summarized as follows:

PROTEROZOIC (PRE-CAMBRIAN)
8- Syenite Aplite/Syenite Pegmatite: K-feldpsar, kaolinite, sericite, calcite, biotite, fluorite, garnet, sphene, specularite, pyrrhotite, pyrite, molybdenite, ilmenite, chalcopyrite, scheelite, tourmaline, apatite, riebeckite, poikilitic aegirine, zircon, zeolite, cancrinite, and analcite
7- Hangingwall Syenite Gneiss, Nepheline Syenite: K-feldspar, green/brown phlogopite,

calcite, chlorite, accessory apatite, zircon, sphene, tourmaline, sphene, apatite, riebeckite, poikilitic aegirine, zircon, fluorite, zeolite, cancrinite and analcite
6- Biotite-Amphibole Marble: weathered and deeply pitted appearance, biotite, hornblende, chlorite, marble (granoblastic), actinolite, diopside
5- Black Biotite Amphibole Gneiss: biotite, hornblende, chlorite, oligoclase, magnetite
4- Quartzite Gneiss:feldspar, granular, interbedded marble bands, actinolite & diopside

Unit 6 (biotite-amphibole marble) has extremely high soda and potash content, and this is likely attributed to fenitization, caused by peralkaline fluids. These fluids are thought to complex and transport REE, associated with minerals such as apatite, zircon, pyrochlore, allanite, monazite and bastnaesite.

11.2 SOIL GEOCHEMISTRY SURVEY (2010)

Soil sampling- A total of 72 soil (talus fines) samples were collected. All 72 soils were taken at 25 m spacing along E-W survey lines. The lines were surveyed with a Garmin 60Cx GPS. A total of 41 soil samples were obtained in a 400 X 200 m area north, east and south of the adit (at 2,031 m., 6,664 ft elevation). In addition, 10 soil samples were gathered from a 100 X 200 m area adjacent to the East Glacier showings (400-500 meters SE of Glacier Zone adit), and 21 soil samples (covering a 350 X 150 m area) were collected from the West Basin, a new mineral zone (located 450-550 m west of Glacier Zone adit, and is the extension of the Marble Breccia Ridge Zone).

The soil geochemical survey consisted of a total of 72 samples taken at 25 m grid spacing. Each sample consisted of 300-500 gms of talus fine material that was collected using a hoe and placed in marked kraft envelopes and dried. The soil samples were shipped to Pioneer Labs, Richmond, BC for lithium borate fusion preparation REE suite ICP-MS. Soil geochemical analysis identified what can be considered an additional target for future exploration.

Mean average values for elements listed, from 72 soil samples geochemically analyzed:

Ce	Dy	Er	La	Nd	Pr	Sm	U	Y	Nb	Ti
519.0 ppm	19.0 ppm	11.0 ppm	389.6 ppm	170.5 ppm	60.0 ppm	29.0 ppm	21.5 ppm	104.7 ppm	323.3 ppm	0.98 %

:
A new zone of rare earth, yttrium, niobium and titanium has been outlined from August, 2010 rock chip and soil sampling. Elevated rare earth values occur notably on Marble Breccia Ridge, a distinct 5-50 m wide band of marble (breccia texture near contacts), and gossan (rusty coloured iron oxides) caused by pyrite-pyrrhotite. Marble Breccia Ridge contains zones of disseminated and fracture filling pyrrhotite-magnetite resulting in a strong (>2,000 nT), positive total field magnetometer survey anomaly zone. Significant rare earth (cerium, lanthanum, neodymium, thorium, yttrium, niobium and titanium values (certificate number 2102718A), from Aug, 2010 soil samples are summarized in the following table:

Northing	Easting	Zone Name	Ce ppm	La	Nd ppm	Th ppm	Y ppm	Nb	Ti %

				ppm				ppm	
5665500	397000	Marble Bx R	**>1,000**	756.1	264.1	87.0	126.1	460.3	0.509
5665500	397025	Marble Bx R	785.1	442.2	220.9	43.2	140.9	523.7	0.611
5665500	397975	J-5 6,300'	802.6	475.4	190.1	86.8	115.0	530.2	0.918
5665500	397275	Marble Bx R	644.9	409.3	183.3	58.2	139.1	242.0	1.051
5665550	397300	Marble Bx R	661.3	430.5	173.0	88.3	120.7	288.4	1.057
5665550	397125	Marble Bx R	636.3	346.9	164.8	57.9	95.4	595.9	1.055
5665550	397250	Marble Bx R	733.8	463.5	195.1	114.9	127.9	338.1	1.922
5665550	397275	Marble Bx R	881.5	441.2	213.8	71.0	161.5	232.1	1.559
5665550	397925	J-5 6,300'	535.3	256.7	146.4	48.5	95.1	297.5	1.003
5665550	397975	J-5 6,300'	652.7	385.9	149.3	68.8	88.8	468.1	1.041
5665050	398100	East Glacier	**>1,000**	643.2	237.8	102.9	143.2	454.7	2.101
5665100	398100	East Glacier	**>1,000**	813.7	241.9	113.7	139.9	558.1	1.674
5665300	397650	Marble Bx R	624.6	335.2	210.2	53.7	88.4	146.7	1.868
5665300	397675	Marble Bx R	806.4	522.8	160.6	104.5	88.8	554.5	0.570
5665400	397650	Marble Bx R	784.8	553.8	153.3	115.2	100.9	277.8	0.454
5665400	397675	Marble Bx R	**>1,000**	747.0	225.8	184.6	143.6	292.1	1.333
5665400	397725	Glacier E Ext	589.2	372.5	153.8	82.0	86.7	234.5	1.126
5665400	397750	Glacier E Ext	756.7	421.4	231.1	71.2	158.0	245.2	1.884
5665400	397775	Glacier E Ext	786.2	436.8	240.8	93.1	151.8	199.1	2.433
5665400	397775	Glacier E Ext	**>1,000**	658.9	275.4	88.3	173.6	561.4	1.033
5665450	397800	Glacier E Ext	646.0	399.5	183.6	67.1	115.3	235.4	1.479
5665450	397875	Glacier E Ext	764.1	445.5	191.3	97.7	131.3	465.3	0.917
5665450	397900	Glacier E Ext	994.0	535.9	228.2	74.1	152.0	610.5	1.017
5665000	398050	East Glacier	**>1,000**	776.5	258.2	187.6	156.0	438.0	1.446
5665000	398075	East Glacier	**>1,000**	875.8	229.8	189.0	148.5	432.8	0.986
5665000	398100	East Glacier	**>1,000**	841.0	263.3	129.4	146.2	469.3	0.977
5665000	398125	East Glacier	**>1,000**	**>1,000**	476.2	163.8	193.4	435.2	1.023
5665000	398150	East Glacier	**>1,000**	723.3	303.4	96.9	181.4	254.6	3.082

Note- Uranium values range from 7.9-67.3 ppm, and average <25 ppm

The East Glacier and Marble Breccia Ridge zones do not have any ore grade Mo & Cu values associated with REE minerals, but the Glacier East Extension and J-5 6,300' zones that are elevated in Mo & Cu values are spatially related to above average REE, yttrium, niobium & titanium geochemical analysis values. Soil geochemical analysis identified what can be considered an additional target for future exploration; the East Glacier Zone has the highest overall Ce-La-Nd-Th-Y in soil anomalous values, especially near where sample COPE10AR-20 is located. This area is a high priority follow-up exploration target (and it is situated near a cliff and a glacier).

12.0 SAMPLING METHOD AND APPROACH

Rock chip samples were collected from outcrop exposures of 18-250 cm in length. The rock samples were collected using hammer and moil perpendicular to strike of mineral trend. Rock chip samples consist of 1-3 kilograms of acorn sized rock fragments from hammering outcrop (or float). Sample material collected was placed in marked poly ore bags and shipped to Pioneer Labs, Richmond, BC for 30 element ICP, and REE suite elements, and over detection limit Mo, Cu assays. The rock chips that were over detection limit for REE suite (8 out of 34, including COPE10AR-3, 12, 19, 20, 22, 23, 25 & 26), were sent to ALS Chemex, N Vancouver BC, for ME-MS81 REE and trace element ICP-MS analysis. One sample (COPE10AR-20) was sent to SGS Canada, Lakefield ON, for La, Ce and Pr assays. Of the 34 total rock chip samples, 11 were float in overburden, not outcrop samples (i.e. not in-situ, but angular in shape and not

originating from great distances). Rock and soil samples were shipped to Pioneer Labs for lithium borate fusion, acid dissolution and ICPMS analysis for rare earth elements (14 of 15 analyzed, Promethium, Pm not analyzed), trace elements, and assays for Mo and Cu for select elevated rock chip samples (geochemical analysis certificate numbers 2102718, 2102718A, & 2102718B).

The soil (talus fine) samples consist were taken from a thin veneer of 'C' horizon (weathered parent material), because essentially there is no developed soil horizon at the elevation of the survey (2,000-2,200 m above sea level). Talus fine material was collected with a hoe and 72 samples were collected, placed in marked kraft bags, dried and shipped to Pioneer Labs, Richmond, BC.

13.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

A total of 34 rock chip, and 72 soil samples were shipped to Pioneer Labs, Richmond BC. A total of 8 of the rock chip samples (with significant REE values) were shipped by the writer to ALS Chemex Labs, N Vancouver BC, where ME-MS81 analysis was done which involves lithium borate fusion and multi-element ICP-MS for REE mineral suite. Over detection La, Ce and Pr limits were exceeded in sample COPE10AR-20, and this sample pulp was shipped to SGS Canada Inc, Lakefield, ON. Sampling and geochemical analysis from 2010 rock chip and soil sampling were carried out using relevant and reliable methods. The samples were prepared using standard analytical procedures by Pioneer Labs, Richmond, B.C. This includes crushing the rock chip samples, and passing through -10 mesh, and splitting 250 grams and pulverizing and passing -150 mesh. Multi-element ICP analysis was done on all samples which involves taking 0.5 grams sample and digesting with 3 ml of aqua regia, diluted with 10 ml water. Mo analysis uses 1 gram sample digested with 50 ml aqua regia, diluted to 100 ml with water and is finished by ICP/ES. The soil samples shipped to Pioneer Labs were dried and screened to -180um. There are no reasons to suspect that samples were unsecure and tampered with.

14.0 DATA VERIFICATION

Repeat sampling and/or check/blank/standard sample inserts were not carried out on rock chip or soil samples. Future trenching and drilling samples require inserts of blanks and standard mineral samples for data verification.

15.0 ADJACENT PROPERTIES

River Jordan (MINFILE 082M 001) is located approximately 2 km east of mineral tenure 501827. River Jordan is a developed prospect and a 1961 resource estimate from CIM Bull 57, page 48 states River Jordan contains a total of 2,605,826 tons grading 37.7 g/t Ag, 5.1% Pb and 5.6% Zn. River Jordan is classified as a stratabound Broken Hill type Ag-Pb-Zn-(Cu). Other nearby mineral deposits (10-20 km radius) include Cottonbelt Ag-Pb-Zn, J & L Au-Ag-As-Pb-Zn, and Goldstream Cu-Zn-Ag, all of which are stratabound base and precious metal bearing

mineral occurrences.

16.0 MINERAL PROCESSING AND METALLURGICAL TESTING

In 1967-68, Colorado School of Mines Research Foundation Inc conducted two series of metallurgical bench tests on samples submitted to them by King Resources Company (Wood, 1969). The first series, completed in March, 1967, was on a 500 pound (226.8 kilogram) sample taken from the surface exposure of the 6950 Glacier Zone. The second series, completed in June, 1968, was on one sample from the 6950 Glacier Zone and one sample from the peripheral zone. Test were conducted to determine optimum size grind, necessity for regrinding the rougher concentrate, dispersants or depressants required, impurities in the concentrate, optimum pH modifiers, tailings effluent composition and tailings settling requirements. Metallurgical test results indicate:

1) Finer grind does increase recovery, but 65 mesh size is sufficient to give desired concentrate grade if reagents are used in flotation circuit for control of iron sulphides and other gangue minerals.

2) The ore is amenable to production of high grade, high recovery concentrate using regrinding and dispersants, but other tests produce similar results without regrinding.

3) The use of dispersants and depressants are necessary to provide and acceptable concentrate grade.

4) Impurities are present, as indicated below, but are low enough to satisfy market requirements:

Zone	% Cu	% Pb	% P	% Sn + As	% Insoluble	% Fe
Glacier	0.04	0.014	0.003	<0.01	1.59	0.86
Peripheral	0.026	0.050	0.004	<0.04	1.91	1.91

A spectrographic analysis reveals the presence of silver in quantities too small to be significant. Arsenic, bismuth and lead impurities are either absent or insignificant.

5) The use of soda ash as a pH modifier was shown to be superior to lime insofar as a higher concentrate grade is concerned.

6) A tailing water effluent test was conducted using the equivalent reagent quantities. The conclusions drawn were that the pine oil, sodium silicate and sodium carbonate are not added in sufficient quantities to be considered pollutants. The cyanide exists mostly as the radical M $(CN)_x$ and not as the iron (CN)-, it resists decomposition, and is considered stable.

7) Utilizing a tailings thickener has been recommended to minimize groundwater pollution.

8) Metallurgy of the Glacier Zone appears to be relatively uncomplicated:
-Apparent optimum grind is 75-80% at -65 mesh
-Concentrate ratio is 25-30 to 1
-Moisture content of concentrate is 10-12%

-Concentrate production from a 200 tons/day mill is approximately 8 tons/day
-Percentage recovery is 93%
-Concentrate grade is 90-92% MoS_2
Reagents used: Fuel oil (standard petroleum product), Syntex L (sulphated monoglyceride of coconut oil, a detergent), pine oil (terpineal derivative from pine trees), Separan MGL (high molecular weight synthetic polymer), sodium cyanide (depressant), sodium silicate (dispersant), sodium carbonate (pH control and flotation agent).

These metallurgical tests are dated (1967-68), and do not conform with present day industry standards and sampling protocol, the data generated by Colorado School of Mines Research Foundation cannot be relied upon.

17.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

There are no categorized mineral resources and mineral reserve estimates on the subject property.

18.0 OTHER RELEVANT DATA AND INFORMATION

Three rock chip samples taken by Discovery Consultants in 1995 on Copeland Ridge (2.378-2,432 m elevation) were tested for suitability for high-purity nepheline syenite (nepheline, potash and soda feldspar with minor biotite, hornblende and magnetite accessory minerals), used in glassmaking, ceramics, glazes, cleaning compounds, insulators, dental spar, and flux coatings. A typical chemical analysis for high-purity nepheline syenite is 60% SiO_2, 23.6% Al_2O_3, 0.07% Fe_2O_3, 0.3% CaO, 0.1% MgO, 5.3% K_2O, 10.2% Na_2O, 0.5% LOI (source: Canadian Minerals Yearbook, Energy, Mines and Resources, Canada). The Copeland Ridge samples fall in the range of nepheline syenite given the relatively comparative silicon, aluminium, potassium and sodium oxide values obtained from geochemical analysis. Effort should be directed to finding samples similar to MC95-3 (taken by T.H.Carpenter, 1995 for Discovery Consultants on Copeland Ridge, A.R. 24,328) which returned values of 0.66% Fe_2O_3 as well as being very low in other impurities.

19.0 INTERPRETATION AND CONCLUSIONS

REE bearing mineralization occurs in the East Glacier Zone (e.g. rock chip sample COPE10AR-20). The East Glacier and Marble Breccia Ridge Zones are about 500 meters apart, but they occur on the same stratigraphic horizon and may be part of an extensive REE bearing mineral zone trending east under the glacier and/or west (towards the west basin). In addition to REE bearing mineralization, a zone of elevated molybdenum and coincident niobium occurs in the east extension of the Copeland underground workings. This area has been targeted for possible extensions of Mo bearing mineralization, and this zone contains elevated Mo-Nb-Ti (e.g. rock chip sample COPE10AR-4 & 5).

The magnetometer survey strong anomalies are located in an area of marble with extensive zones of pyrrhotite and/or magnetite/ilmenite replacement mineralization which coincides with elevated REE geochemical analysis of rock chips taken in 2010 for Torch R Resources

(COPE10AR-22 to 26 are from Marble Breccia Ridge). These geophysical anomalies represent potential for buried sulphide/oxide REE bearing mineralization and are high priority follow-up drill targets. The results warrant exploration in the area of the Marble Breccia Ridge Zone, in order to drill test the east extension of surface mineralization in COPE10AR-22. Previous drilling has focused on the molybdenum bearing aplitic phases nepheline syenite complex of the Glacier Zone. The new area of attention is the marble ridge (pyrrhotite-magnetite) breccia zone. The area represents a significant REE, Y, Nb, Ti, Zr bearing mineral potential, and the east and west extension of this mineral trend are high priority diamond drill targets.

Additional targets for REE bearing mineralization include the East Glacier where sample COPE10AR-20 returned the highest REE values of all samples taken. The strong REE, soil geochemical anomaly in the East Glacier

The other type of mineral occurrence present on the property is high-purity nepheline syenite. Copeland Ridge area is reported to contain nepheline, potash and soda feldspar minerals suitable for industrial applications.

20.0 RECOMMENDATIONS

Based on the results of previous exploration and mining activity, there is potential to outline further economic concentrations of molybdenite-(scheelite) and REE, Y, Nb, Ti, Zr bearing mineralization on the subject property. A two phase program consisting of preliminary geological mapping, trenching, and magnetometer geophysics, litho-geochemical sampling as well as fence pattern diamond drill holes and further detailed geological mapping are proposed to test the depth extension of surface mineral occurrences on Marble Breccia Ridge, East Glacier, Glacier Zone (upper and lower, surface mineralization trends), and West Basin. Concurrent with drilling, a program of hand trenching, geological mapping and rock chip sampling is required to outline further extensions of known mineral trends.

A detailed budget of this 2 phase exploration program is described as follows:
PHASE 1: PROPOSED BUDGET FOR COPELAND Mo-(W):

FIELD CREW- Geologist, 1 geotechnician, 21 days	$	12,500.00
FIELD COSTS-Assays 250		5,400.00
Rock chip geological/geochemical survey		15,000.00
Core drilling 3,000 feet (914.4 m)		200,000.00
Geophysics (magnetometer)		23,000.00
Soil Grid		2,500.00
Equipment and Supplies		2,000.00
Communication		900.00
Food		2,400.00
Transportation		17,100.00
Emergency camp construction		7,350.00
REPORT		1,850.00
Contingency		10,000.00
Total =	$	300,000.00

PHASE 2: PROPOSED BUDGET FOR COPELAND Mo-(W) TARGETS:

FIELD CREW-	Geologist, 1 geotechnician, 1 cook 120 days	$ 46,000.00
FIELD COSTS-	Core drilling, 5,000 feet (1,524 m).	325,000.00
	Assays 1,400	28,000.00
	Equipment and Supplies	4,000.00
	Communication	3,000.00
	Food	6,500.00
	Transportation	58,000.00
REPORT		1,200.00
	Contingency	18,300.00
	Total =	$ 500,000.00

TOTAL PHASE 1 + 2 = $ 800,000.00

The total recommended core drilling for phase 1 + 2 is 8,000 feet (2.438.4 m).

21.0 REFERENCES

Canadian Minerals Handbook 1978, Energy, Mines and Resources Canada

Carpenter, T.H., (1996) Geological Report for Discovery Consultants, Assessment Report 24,328, BC Ministry of Energy & Mines

CIM Special Volume 15, 1976, page 418-420 Characteristics of Canadian Cordillera Molybdenum Deposits (Soregaroli, A.R., Sutherland Brown, A., 1976)

Clark, K.J., 1972, Stockwork Molybdenum Deposits in the Western Cordillera of North America, Econ. Geol. Volume 67, pp. 731-758

EMPR Assessment Report # 679, 776, 1788, 8752, and 24328

EMPR Bulletin 57 pp. 22, 40, 58-61

EMPR EXPL 1978 pp. 100, 101; 1980 pp. 137,138

EMPR PF (Fyles, J.T., McCammon, J.W., 1969) Mineral Resources Revelstoke Area.

EMPR MP CORPFILE (King Resources Company, 1969, 1970)

GAC Special Paper No. 6, pp. 87-98 (Fyles, J.T., 1970)

Guillet, G. Robert, 1994, “Nepheline Syenite” in Industrial Minerals and Rocks, Donald G. Carr,

Ed., Society for Mining, Metallurgy, and Exploration, Inc.

Kikauka, Andris A., (2005), Geological and Geochemical Report on Mount Copeland Molybdenum Project, Assessment Report for BC Ministry of Energy & Mines, Mineral Titles, available online www.em.gov.bc.ca

Kirkham, R.V., 1972, Intermineral Intrusions and their Bearing on Porphyry Copper and Molybdenum Deposits, Econ Geol., Volume 66, 1244-1249

Wood, John A., (1969) Preliminary Feasibility Study, Copeland Mountain Molybdenum Project, Revelstoke Mining Division, King Resources Company

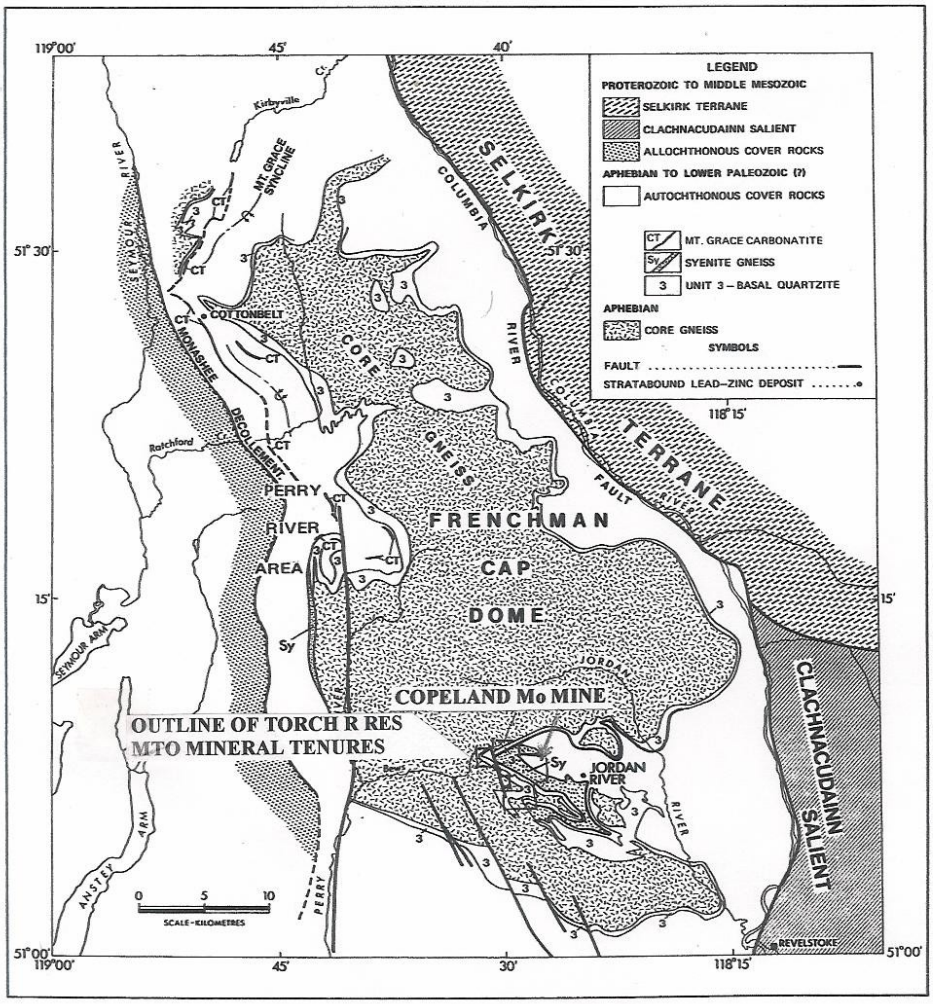
22.0 DATE AND CERTIFICATE

I, Andris Kikauka, of 4901 East Sooke Rd., Sooke B.C. V0S 1NO am a self employed professional geoscientist. I hereby certify that:

1. I am a graduate of Brock University, St. Catharines, Ont., with an Honours Bachelor of Science Degree in Geological Sciences, 1980.
2. I am a Fellow in good standing with the Geological Association of Canada.
3. I am registered in the Province of British Columbia as a Professional Geoscientist.
4. I have practiced my profession for twenty years in precious and base metal exploration in the Cordillera of Western Canada, U.S.A., Mexico, Central America, and South America, as well as for three years in uranium exploration in the Canadian Shield. **5.** The information, opinions, and recommendations in the Technical Report are based on fieldwork carried out in my presence on the subject properties during Aug 18-23, 2010 during which time a technical evaluation consisting of geological mapping, geochemical sampling of mineral zones located on the subject property was carried out by the writer.
6. As at the date hereof, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
7. This report summarizes technical data for the purpose of reporting fieldwork for geological, geochemical and geophysical assessment work.
8. Recommendations and proposed budgets listed in this report are guidelines, and are not intended for the purpose of public financing or NI 43-101.

Andris Kikauka, P. Geo.,

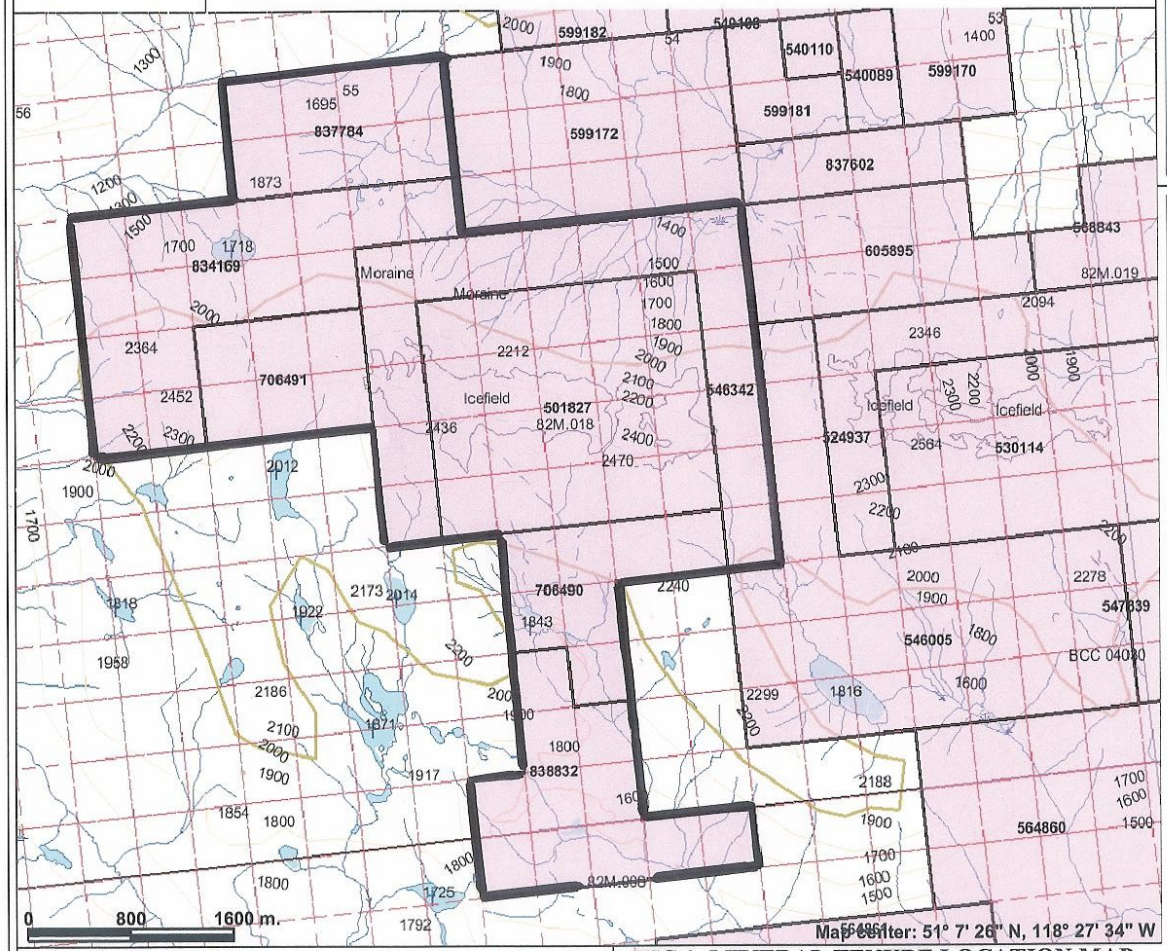
December 5, 2010

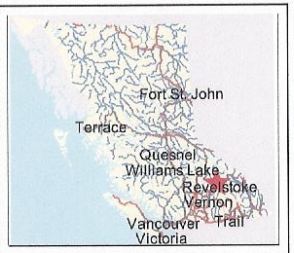


Regional geological map showing the distribution and tectonic setting of alkalic rocks in Frenchman Cap dome, Shuswap Metamorphic Complex (from Höy and Brown, 1980).

FIG. 1 GENERAL LOCATION MAP
COPELAND MOLYBDENUM PROPERTY WITH RESPECT TO FRENCHMAN CAP DOME

Copeland MTO Mineral Tenures, Dec 5, 2010





Legend

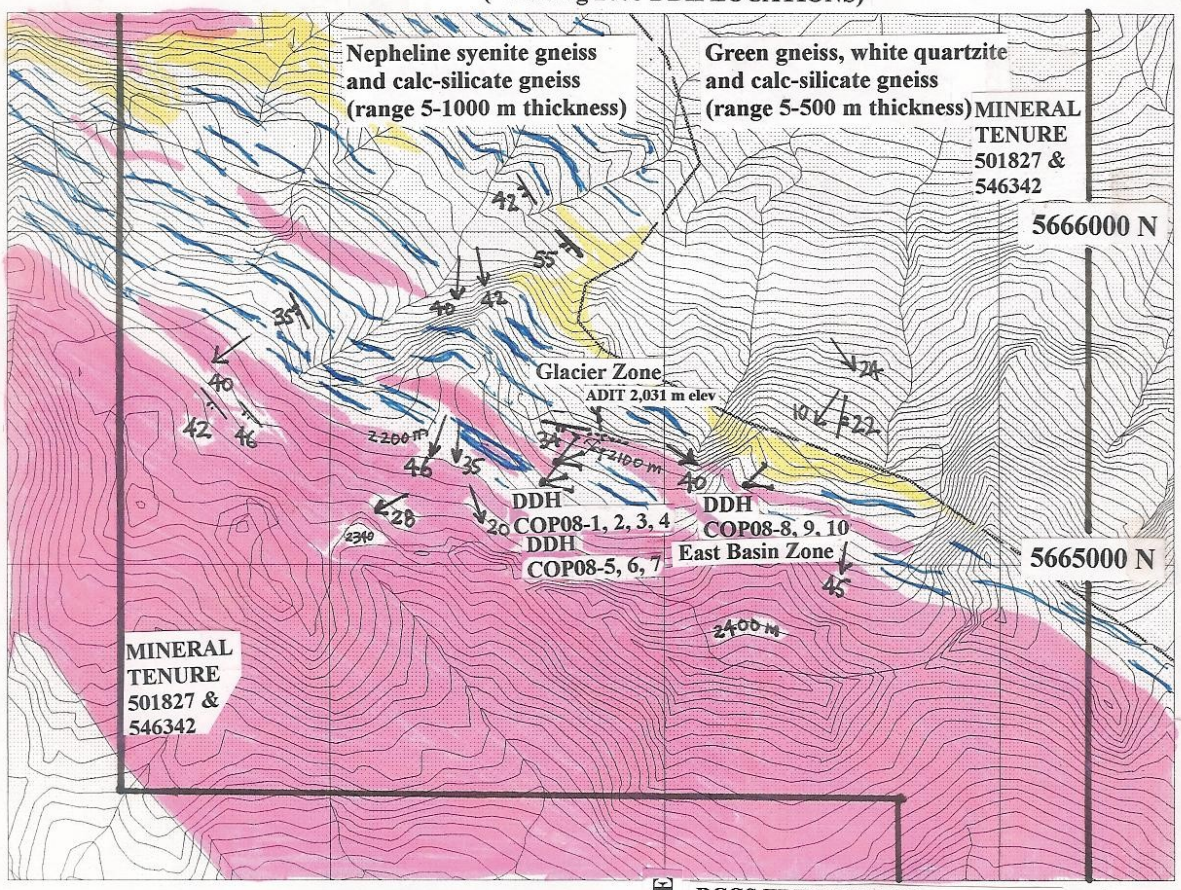
- Indian Reserves
- National Parks
- Conservancy Areas
- Parks
- MTO Grid (MTO)
- Blocked by MEM
- Other
- Mineral Tenure (current)
- Mineral Claim
- Mineral Lease
- Mineral Reserves (current)
- Placer Claim Designation
- Placer Lease Designation
- No Staking Reserve
- Conditional Reserve
- Release Required Reserve
- Surface Restriction
- Recreation Area
- Others
- Survey Parcels
- BCGS Grid
- Contours (1:250K)
- Contour - Index
- Contour - Intermediate
- Areaof Exclusion
- Areaof Indefinite Contours
- Transportation - Points (TRIM)
- Helipad
- Transportation - Lines (TRIM)
- Airfield
- Airport
- Airstrip

Scale: 1:44,593

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

FIG 2 MINERAL TENURE LOCATION MAP
501827, 546342, 706490, 706491, 834169, 837784
BCGS 082M.018, REVELSTOKE MINING DIVISION

FIG 3 GEOLOGY of MINERAL TENURE 501827, 546342 (including 2008 DDH LOCATIONS)



UTM NAD 83
ZONE 11

SCALE 1 : 17,232

200 0 200 400 600
METERS

46 Axial plane of fold

40 Shallow to moderately dipping plunge of minor fold axis (Fyles, 1969)

Syenite gneiss, nepheline syenite, aplite/pegmatite, apatite, zircon, sphene

Quartzite gneiss, interbedded marble, minor actinolite, diopside

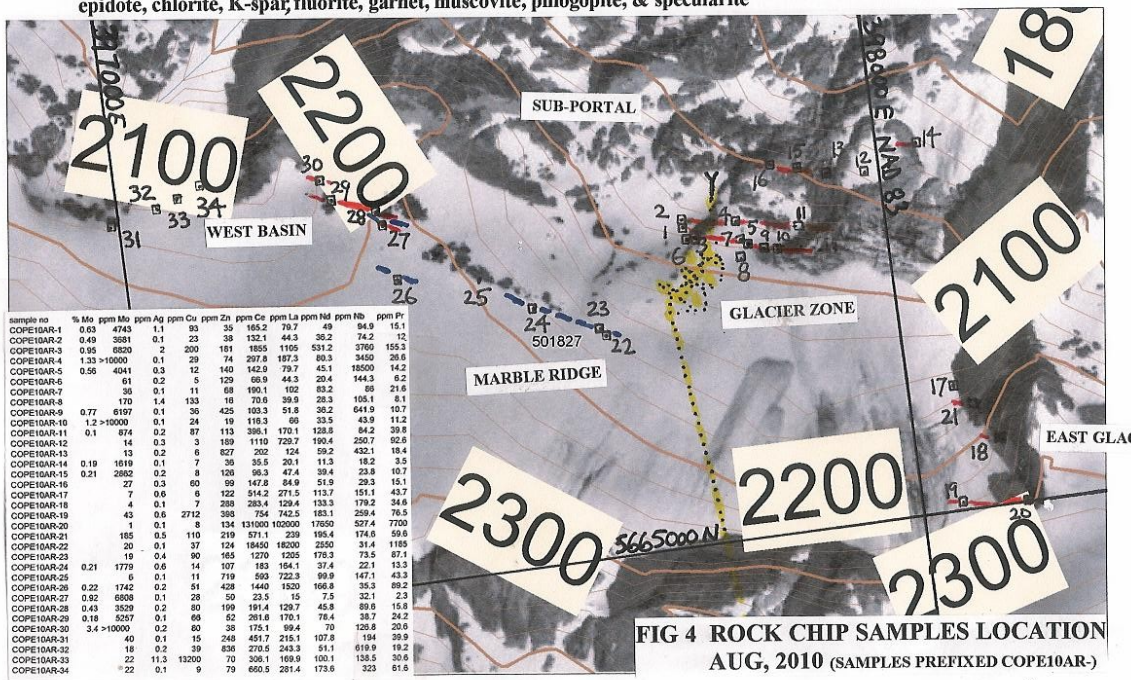
Biotite-amphibole marble, biotite, hornblende, chlorite, actinolite, diopside

Copeland August, 2010 Rock Chip Samples

- - - Syenite pegmatite-aplite sulphide-oxide - - - Marble breccia skarn sulphide-oxide ····· 1970's King Resources Underground Workings

Y Adit

Associated minerals: zircon, sphene, apatite, tourmaline, riebeckite, aegirine, ilmenite, magnetite, pyrrhotite, pyrite, molybdenite, chalcopyrite & rare quartz, scheelite, malachite, azurite, sodalite, chalcocite, analcite (zeolite), thompsonite (agate) Alteration minerals: kaolinite, sericite, calcite, epidote, chlorite, K-spar, fluorite, garnet, muscovite, phlogopite, & specularite



sample no	% Mo	ppm Mo	ppm Ag	ppm Cu	ppm Zn	ppm Ce	ppm La	ppm Nd	ppm Nb	ppm Pr
COPE10AR-1	0.63	4743	1.1	93	35	165.2	79.7	49	94.9	15.1
COPE10AR-2	0.49	3581	0.1	23	38	132.1	44.3	36.2	74.2	12
COPE10AR-3	0.95	6820	2	200	181	1855	1105	531.2	3760	155.3
COPE10AR-4	1.33	>10000	0.1	29	74	297.8	187.3	80.3	3450	26.6
COPE10AR-5	0.56	4041	0.3	12	140	142.9	79.7	45.1	18500	14.2
COPE10AR-6		61	0.2	5	129	68.9	44.3	20.4	144.3	6.2
COPE10AR-7		36	0.1	11	68	190.1	102	83.2	86	21.6
COPE10AR-8		170	1.4	133	18	70.6	39.9	28.3	105.1	8.1
COPE10AR-9	0.77	6197	0.1	36	425	103.3	51.8	38.2	641.9	10.7
COPE10AR-10	1.2	>10000	0.1	24	19	116.3	66	33.5	43.9	11.2
COPE10AR-11	0.1	874	0.2	87	113	396.1	170.1	128.8	84.2	39.8
COPE10AR-12		14	0.3	3	189	1110	729.7	190.4	250.7	92.6
COPE10AR-13		13	0.2	6	827	202	124	59.2	432.1	18.4
COPE10AR-14	0.19	1619	0.1	7	39	35.5	20.1	11.3	18.2	3.5
COPE10AR-15	0.21	2862	0.2	8	126	96.3	47.4	39.4	23.8	10.7
COPE10AR-16		27	0.3	60	99	147.8	84.9	51.9	29.3	15.1
COPE10AR-17		7	0.6	6	122	514.2	271.5	113.7	151.1	43.7
COPE10AR-18		4	0.1	7	288	283.4	129.4	133.3	179.2	34.6
COPE10AR-19		43	0.6	2712	398	754	742.5	183.1	259.4	76.5
COPE10AR-20		1	0.1	8	134	131000	102000	17650	527.4	7700
COPE10AR-21		185	0.5	110	219	571.1	239	195.4	174.6	59.6
COPE10AR-22		20	0.1	37	124	18450	18200	2550	31.4	1185
COPE10AR-23		19	0.4	90	165	1270	1205	176.3	73.5	87.1
COPE10AR-24	0.21	1779	0.6	14	107	183	164.1	37.4	22.1	13.3
COPE10AR-25		6	0.1	11	719	593	722.3	99.9	147.1	43.3
COPE10AR-26	0.22	1742	0.2	51	428	1440	1520	166.8	35.3	89.2
COPE10AR-27	0.92	6808	0.1	28	50	23.5	15	7.5	32.1	2.3
COPE10AR-28	0.43	3529	0.2	80	199	191.4	129.7	45.8	89.6	15.8
COPE10AR-29	0.18	5257	0.1	68	52	261.6	170.1	78.4	38.7	24.2
COPE10AR-30	3.4	>10000	0.2	80	38	175.1	99.4	70	126.8	20.6
COPE10AR-31		40	0.1	15	248	451.7	215.1	107.8	194	39.9
COPE10AR-32		18	0.2	39	836	270.5	243.3	51.1	619.9	19.2
COPE10AR-33		22	11.3	13200	70	306.1	169.9	100.1	138.5	30.6
COPE10AR-34		22	0.1	9	79	660.5	281.4	173.6	323	61.6

FIG 4 ROCK CHIP SAMPLES LOCATION AUG, 2010 (SAMPLES PREFIXED COPE10AR-)

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 7,500

500 0 500 1,000 1,500
FEET

0 250 m

N

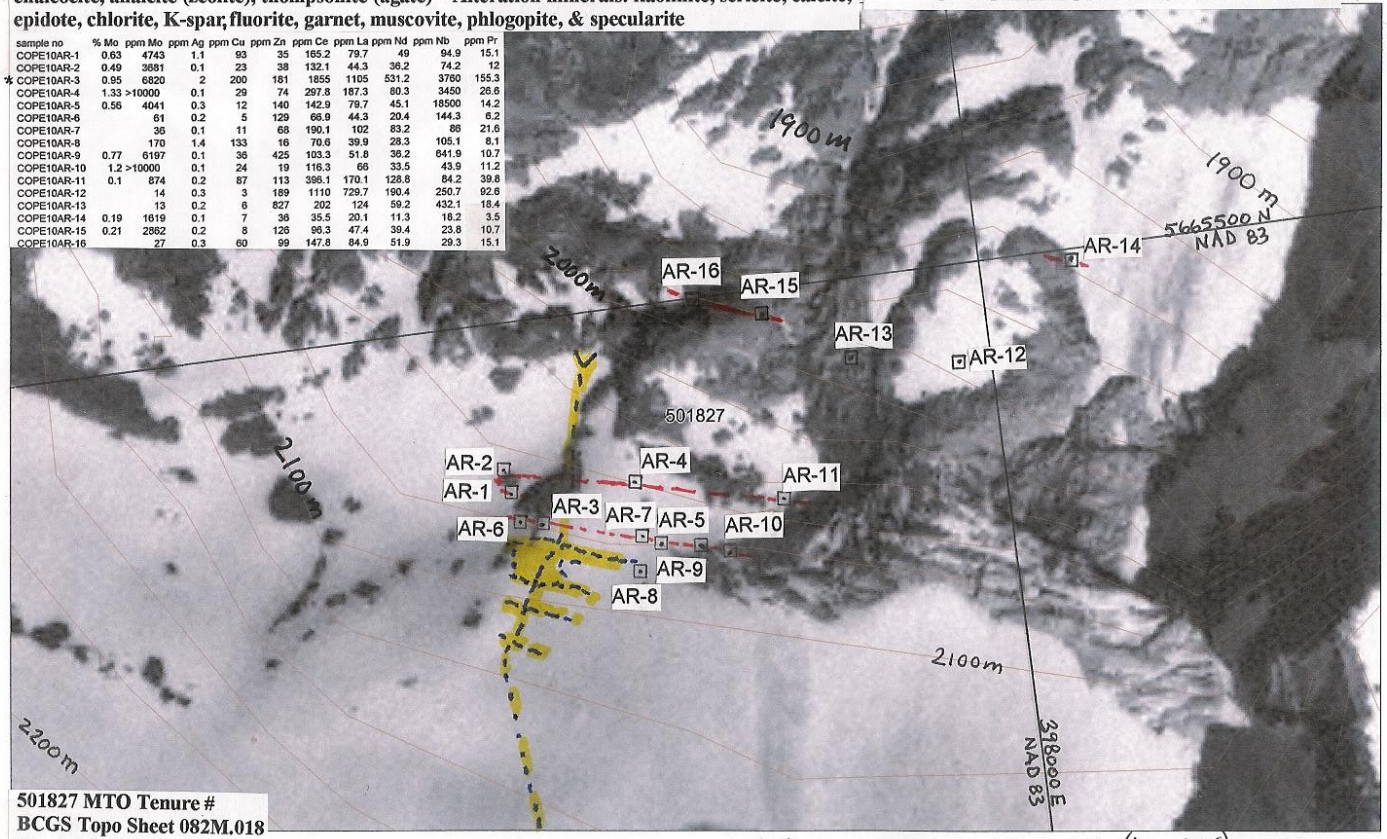
Note- marble breccia coincides with 1000-2000 nT positive magnetic survey anomaly

Copeland Rock Chip Samples Glacier Zone-East Extension

Associated minerals: zircon, sphene, apatite, tourmaline, riebeckite, aegirine, ilmenite, magnetite, pyrrhotite, pyrite, molybdenite, chalcopyrite & rare quartz, scheelite, malachite, azurite, sodalite, chalcocite, analcite (zeolite), thompsonite (agate) Alteration minerals: kaolinite, sericite, calcite, epidote, chlorite, K-spar, fluorite, garnet, muscovite, phlogopite, & specularite

sample no	% Mo	ppm Mo	ppm Ag	ppm Cu	ppm Zn	ppm Ce	ppm La	ppm Nd	ppm Nb	ppm Pr
COPE10AR-1	0.63	4743	1.1	93	35	165.2	79.7	49	94.9	15.1
COPE10AR-2	0.49	3681	0.1	23	38	132.1	44.3	36.2	74.2	12
* COPE10AR-3	0.95	6820	2	200	181	1855	1105	531.2	3760	155.3
COPE10AR-4	1.33	>10000	0.1	29	74	297.8	187.3	80.3	3450	26.6
COPE10AR-5	0.56	4041	0.3	12	140	142.9	79.7	45.1	18500	14.2
COPE10AR-6		61	0.2	5	129	66.9	44.3	20.4	144.3	6.2
COPE10AR-7		36	0.1	11	68	190.1	102	83.2	86	21.6
COPE10AR-8		170	1.4	133	16	70.6	39.9	28.3	105.1	8.1
COPE10AR-9	0.77	6197	0.1	36	425	103.3	51.8	36.2	641.9	10.7
COPE10AR-10	1.2	>10000	0.1	24	19	116.3	66	33.5	43.9	11.2
COPE10AR-11	0.1	874	0.2	87	113	396.1	170.1	128.8	84.2	39.8
COPE10AR-12		14	0.3	3	189	1110	729.7	190.4	250.7	92.6
COPE10AR-13		13	0.2	6	827	202	124	59.2	432.1	18.4
COPE10AR-14	0.19	1619	0.1	7	36	35.5	20.1	11.3	18.2	3.5
COPE10AR-15	0.21	2862	0.2	8	125	96.3	47.4	39.4	23.8	10.7
COPE10AR-16		27	0.3	60	99	147.8	84.9	51.9	29.3	15.1

FIG 5 ROCK CHIP SAMPLES AUG, 2010
GLACIER ZONE-EAST EXTENSION



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET
0 200 m

* Vancouver Petrographics Ltd. description (Appendix C)

Syenite pegmatite-aplite sulphide-oxide

Rock Chip Sample With Identifier # (prefix COPE10)

1970's King Res Underground Workings

N

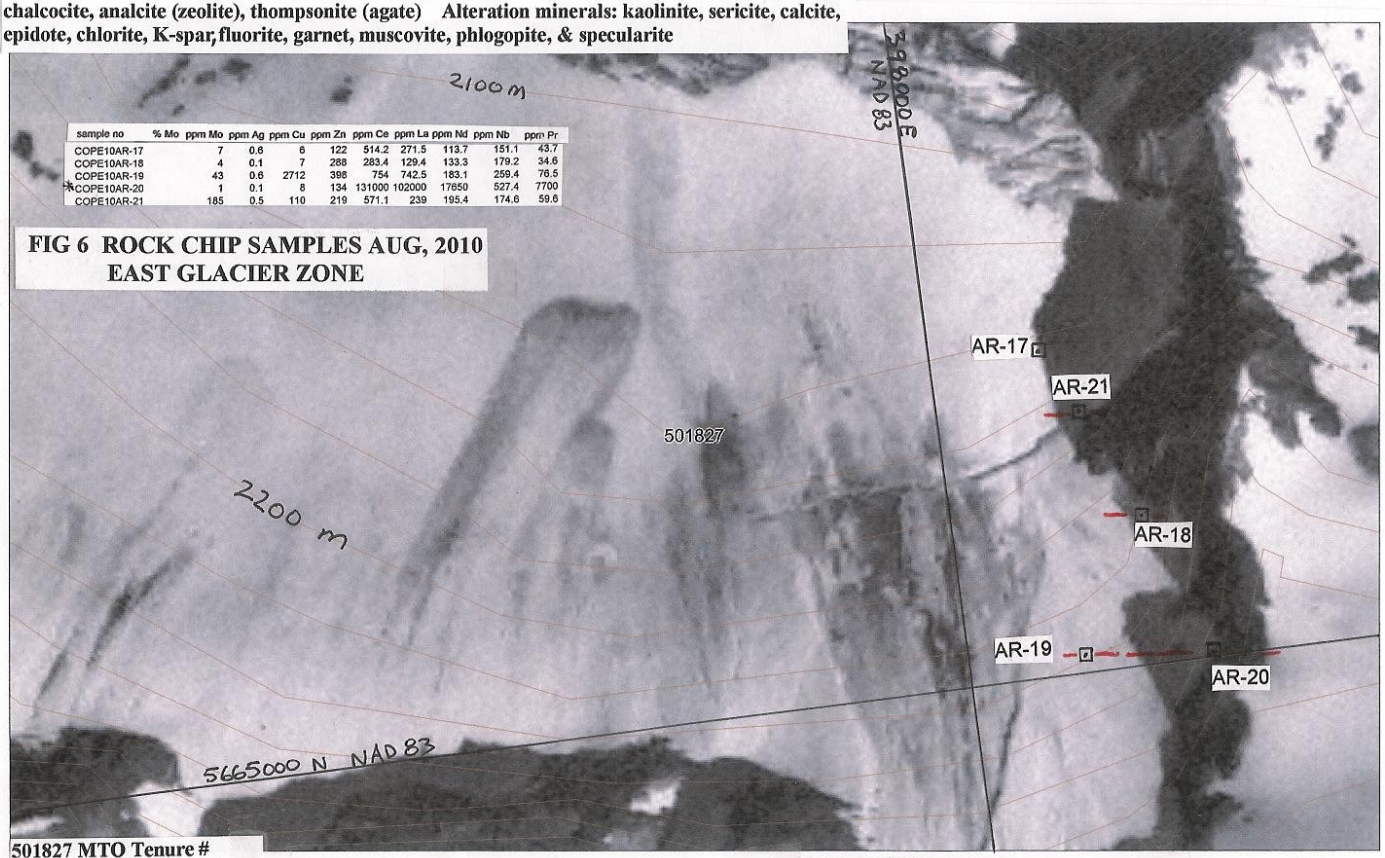
Copeland Rock Chip Samples East Glacier Zone

Associated minerals: zircon, sphene, apatite, tourmaline, riebeckite, aegirine, ilmenite, magnetite, pyrrhotite, pyrite, molybdenite, chalcopyrite & rare quartz, scheelite, malachite, azurite, sodalite, chalcocite, analcite (zeolite), thompsonite (agate) Alteration minerals: kaolinite, sericite, calcite, epidote, chlorite, K-spar, fluorite, garnet, muscovite, phlogopite, & specularite

Syenite pegmatite-aplite sulphide-oxide

sample no	% Mo	ppm Mo	ppm Ag	ppm Cu	ppm Zn	ppm Ce	ppm La	ppm Nd	ppm Nb	ppm Pr
COPE10AR-17		7	0.6	6	122	514.2	271.5	113.7	151.1	43.7
COPE10AR-18		4	0.1	7	288	283.4	129.4	133.3	179.2	34.6
COPE10AR-19		43	0.6	2712	398	754	742.5	183.1	259.4	76.5
*COPE10AR-20		1	0.1	8	134	131000	102000	17650	527.4	7700
COPE10AR-21		185	0.5	110	219	571.1	239	195.4	174.6	59.6

FIG 6 ROCK CHIP SAMPLES AUG, 2010
EAST GLACIER ZONE



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

Rock Chip Sample
With Identifier # (prefix COPE10AR-)

0 100 200m

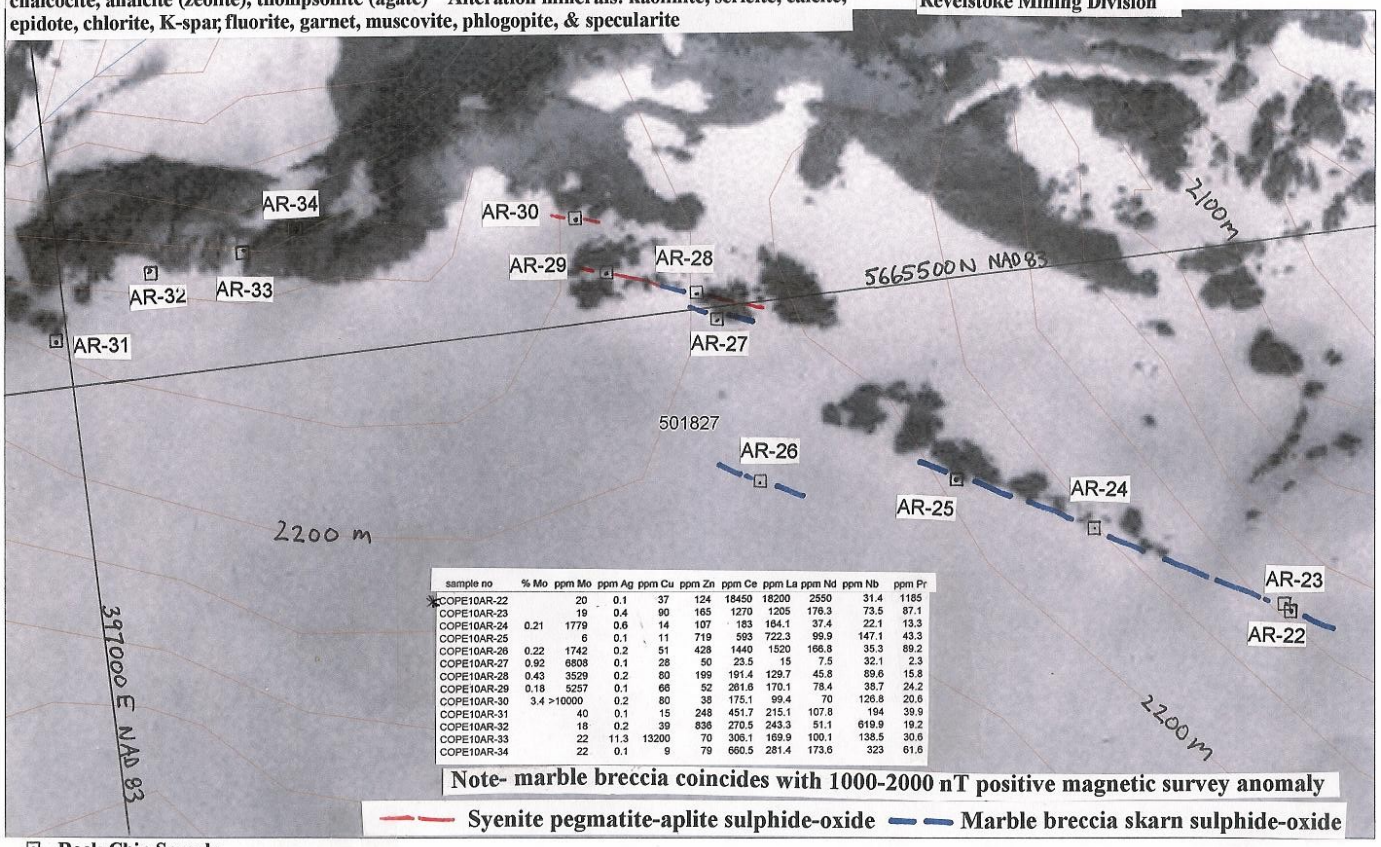
N

* Vancouver Petrographics Ltd Description (Appendix C)

Copeland Rock Chip Samples West Basin & Ridge

Associated minerals: zircon, sphene, apatite, tourmaline, riebeckite, aegirine, ilmenite, magnetite, pyrrhotite, pyrite, molybdenite, chalcopyrite & rare quartz, scheelite, malachite, azurite, sodalite, chalcocite, analcite (zeolite), thompsonite (agate) Alteration minerals: kaolinite, sericite, calcite, epidote, chlorite, K-spar, fluorite, garnet, muscovite, phlogopite, & specularite

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division



sample no	% Mo	ppm Mo	ppm Ag	ppm Cu	ppm Zn	ppm Ce	ppm La	ppm Nd	ppm Nb	ppm Pr
*COPE10AR-22		20	0.1	37	124	18450	18200	2550	31.4	1185
COPE10AR-23		19	0.4	90	165	1270	1205	176.3	73.5	87.1
COPE10AR-24	0.21	1779	0.6	14	107	183	164.1	37.4	22.1	13.3
COPE10AR-25		6	0.1	11	719	593	722.3	99.9	147.1	43.3
COPE10AR-26	0.22	1742	0.2	51	428	1440	1520	166.8	35.3	89.2
COPE10AR-27	0.92	6808	0.1	28	50	23.5	15	7.5	32.1	2.3
COPE10AR-28	0.43	3529	0.2	80	199	191.4	129.7	45.8	89.6	15.8
COPE10AR-29	0.18	5257	0.1	66	52	261.6	170.1	78.4	38.7	24.2
COPE10AR-30	3.4	>10000	0.2	80	38	175.1	99.4	70	126.8	20.6
COPE10AR-31		40	0.1	15	248	451.7	215.1	107.8	194	39.9
COPE10AR-32		18	0.2	39	836	270.5	243.3	51.1	619.9	19.2
COPE10AR-33		22	11.3	13200	70	306.1	169.9	100.1	138.5	30.6
COPE10AR-34		22	0.1	9	79	660.5	281.4	173.6	323	61.6

Note- marble breccia coincides with 1000-2000 nT positive magnetic survey anomaly

Syenite pegmatite-aplite sulphide-oxide — **Marble breccia skarn sulphide-oxide**

Rock Chip Sample
With Identifier # (prefix COPE10) SCALE 1 : 3,000

200 0 200 400 600
FEET
0 100 200m

FIG 7 ROCK CHIP SAMPLES AUG, 2010
WEST BASIN & RIDGE ZONES

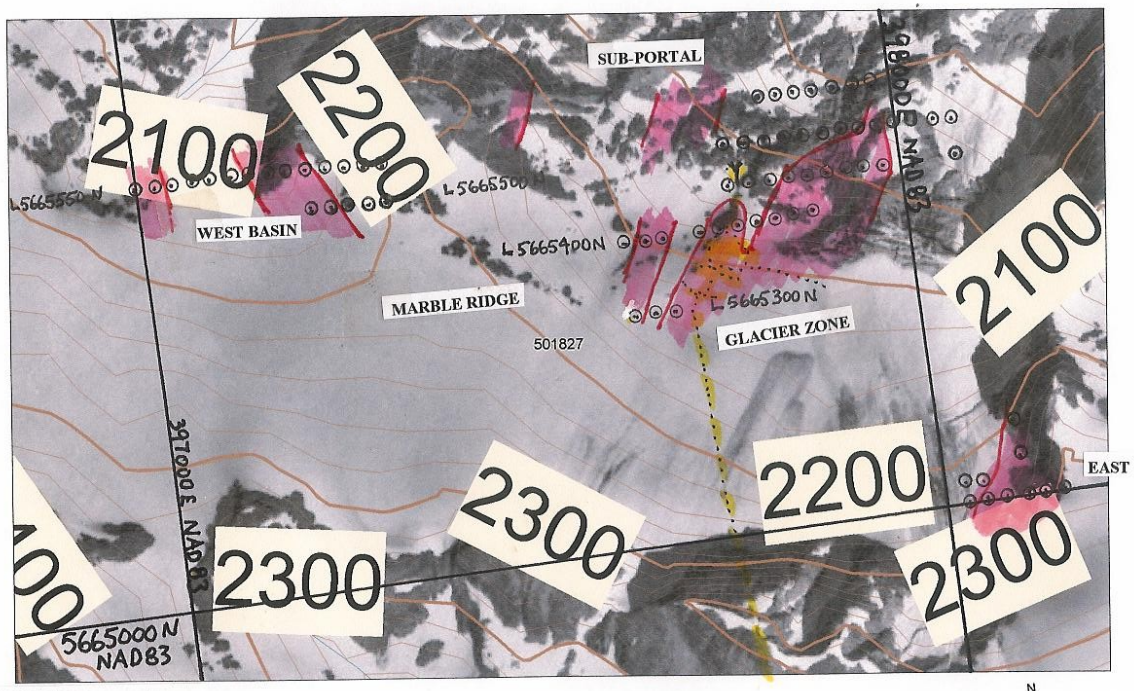
N

* Vancouver Petrographics Ltd Description (Appendix C)

Copeland August, 2010 Soil Samples

FIG 8 SOIL SAMPLES AUG, 2010
HIGHLIGHTING >400 ppm La

Y Adit (2,031 m elev.)



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 7,500

500 0 500 1,000 1,500
FEET

0 250m

N

1970's King Resources Underground Workings

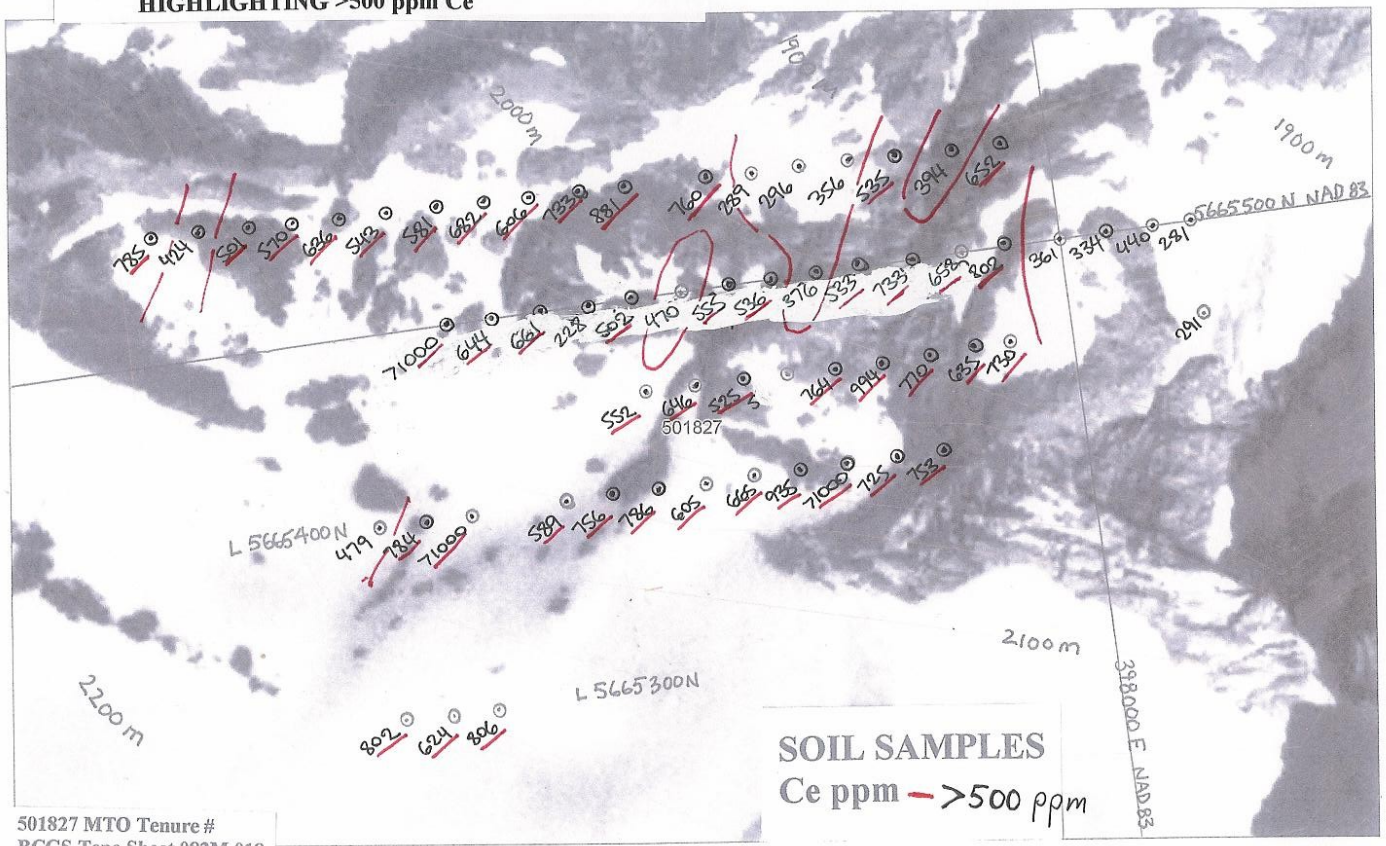
Soil Sample (along E-W grid lines, 25 m spacing)

>400 ppm La in soil

Copeland Soil Samples Glacier Zone-East Extension

FIG 9 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >500 ppm Ce

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



SOIL SAMPLES
Ce ppm — >500 ppm

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

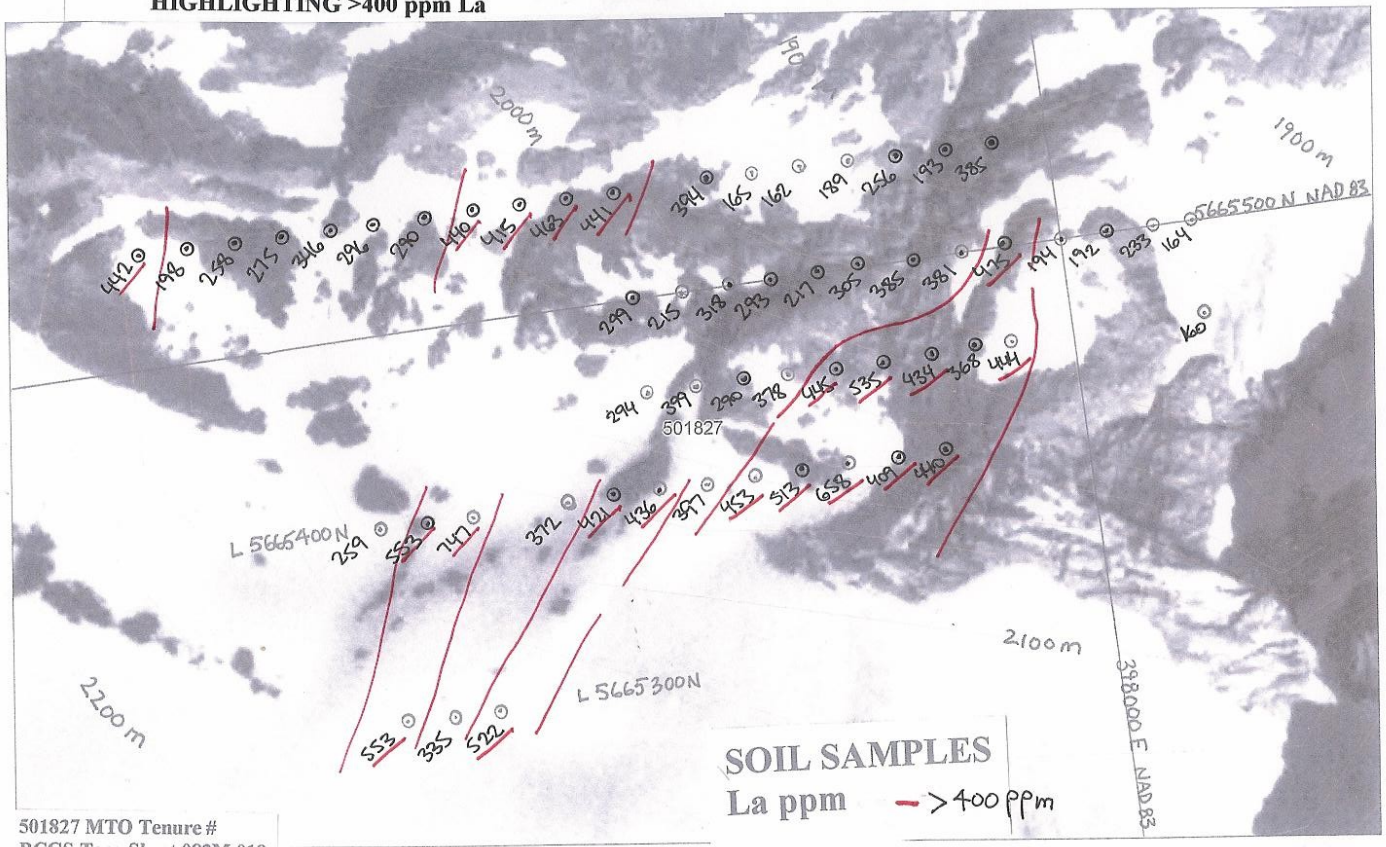
0 200 m

N

Copeland Soil Samples Glacier Zone-East Extension

FIG 10 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >400 ppm La

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

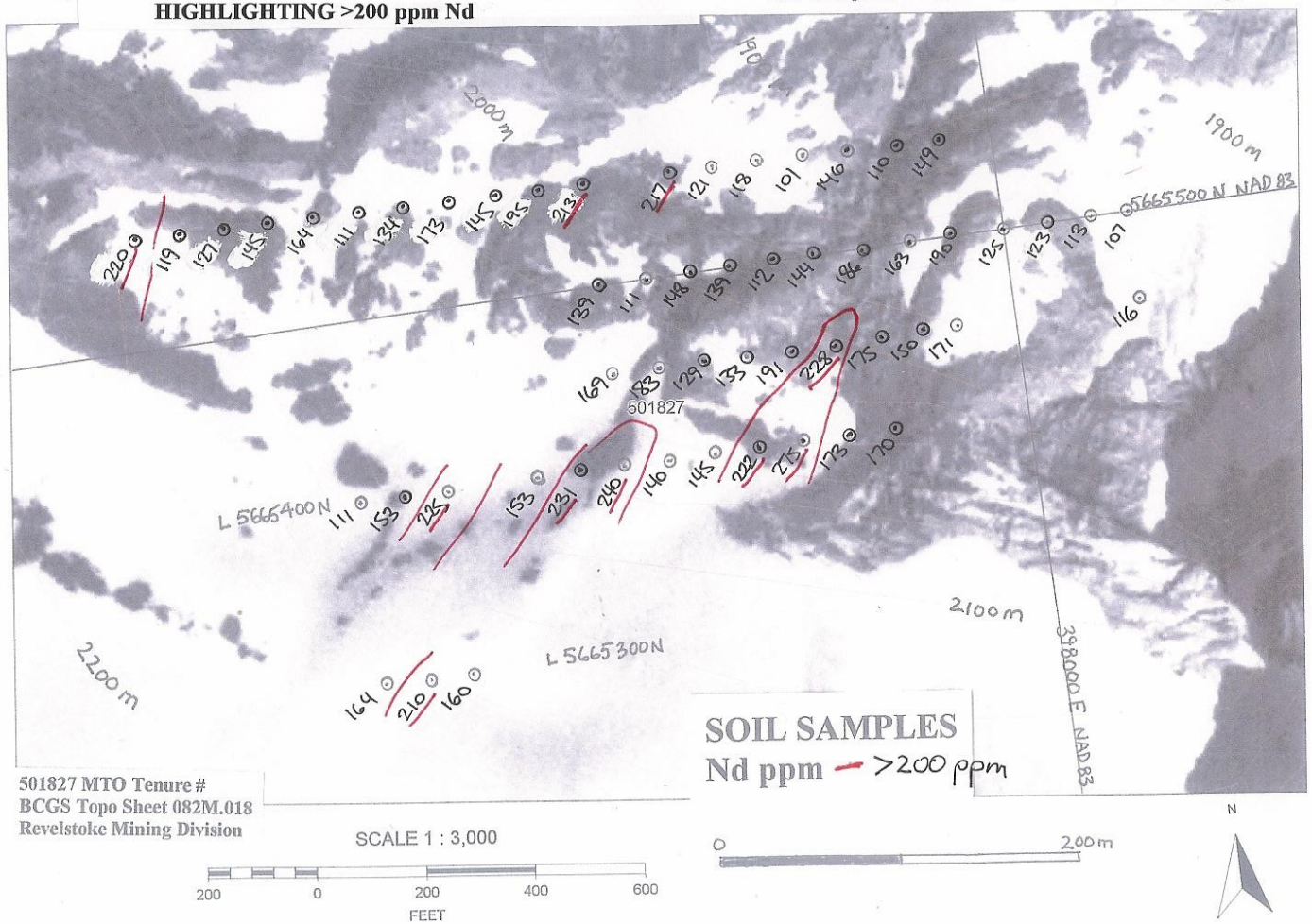
0 200 m

N

Copeland Soil Samples Glacier Zone-East Extension

FIG 11 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >200 ppm Nd

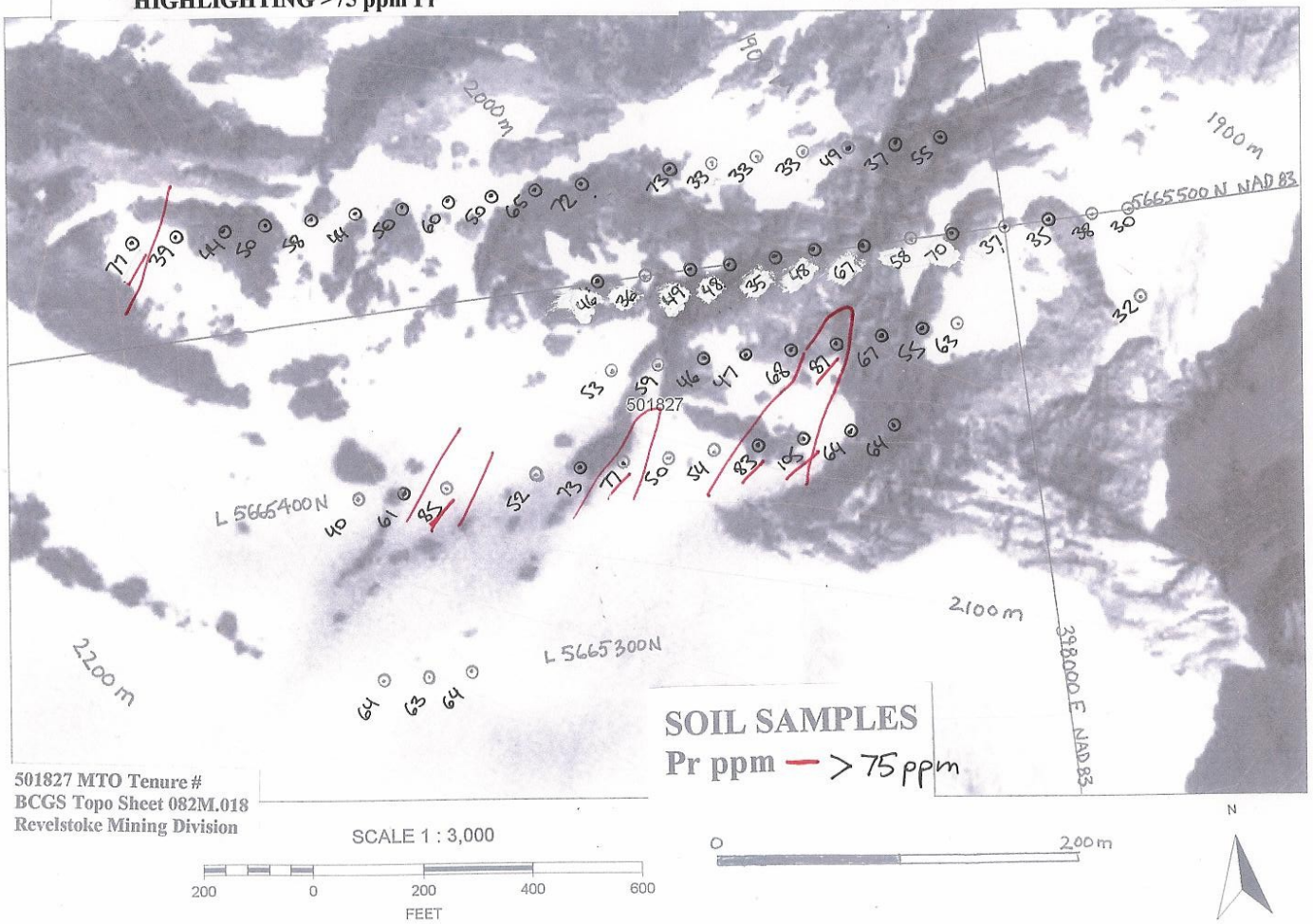
⊙ Soil Sample (along E-W grid lines, 25 m spacing)



Copeland Soil Samples Glacier Zone-East Extension

FIG 12 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >75 ppm Pr

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

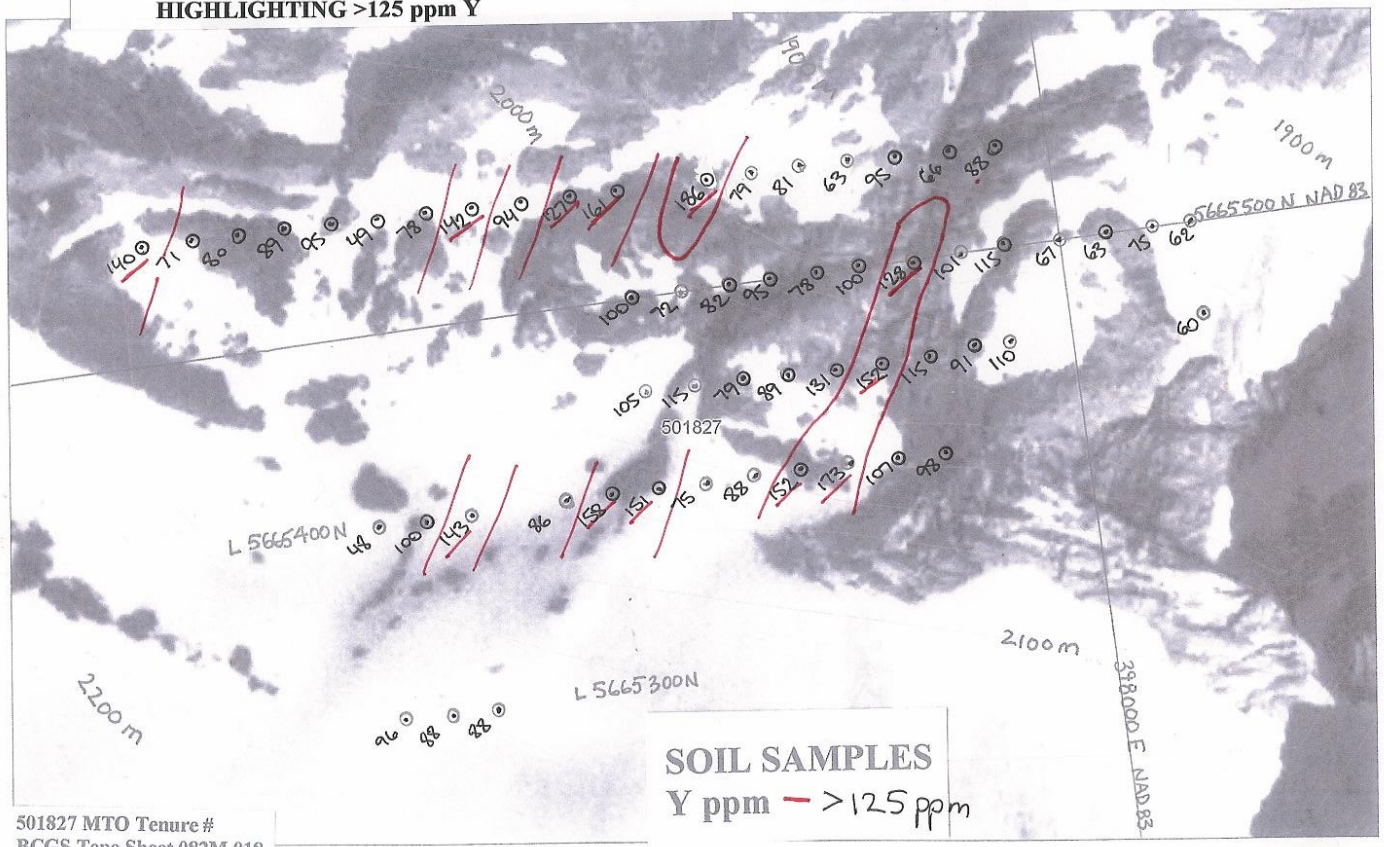
SCALE 1 : 3,000

200 0 200 400 600
FEET

Copeland Soil Samples Glacier Zone-East Extension

FIG 13 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >125 ppm Y

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

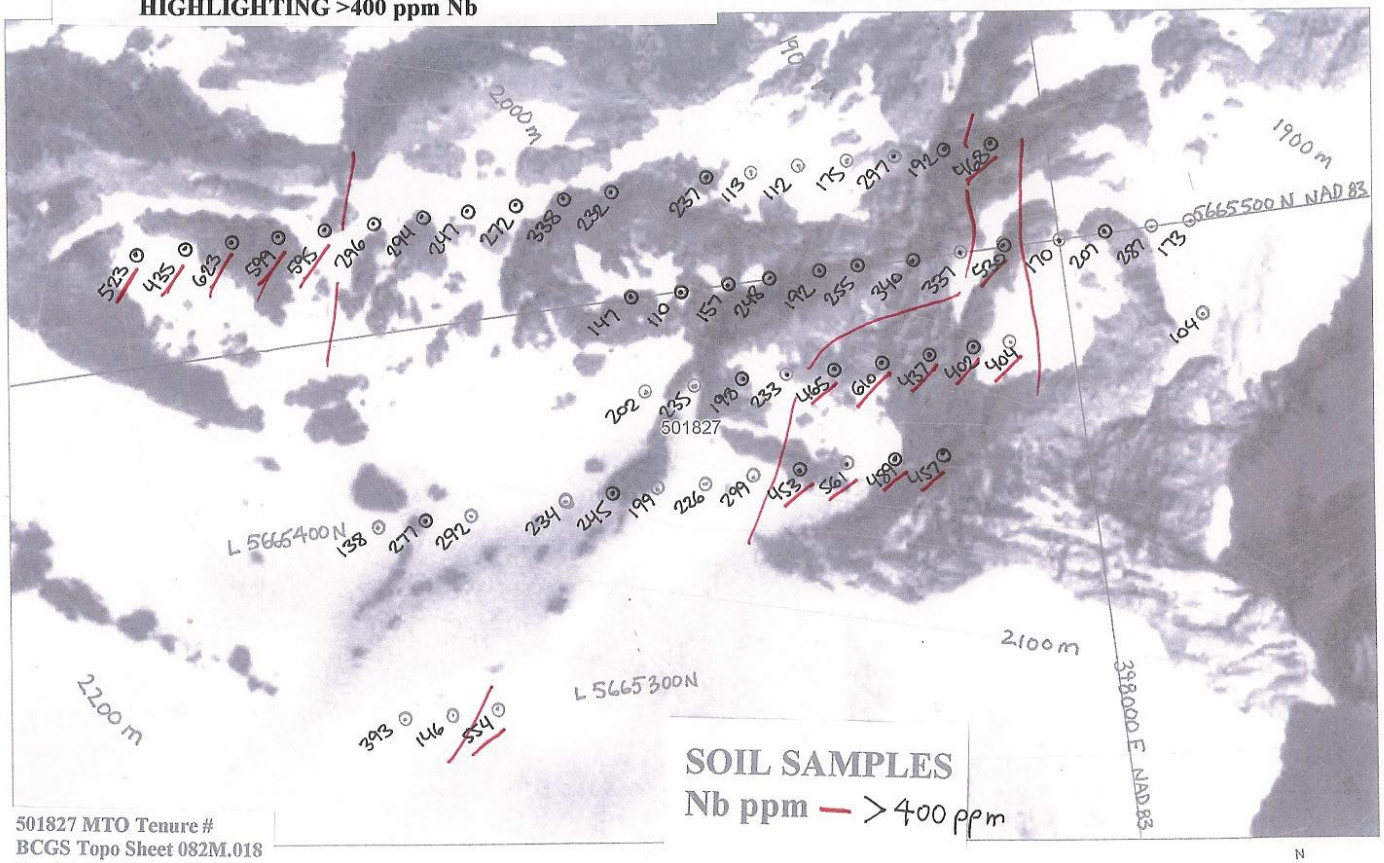
0 200 m

N

Copeland Soil Samples Glacier Zone-East Extension

FIG 14 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >400 ppm Nb

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

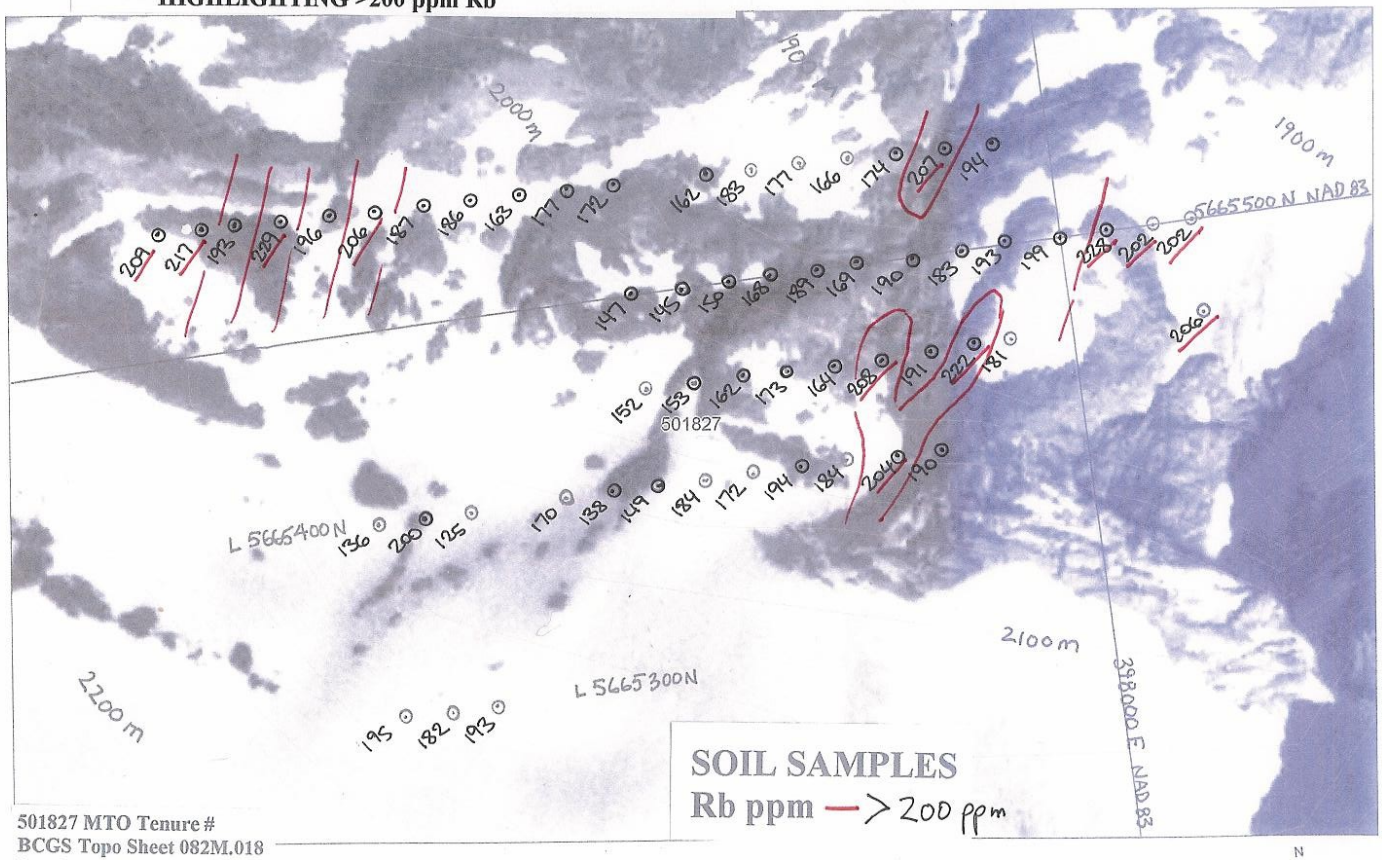
0 200 m

N

Copeland Soil Samples Glacier Zone-East Extension

FIG 15 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >200 ppm Rb

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

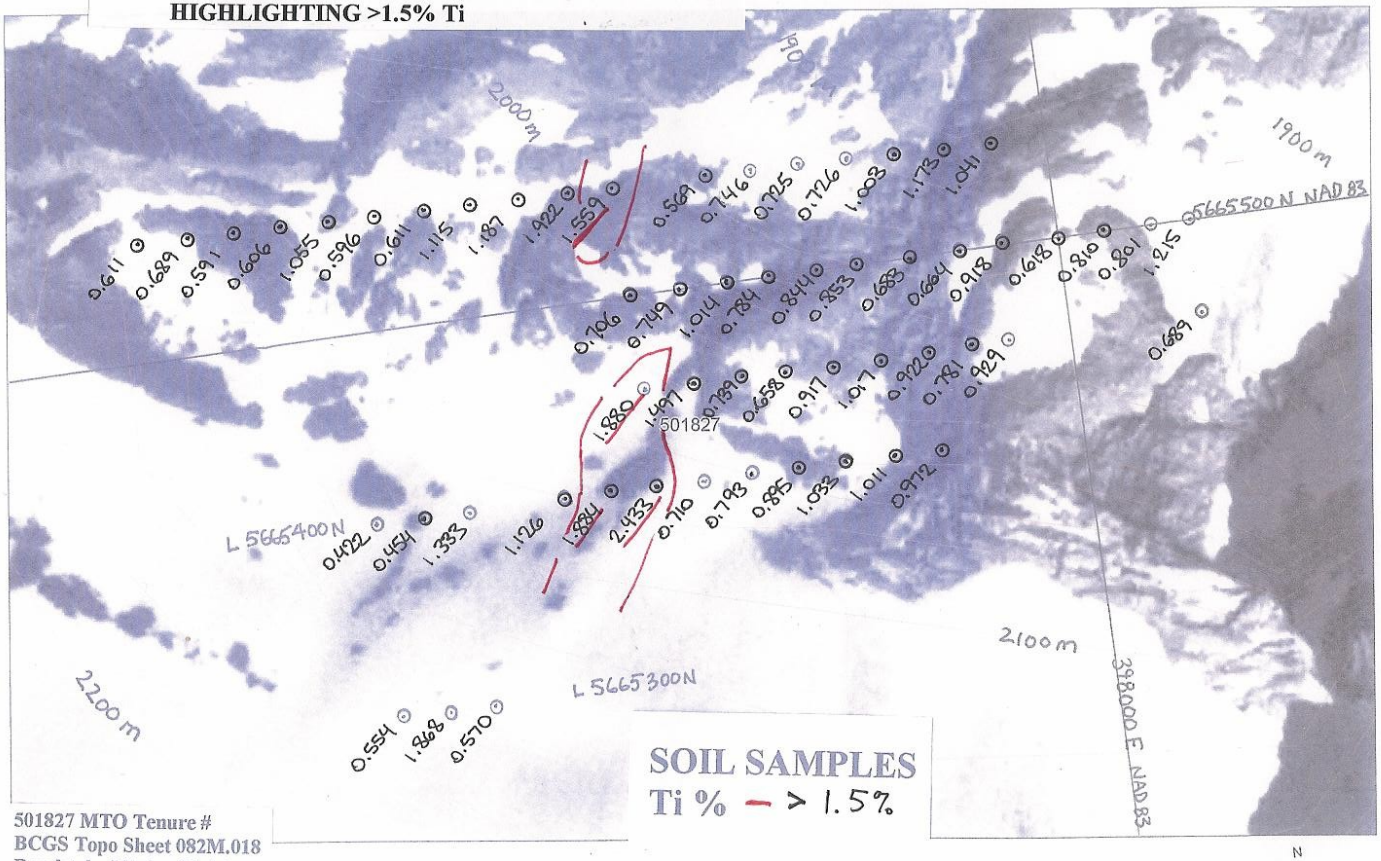
0 200m

N

Copeland Soil Samples Glacier Zone-East Extension

FIG 16 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >1.5% Ti

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



SOIL SAMPLES
Ti % — > 1.5%

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

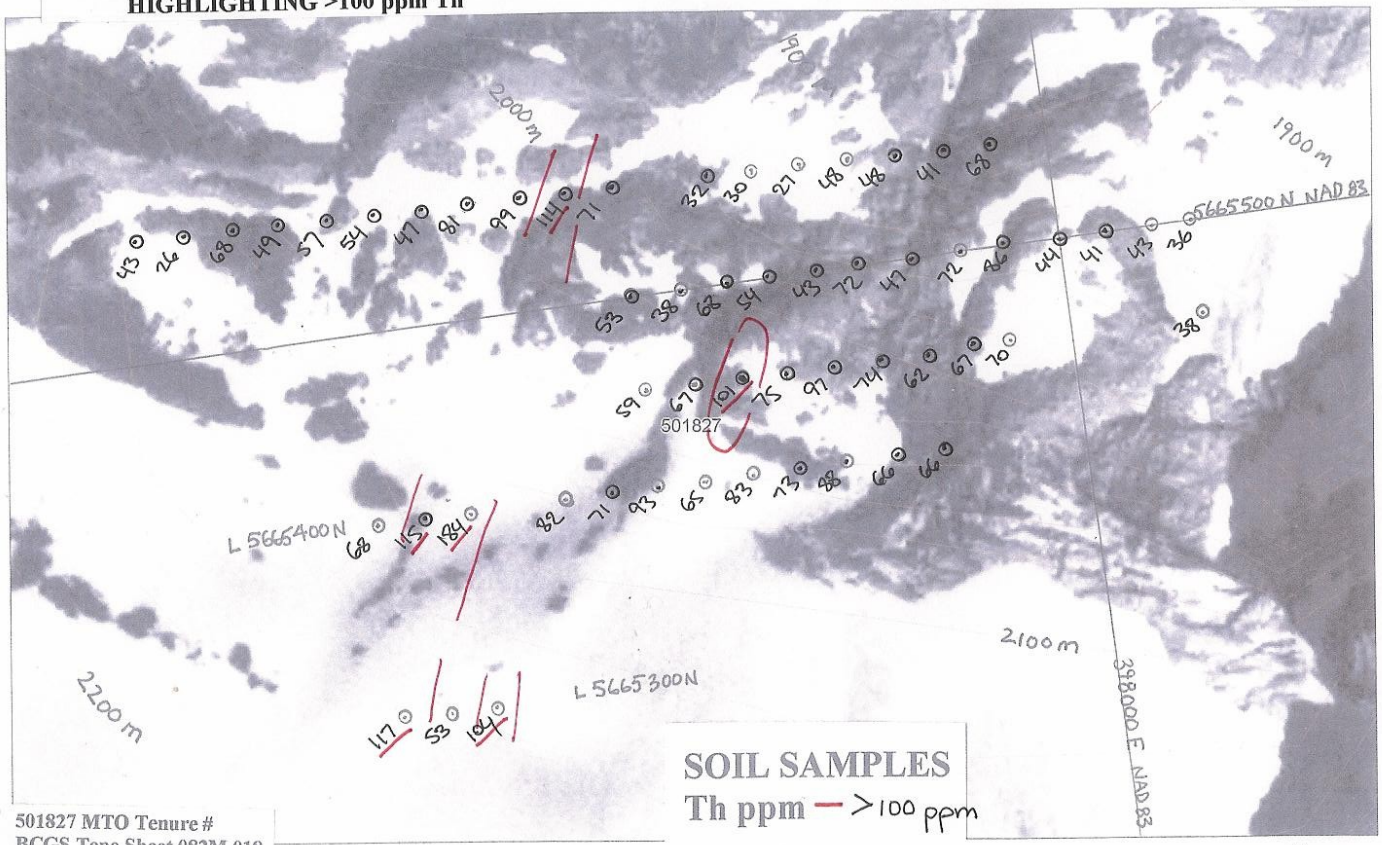
0 200m

N

Copeland Soil Samples Glacier Zone-East Extension

FIG 17 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >100 ppm Th

⊙ Soil Sample (along E-W grid lines, 25 m spacing)



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

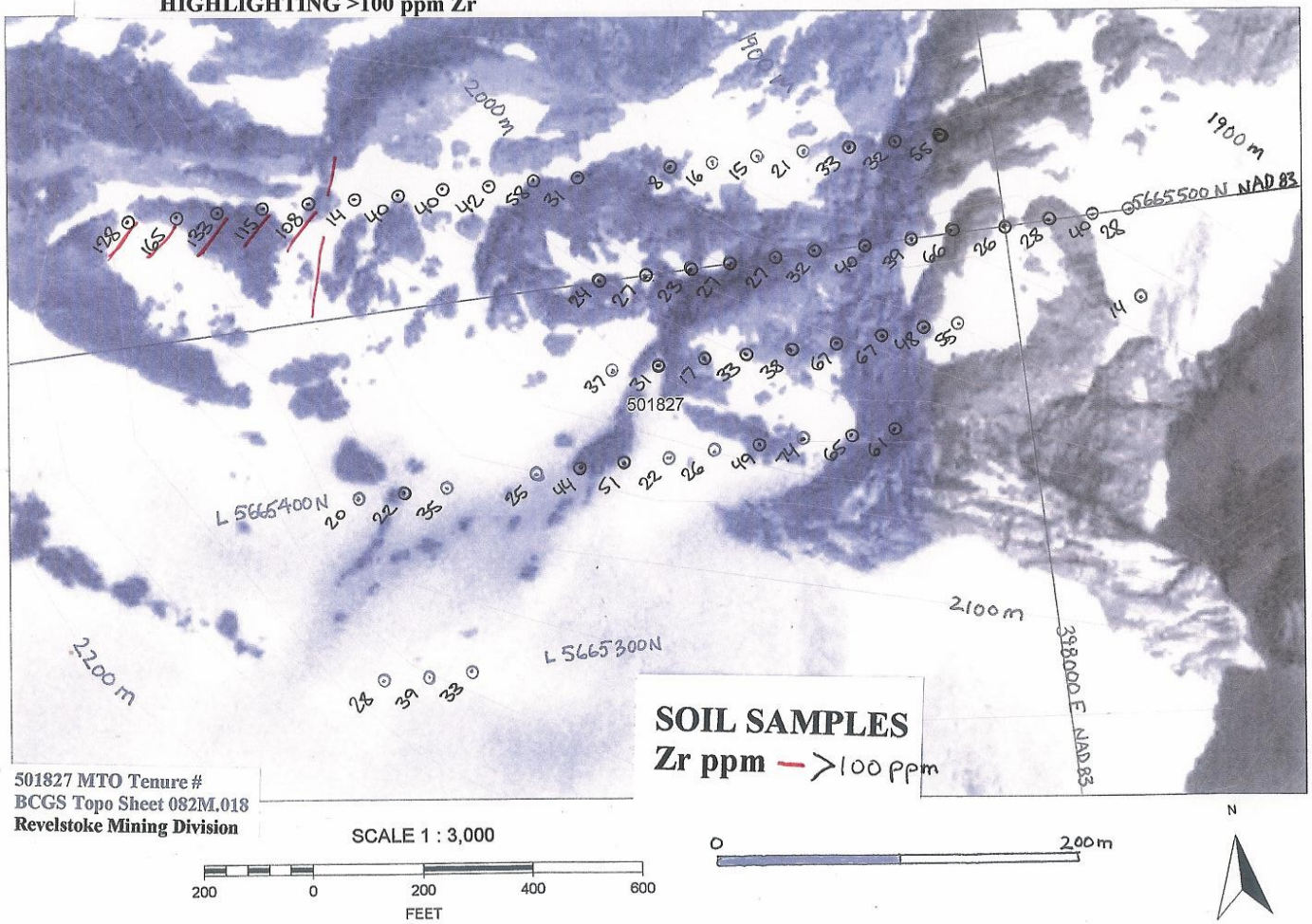
0 200 m

N

Copeland Soil Samples Glacier Zone-East Extension

FIG 18 GLACIER ZONE EAST SOIL SAMPLES AUG, 2010
HIGHLIGHTING >100 ppm Zr

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**



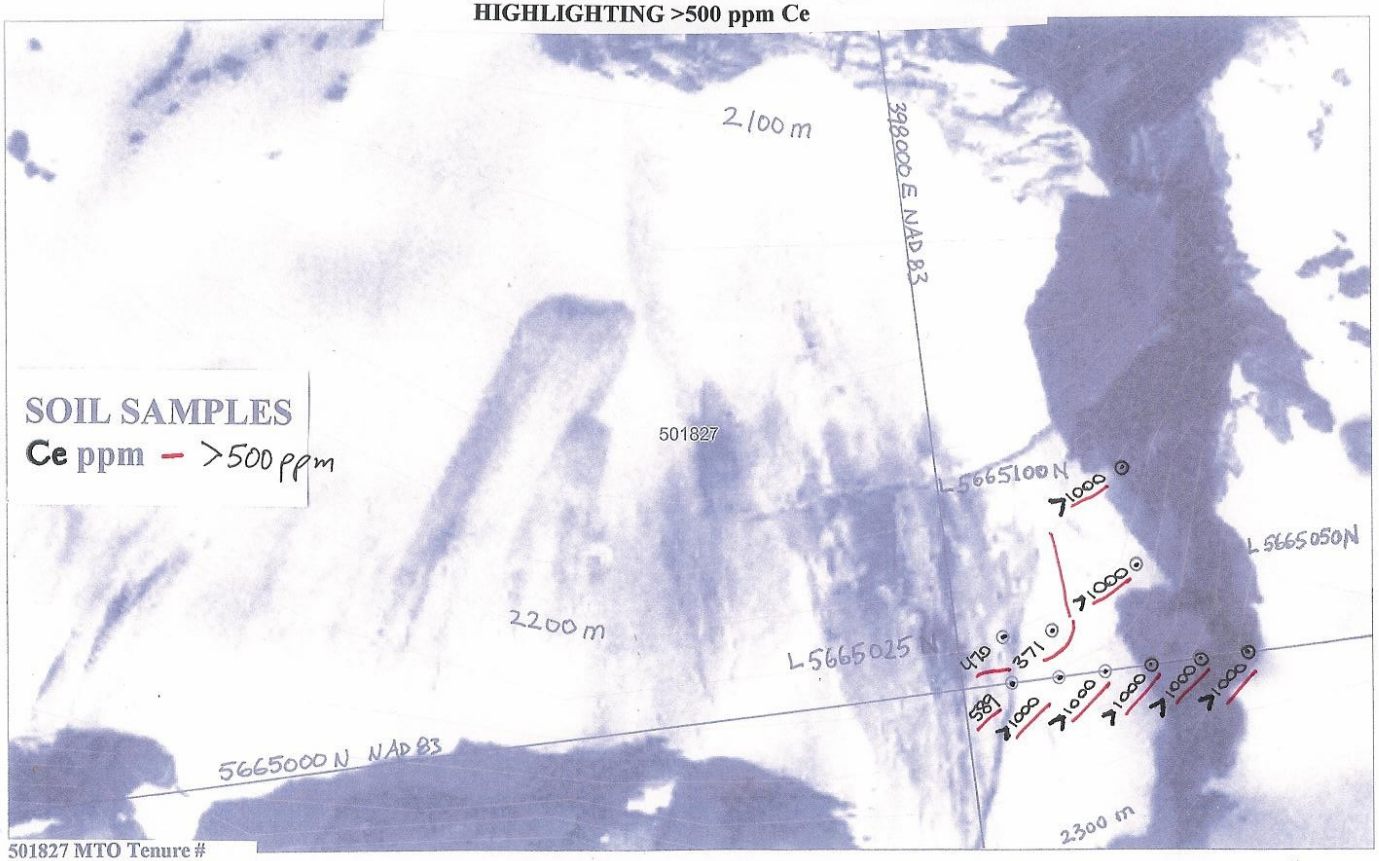
501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

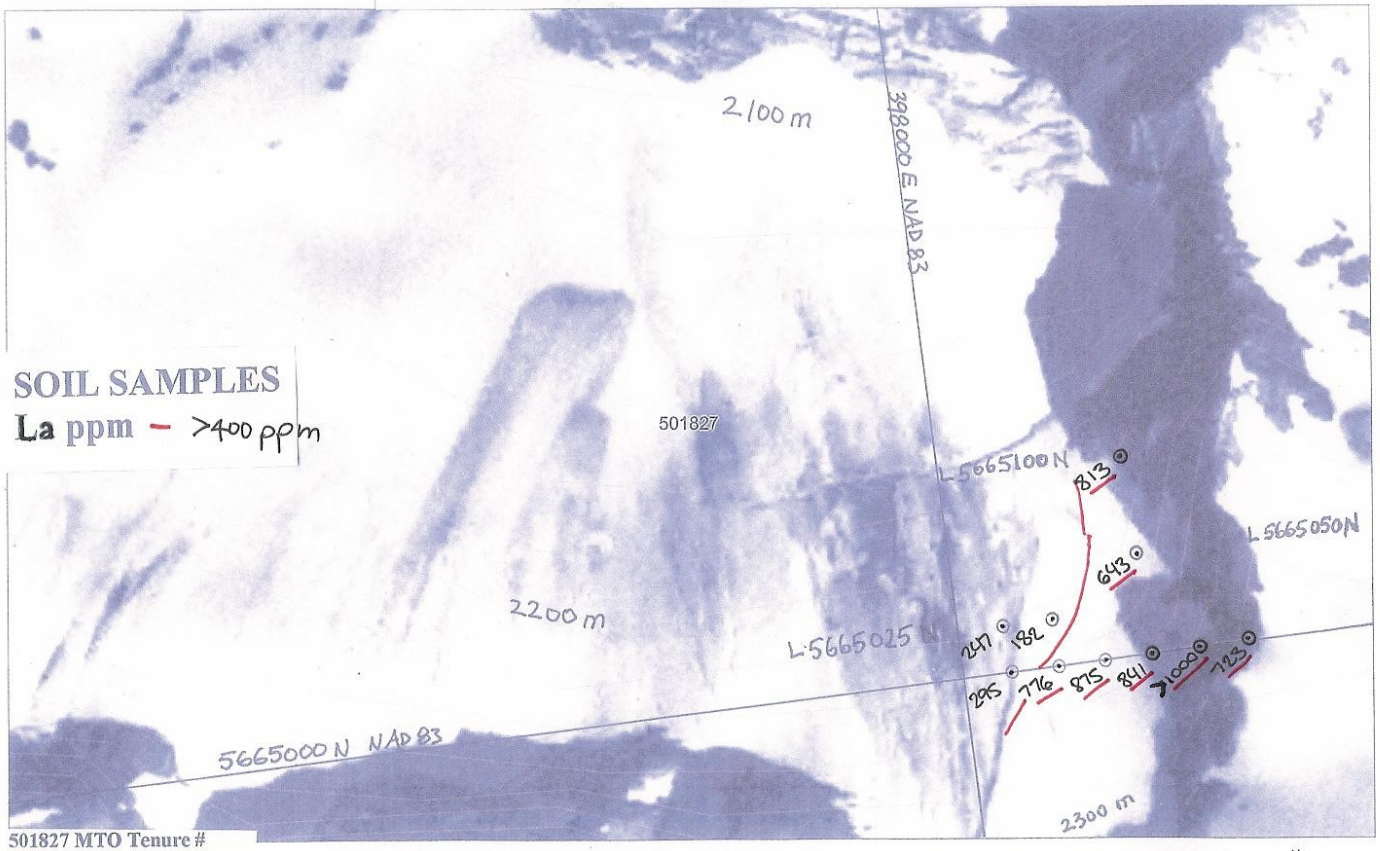
Copeland Soil Samples East Glacier Zone

FIG 19 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >500 ppm Ce



Copeland Soil Samples East Glacier Zone

FIG 20 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >400 ppm La



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

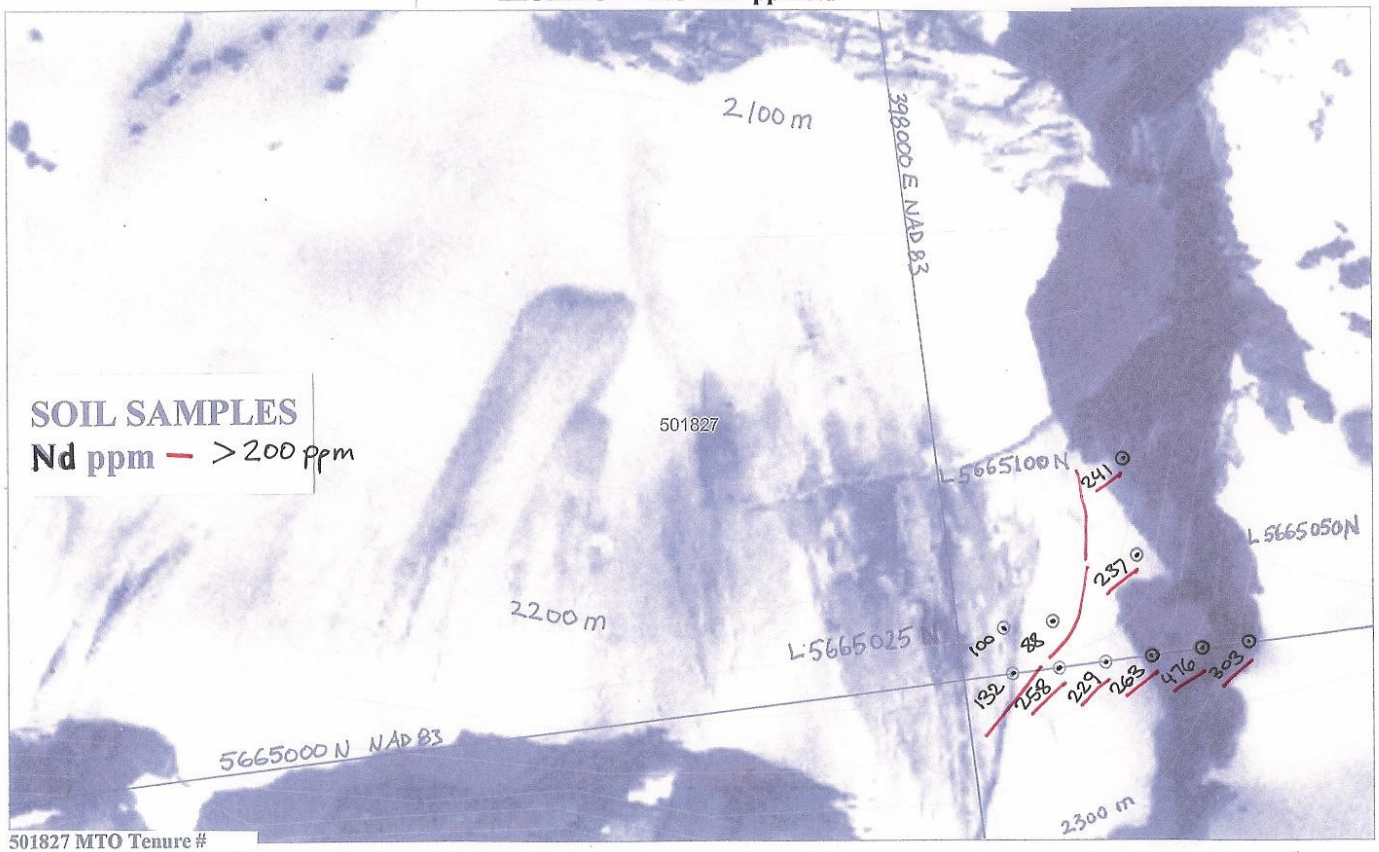
200 0 200 400 600
FEET
0 100 200 m

⊙ Soil Sample (along E-W grid lines, 25 m spacing)

N

Copeland Soil Samples East Glacier Zone

FIG 21 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >200 ppm Nd



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

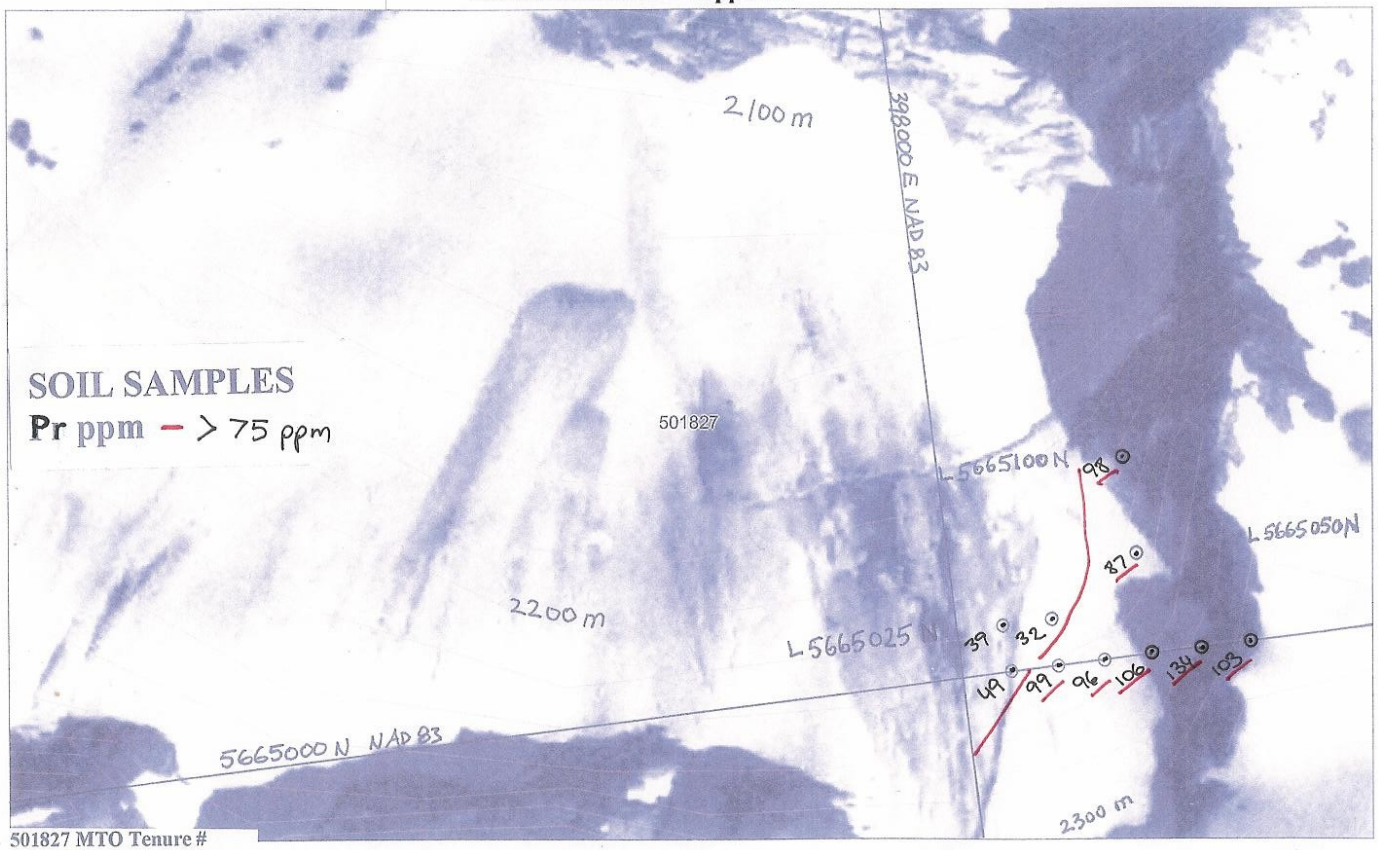
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples East Glacier Zone

FIG 22 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >75 ppm Pr



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

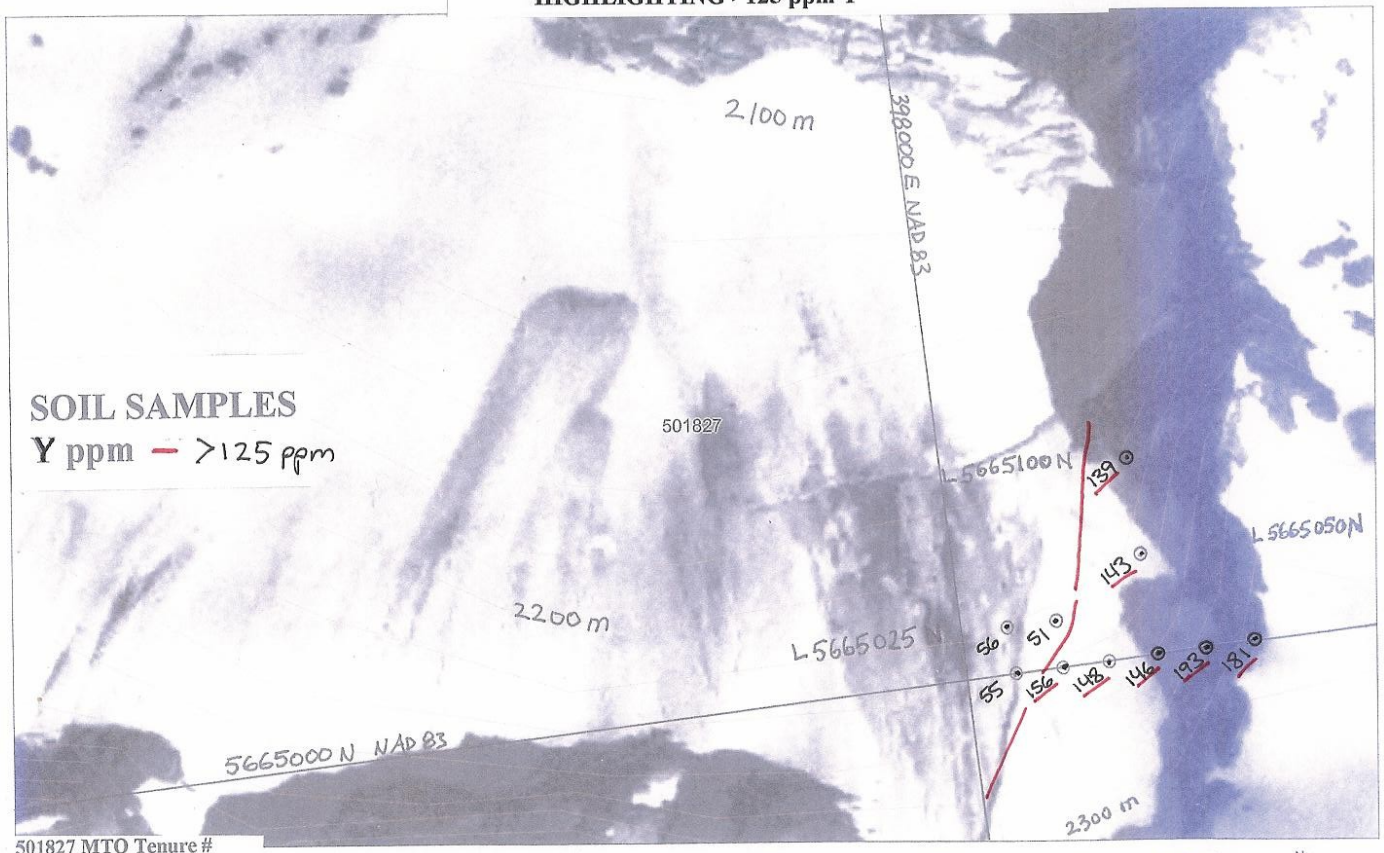
200 0 200 400 600
FEET
0 100 200 m

⊙ Soil Sample (along E-W grid lines, 25 m spacing)

N

Copeland Soil Samples East Glacier Zone

FIG 23 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >125 ppm Y



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

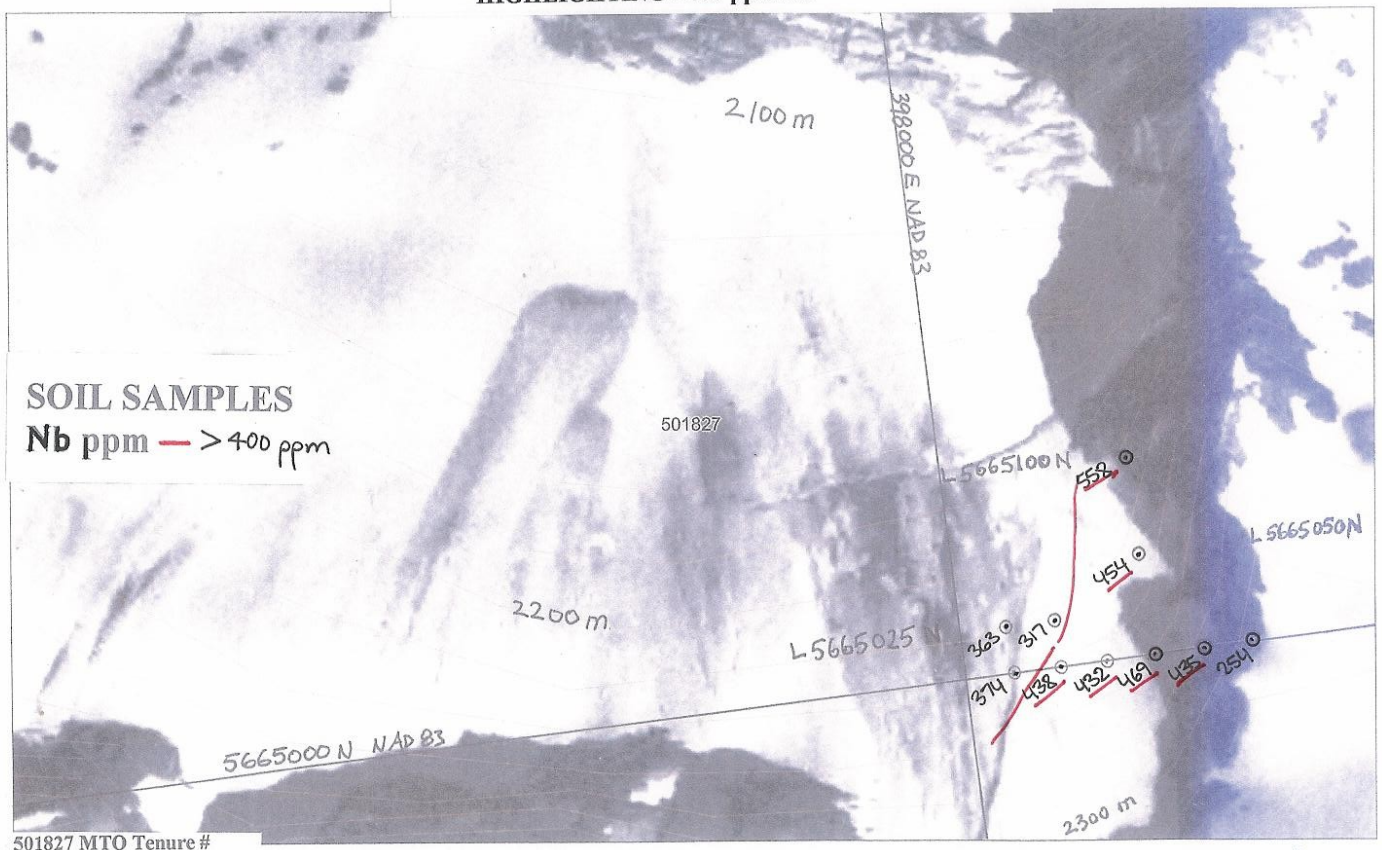
200 0 200 400 600
FEET
0 100 200 m

⊙ Soil Sample (along E-W grid lines, 25 m spacing)

N

Copeland Soil Samples East Glacier Zone

FIG 24 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >400 ppm Nb



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

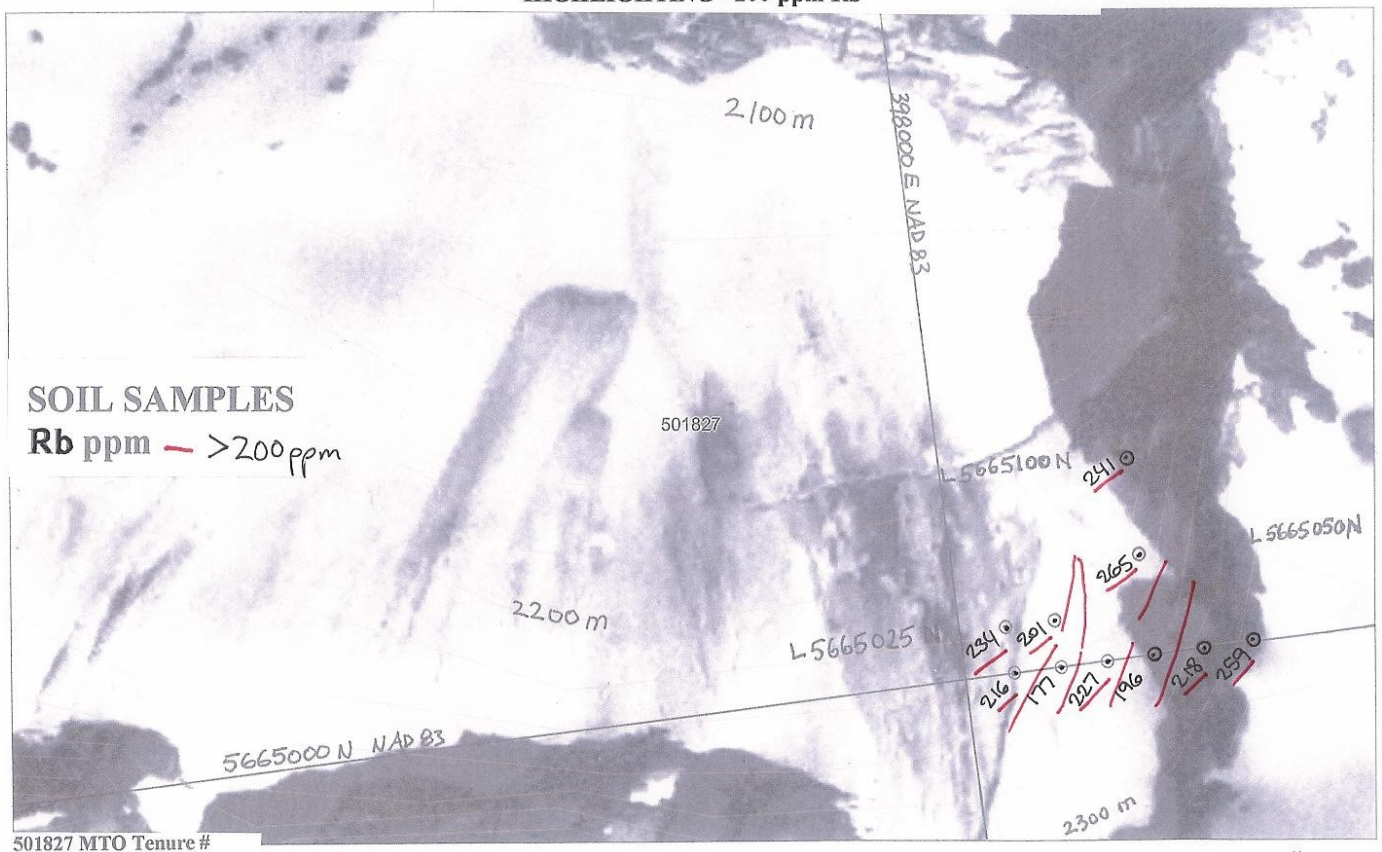
200 0 200 400 600
FEET
0 100 200 m

⊙ Soil Sample (along E-W grid lines, 25 m spacing)

N

Copeland Soil Samples East Glacier Zone

FIG 25 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >200 ppm Rb



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

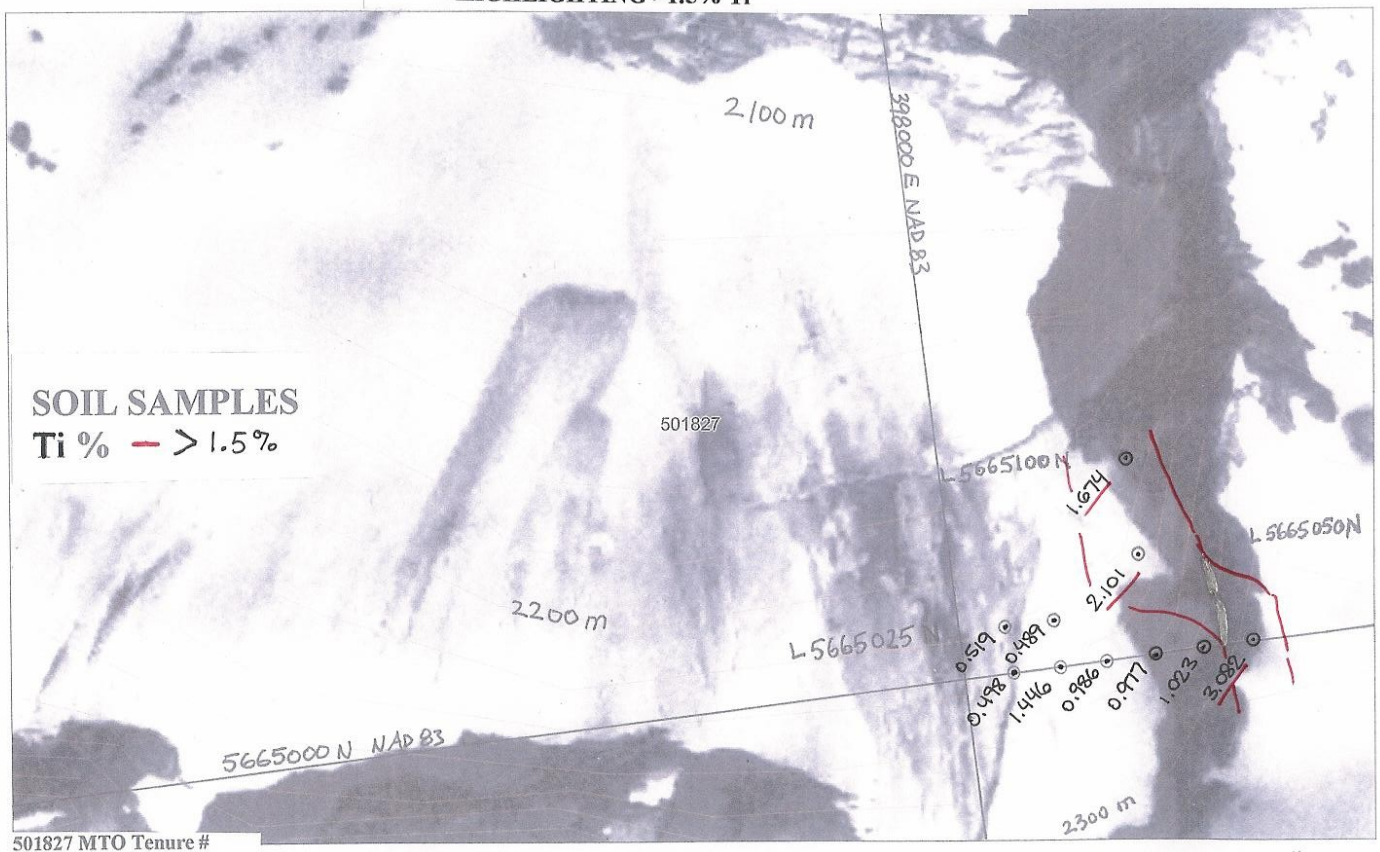
200 0 200 400 600
FEET
0 100 200 m

⊙ Soil Sample (along E-W grid lines, 25 m spacing)

N

Copeland Soil Samples East Glacier Zone

FIG 26 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >1.5% Ti



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

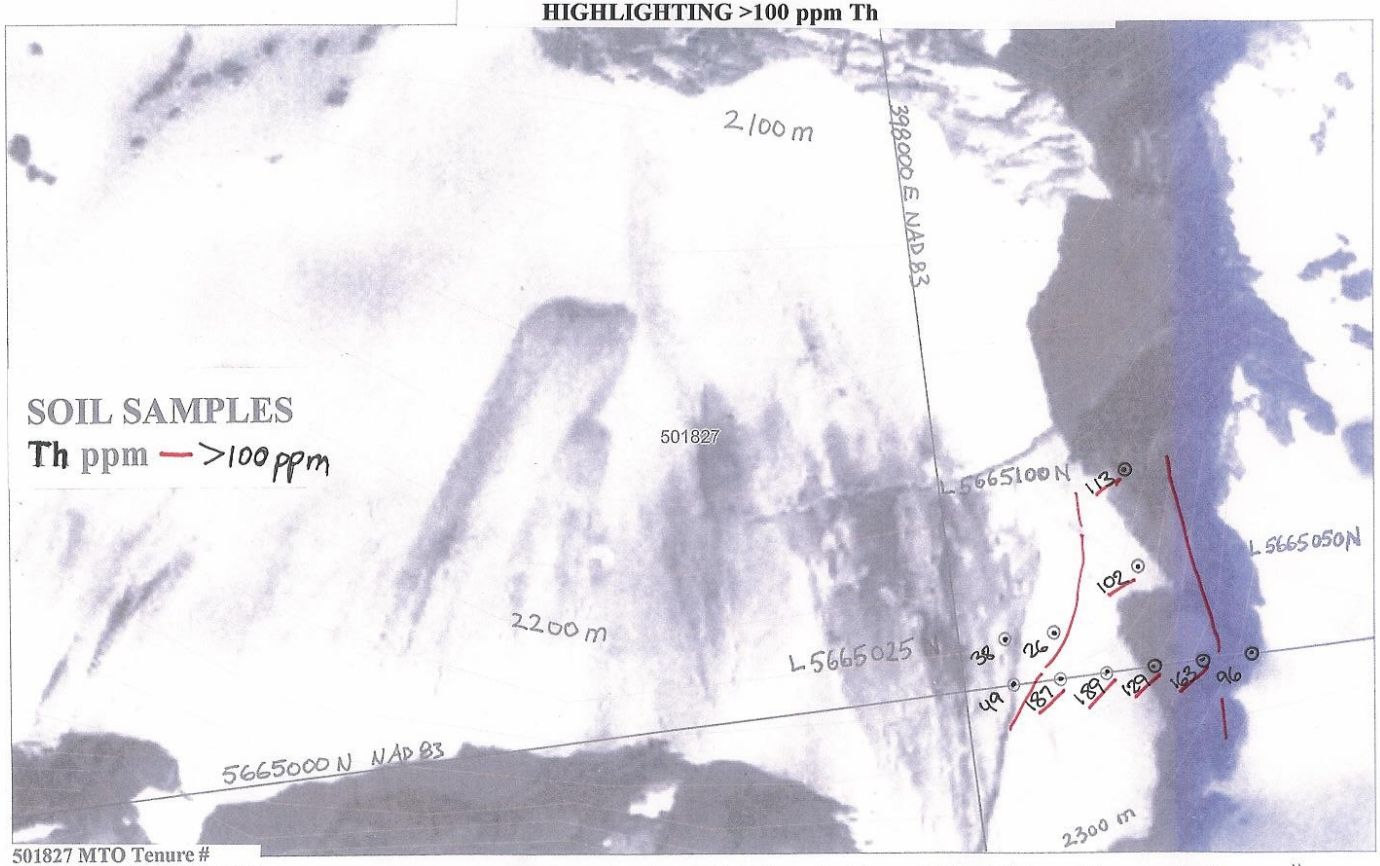
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples East Glacier Zone

FIG 27 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >100 ppm Th



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

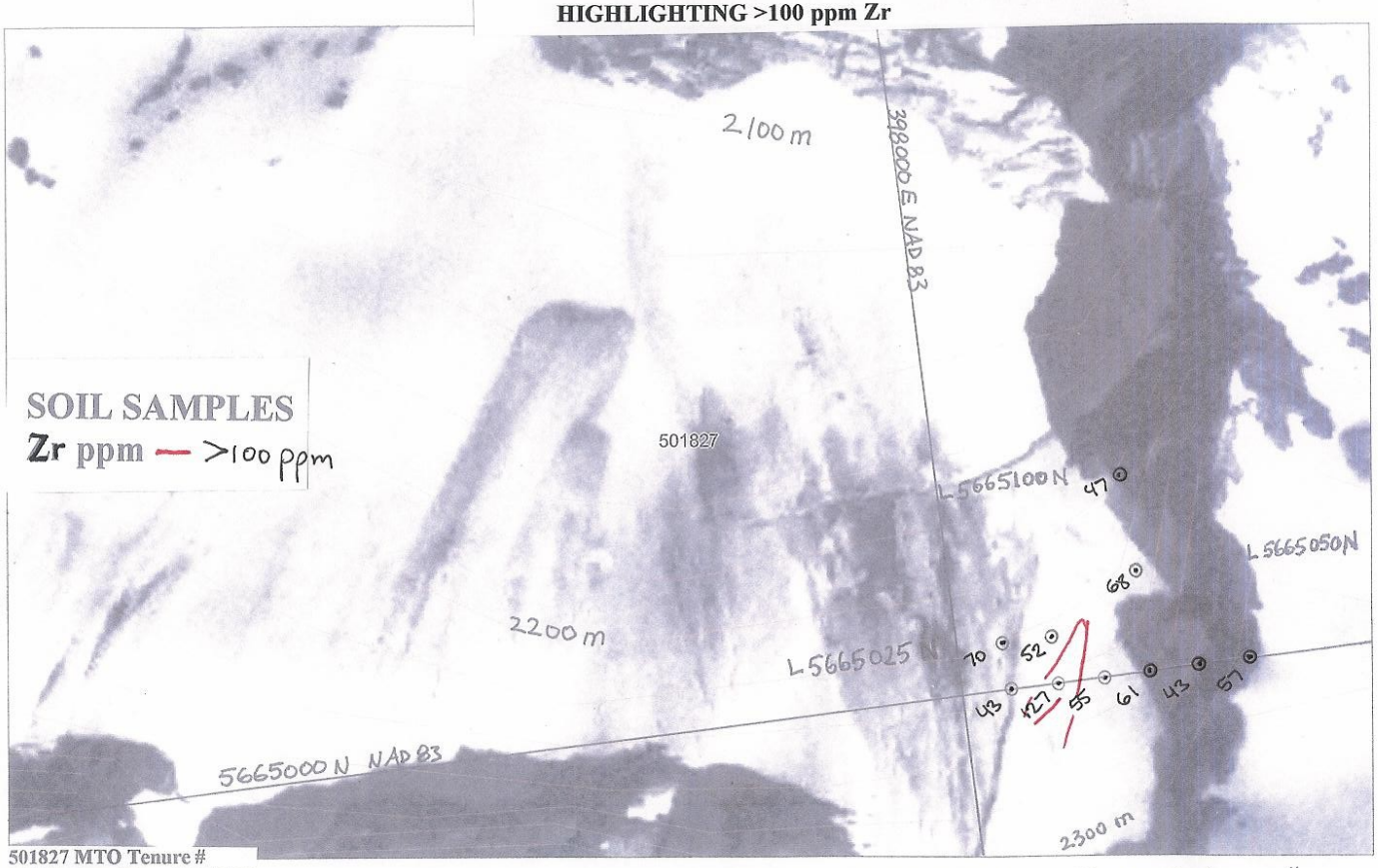
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples East Glacier Zone

FIG 28 EAST GLACIER ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >100 ppm Zr



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

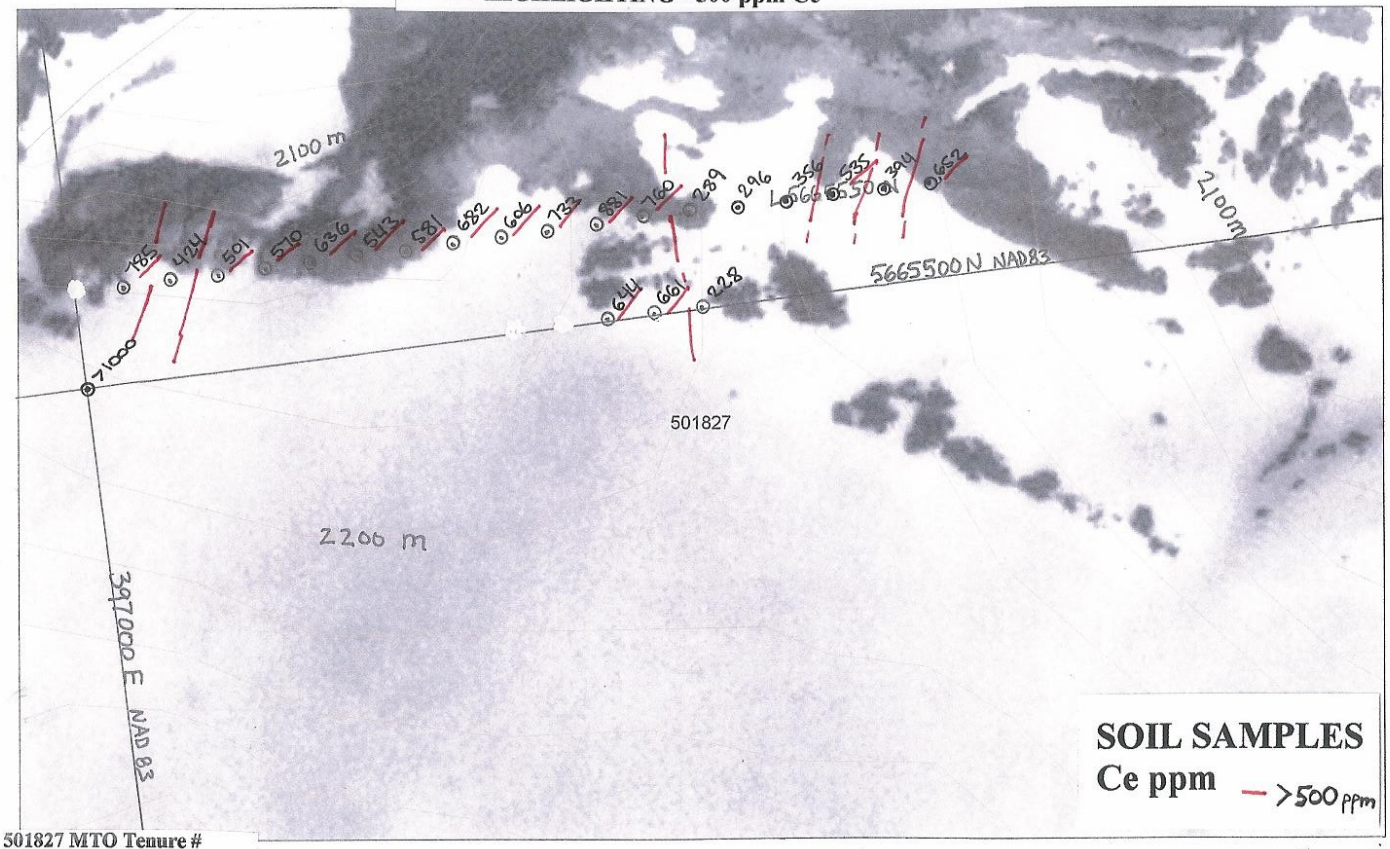
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 29 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >500 ppm Ce



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

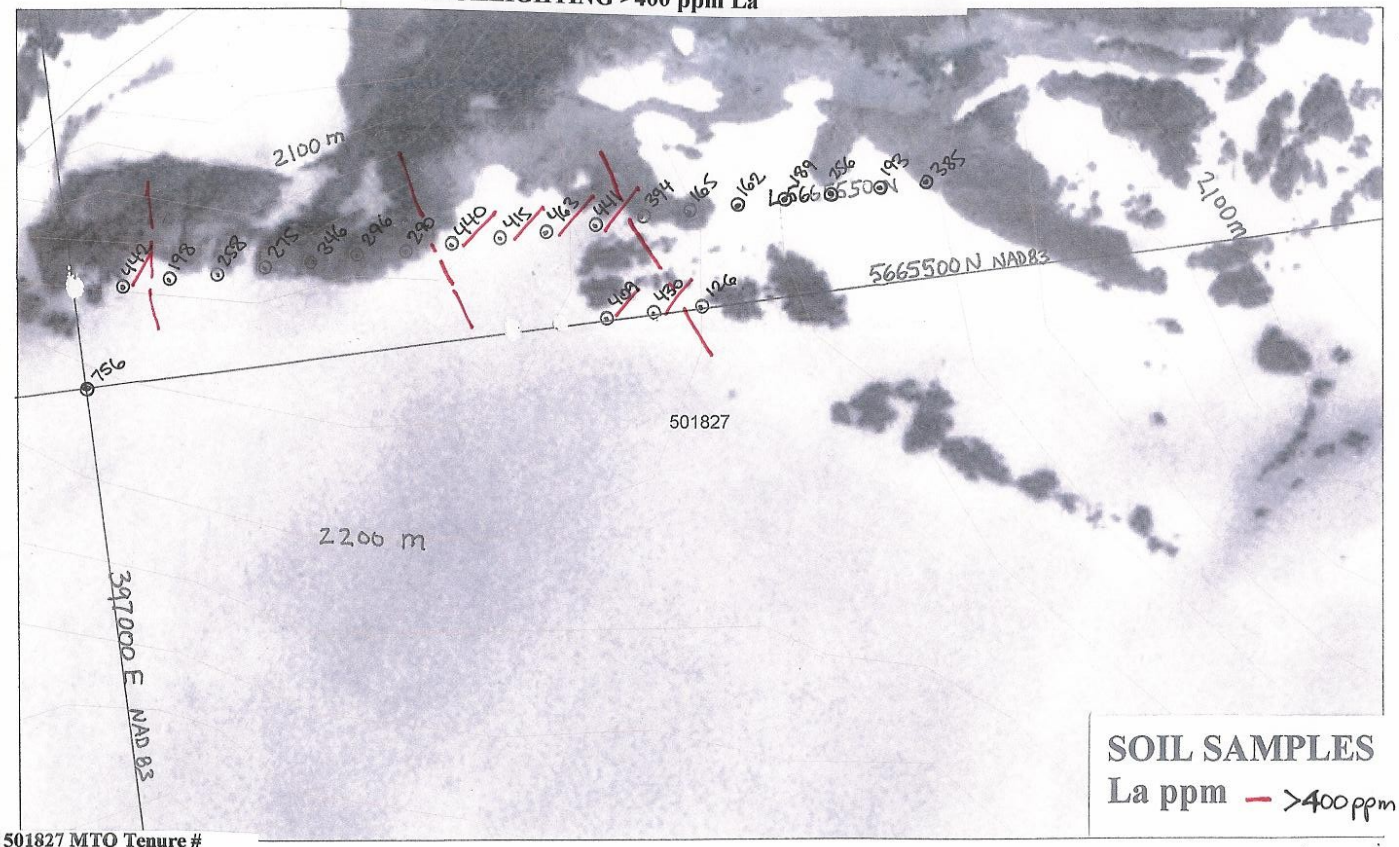
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 30 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >400 ppm La



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

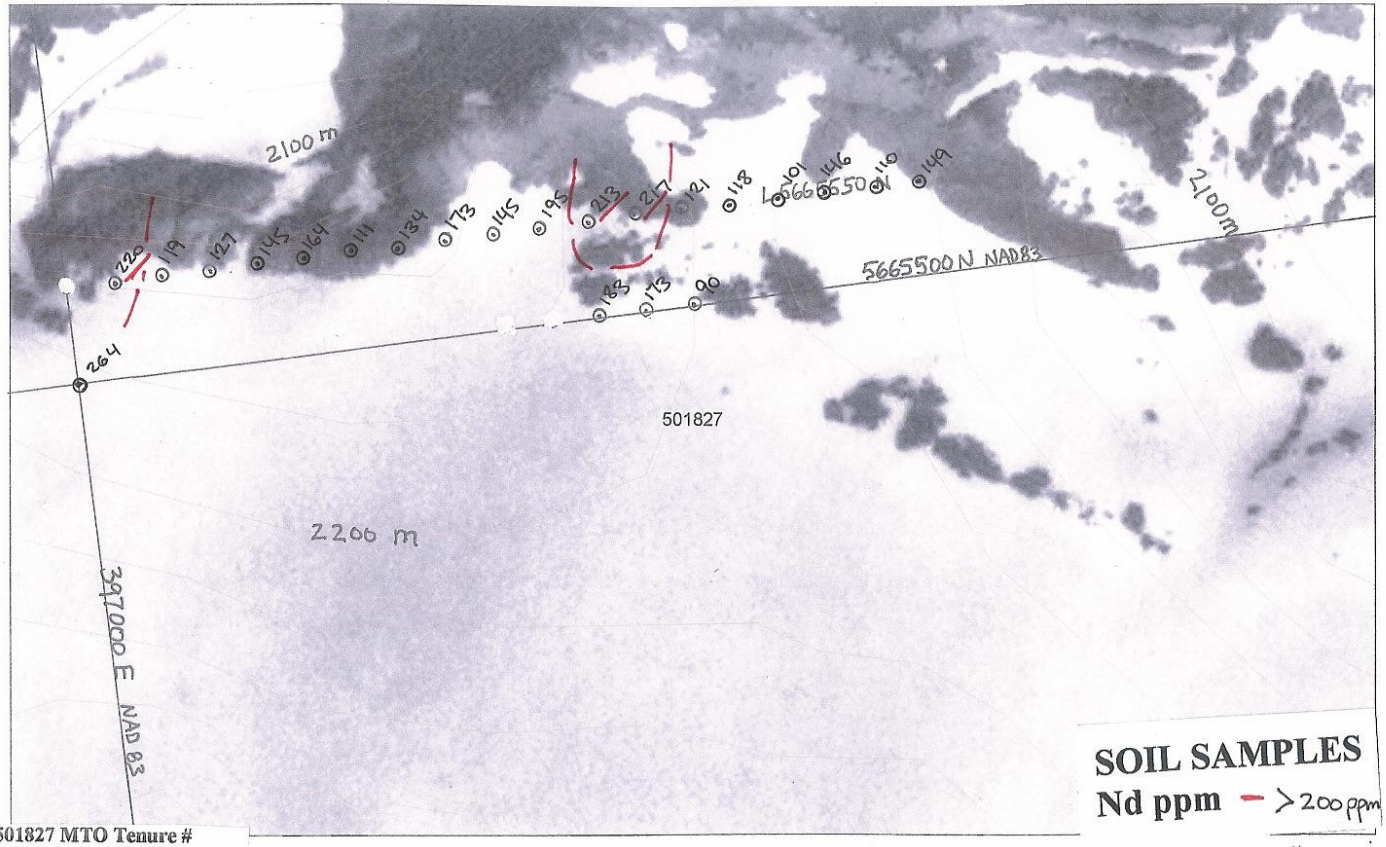
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 31 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >200 ppm Nd



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

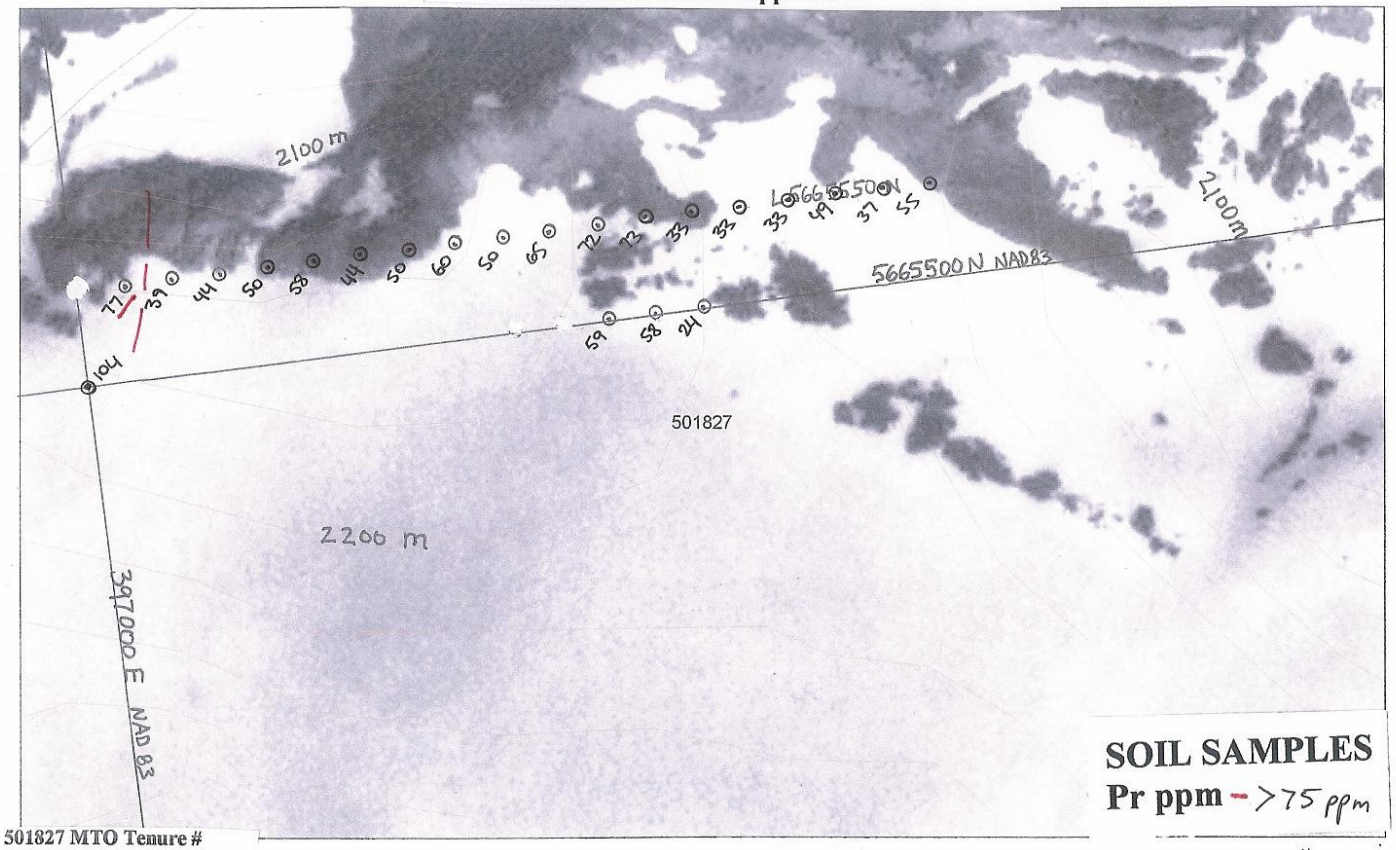
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 32 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >75 ppm Pr



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

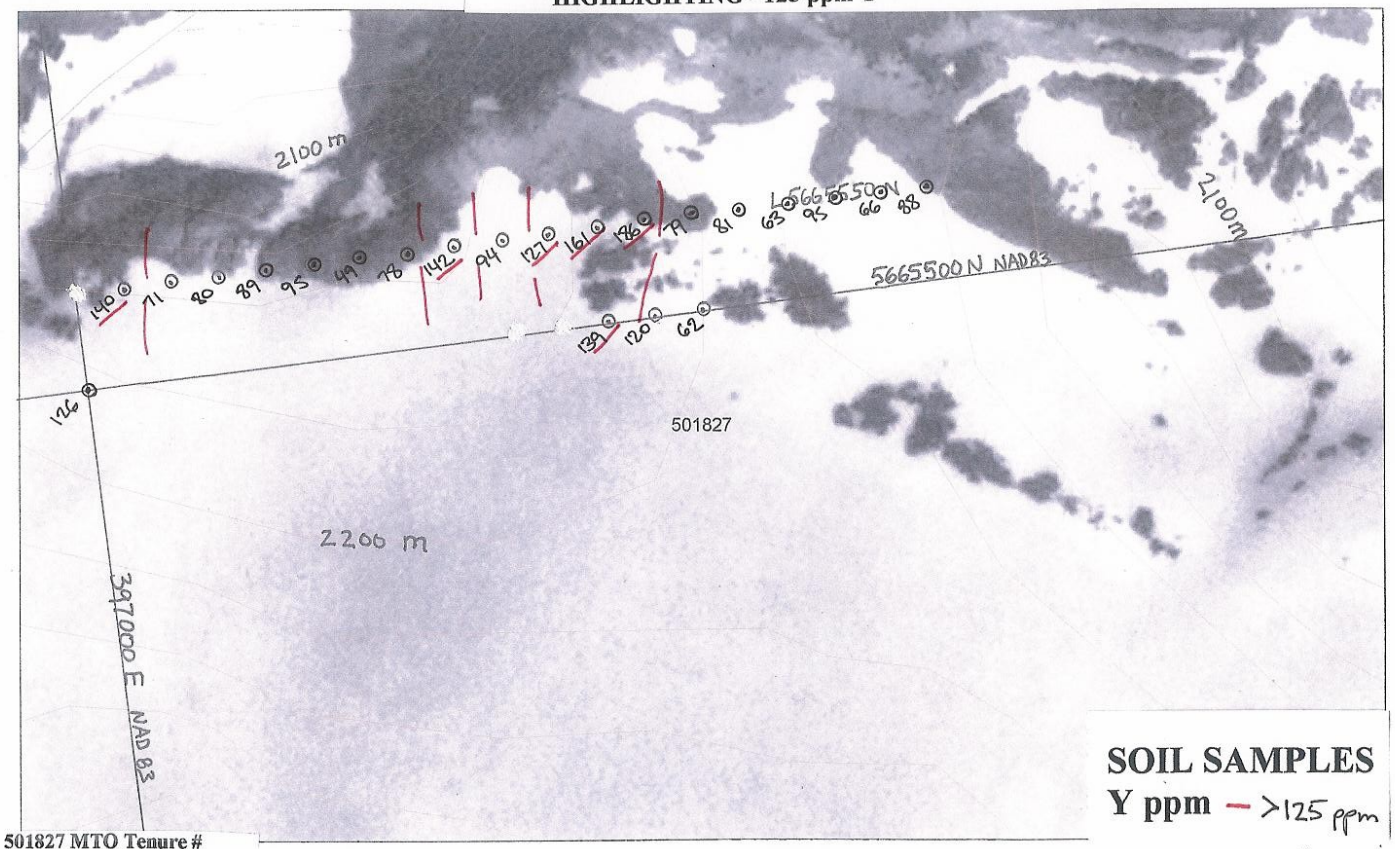
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 33 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >125 ppm Y



SOIL SAMPLES
Y ppm — >125 ppm

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

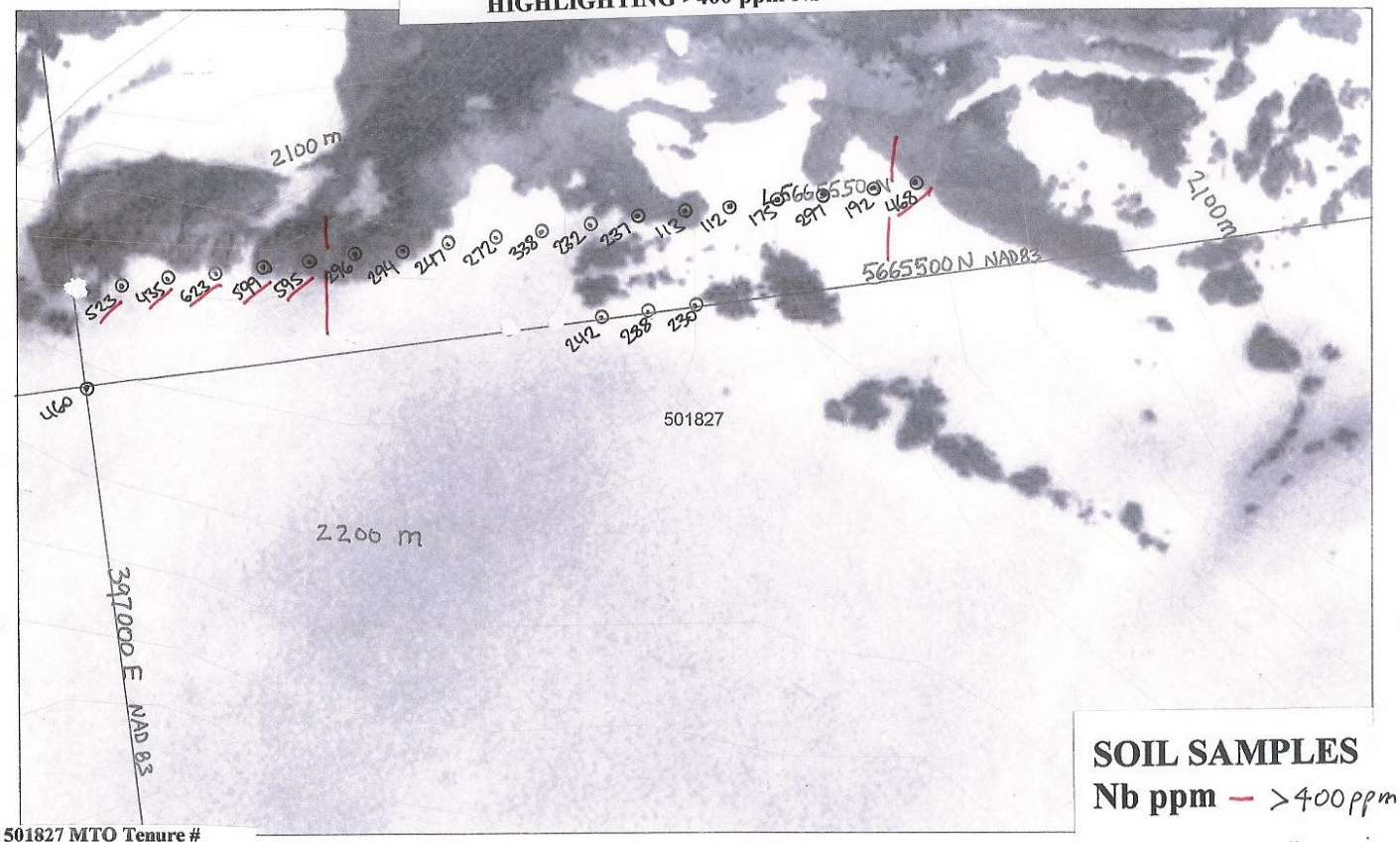
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 34 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >400 ppm Nb



SOIL SAMPLES
Nb ppm — >400 ppm

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

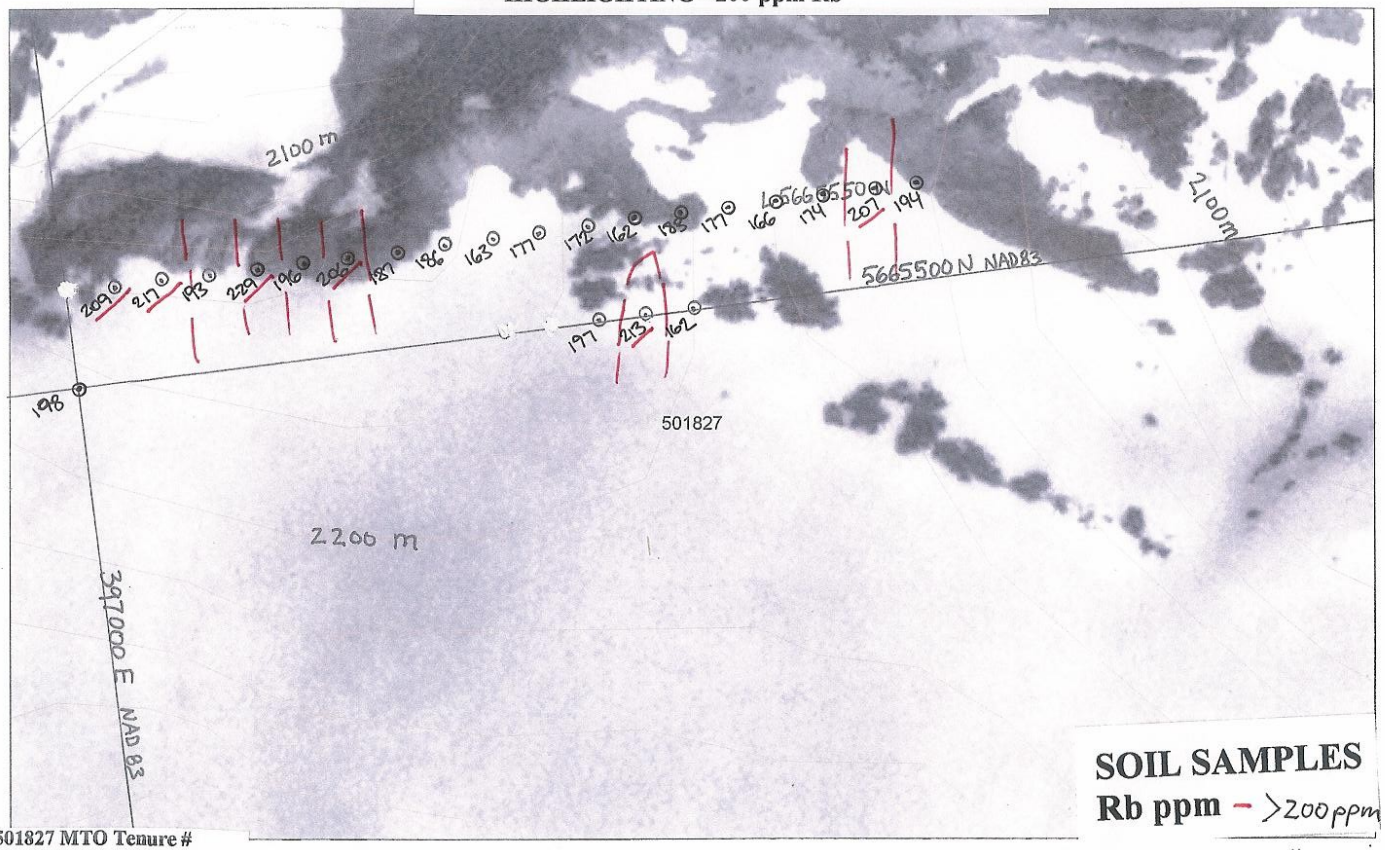
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 35 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >200 ppm Rb



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET

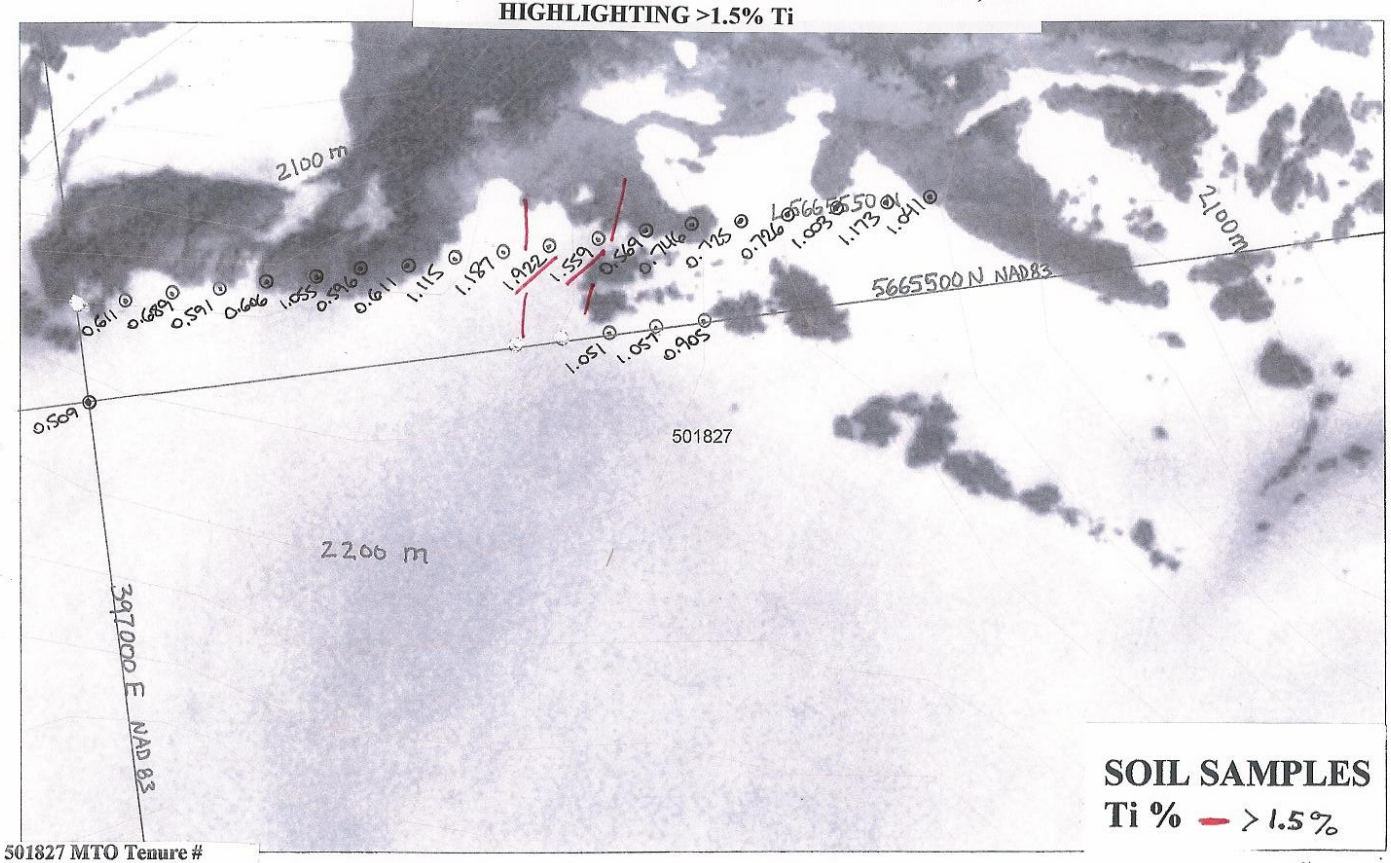
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 36 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >1.5% Ti



501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

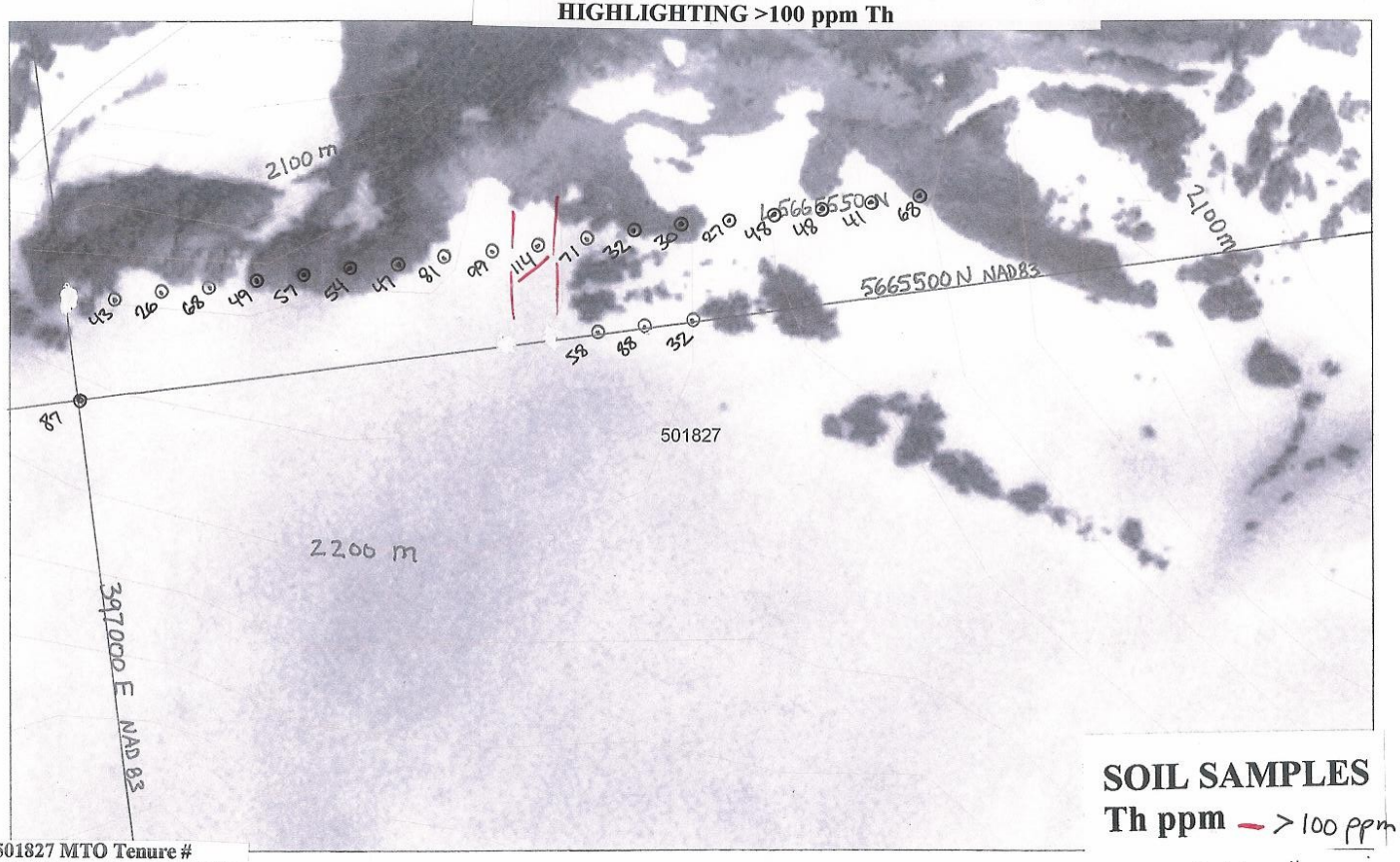
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 37 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >100 ppm Th



SOIL SAMPLES
Th ppm — > 100 ppm

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

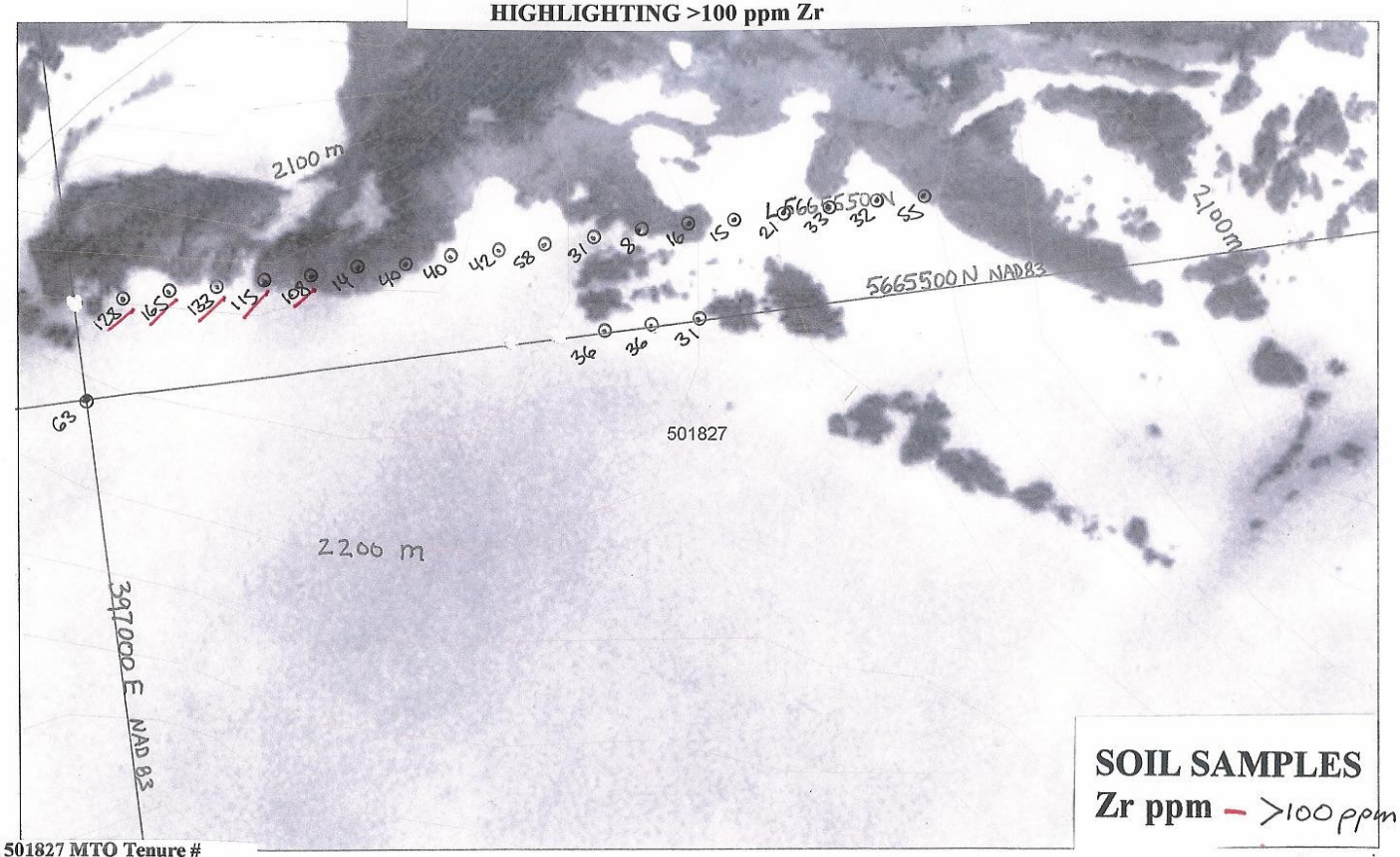
200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

Copeland Soil Samples West Basin & Ridge

FIG 38 WEST BASIN ZONE SOIL SAMPLES AUG, 2010
HIGHLIGHTING >100 ppm Zr



SOIL SAMPLES
Zr ppm – >100 ppm

501827 MTO Tenure #
BCGS Topo Sheet 082M.018
Revelstoke Mining Division

SCALE 1 : 3,000

200 0 200 400 600
FEET
0 100 200 m

⊙ **Soil Sample (along E-W grid lines, 25 m spacing)**

N

APPRENDIX A

PETROGRAPHIC REPORT ON 3 SAMPLES FROM MOUNT COPELAND

Report for: Andris Kikauka, P. Geo. Invoice 101039

Geofacts Consulting
406-4901 East Sooke Road.
Sooke, B.C. V0S 1N0 (250) 474-0424 Nov. 29, 2010.

SUMMARY:

All three samples (leucocratic syenite, unknown, and syeno-monzonite gneiss) appear to contain minor to significant amounts of possible REE-bearing minerals (possibly mostly monazite in COPE10-AR-3, perhaps allanite-REE oxides (?) in 10-AR-20, and minor REE oxides (?) in 10-AR-22). The mineralogy of COPE10-AR-20 is largely unresolved; it appears to consist largely of uncommon minerals and should be subjected to SEM (scanning electron microscope) analysis.

Capsule descriptions are as follows:

COPE10AR-3: appears to represent leucocratic syenite (if albitic plagioclase is included as alkali feldspar) cut by vein sets of pyrite-green biotite/chlorite-carbonate-trace phlogopite-sphene, or discontinuous magnetite, both with minor monazite?-REE minerals?

COPE10AR-20: the mineralogy of this sample is so poorly understood from optical microscopy that it needs to be subjected to further analysis by SEM to identify many of the relatively uncommon minerals present in it. Speculatively it could consist largely of iddingsite surrounded by amphibole, with interstitial carbonate-quartz-plagioclase and accessory sphene-columbite-allanite-REE mineral.

COPE10AR-22: somewhat foliated/layered syenite or monzonite gneiss (plagioclase, lesser Kspar, somewhat aligned/layered phlogopite) with accessory pyrrhotite partly oxidized to pyrite/marcasite and limonite, carbonate (possibly dolomite and ankerite?), (in part after relict clinopyroxene), sphene, and possible REE mineral oxides (?).

Detailed petrographic descriptions and photomicrographs are appended (on CD). If you have any questions regarding the petrography, please do not hesitate to contact me.

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492 Isabella Point Road, Salt Spring Island, B.C. Canada V8K 1V4

COPE10AR-3: LEUCOCRATIC SYENITE CUT BY VEINS OF PYRITE-GREEN BIOTITE-CHLORITE±CARBONATE OR MAGNETITE, BOTH WITH MONAZITE?-REE MINERALS?

Assay results for this sample show significant molybdenum (~1%) and minor REE (not as much as in the other two samples submitted; see below). The hand specimen shows a creamy buff-white, fine-grained rock of uncertain derivation cut by a closely spaced set of sheeted black veins and sub-perpendicular, discontinuous magnetite (?) veinlet. The rock is locally magnetic, shows no reaction to cold dilute HCl, and moderate stain for K-feldspar in the etched offcut. Modal mineralogy in polished thin section is approximately:

Plagioclase (albite-oligoclase?)	50%
K-feldspar (primary, orthoclase/minor microcline?)	30%
Pyrite (partly oxidized to limonite), trace chalcopyrite	10%
Green biotite (veins)	2-3%
Chlorite (mostly in veins, after biotite?)	2-3%
Clay?/sericite (after feldspars)	1-2%
Carbonate (ankerite?)	1-2%
Magnetite (veins)	1%
Monazite, trace zircon (?)	<1%
Possible REE oxides	<1%
Phlogopite	<<1%
Sphene	<<1%

This sample consists essentially of alkali feldspars (plagioclase and Kspar) with only minor biotite (partly chloritized), cut by veins of pyrite-green biotite/chlorite-minor carbonate and discontinuous sub-perpendicular veinlets of magnetite-possible monazite-REE minerals (?)

Plagioclase forms interlocking, randomly oriented subhedral laths mostly <2 mm in diameter, generally <10% replaced by fine-grained sericite (subhedral flakes <20 um) and carbonate (ragged anhedra of similar size). Composition appears likely to be in the albite-oligoclase range based on extinction Y^010 in the 10-15º range (however, no quartz is present to compare refractive indices with to make sure it is not calcic oligoclase).

K-feldspar tends to be interstitial to plagioclase, forming mostly smaller, subhedral crystals rarely up to 1 mm in diameter. It may be mostly orthoclase (but grid twinning typical of microcline is seen in some cores). Most crystals are <10% clouded by minute particles of clay?/sericite.

Mafic minerals include chloritized biotite as ragged, irregular subhedra up to ~0.5 mm with bright red-brown pleochroism except where replaced by chlorite of similar size with distinct green pleochroism and length-slow, anomalous blue-green birefringence suggestive of Fe:Fe+Mg, or F:M, around 0.5-0.6 (?). Rare zircon (?) forms stubby euhedral prisms <0.1 mm long.

In the pyritic veins, which are mostly <1-2 mm thick, pyrite forms sub/euhedra rarely to 1 mm (generally strongly fractured, partly oxidized to limonite along margins and fractures, associated with rare trace chalcopyrite <20 um), intergrown and surrounded by biotite as ragged subhedral flakes to 0.5 mm with intense green pleochroism (likely highly ferriferous), partly altered at margins/cores to chlorite as described above or in places to carbonate as subhedra to 0.2 mm (likely ankerite?). Some pyrite may be after magnetite with a bladed textures suggestive of former hematite (?). In the magnetite veinlet (<1 mm thick), discontinuous blebs of magnetite

are up to 3 mm long composed of euhedra to 1 mm. Both types of vein, and locally relict mafic sites between them, also contain minor amounts of what may be monazite (rounded euhedra mostly <0.25 mm) and local opaque to dark red-brown or yellow-brown unidentified phases (could in part be REE oxide or fluorocarbonate minerals; SEM analysis would be required to identify them). Rare sphene (euhedra to 0.2 mm) and phlogopite (palest brown, sub/euhedral flakes <0.15 mm) are also locally associated with the veins.

In summary, this appears to represent leucocratic syenite (if albitic plagioclase is included as alkali feldspar) cut by vein sets of pyrite-green biotite/chlorite-carbonate-trace phlogopite-sphene, or discontinuous magnetite, both with minor monazite?-REE minerals?

COPE10AR-20: COMPLEX ROCK OF UNIDENTIFIED PHASES (PARTLY REE-BEARING?) IN MATRIX OF CALCITE-QUARTZ-PLAGIOCLASE-ACCESSORY SPHENE

Assay results for this sample show significant REE (Ce, La, Nd, Pr, Sm, Y, Yb) as well as Nb, Th, V and Zr. The hand specimen shows fine-grained, dark brownish black rock of uncertain derivation with local clots of carbonate, and cut by local limonitic fractures. The rock is locally slightly magnetic, shows minor reaction to cold dilute HCl in the clots, and no stain for K-feldspar in the etched offcut. Modal mineralogy in polished thin section is approximately:

Unidentified #1 (iddingsite?)	50%
Unidentified #2 (amphibole?)	20%
Carbonate (calcite?)	15%
Quartz (secondary)	5%
Plagioclase (oligoclase?)	2-3%
Unidentified#3 (allanite?)	2-3%
Sphene	1-2%
Columbite-tantalite (?)	1-2%
REE mineral (?)	1-2%

This is an unusual rock in which the minerals are not common and remain largely unidentified. It is composed mainly of large masses of a dark-red brown mineral (Unidentified #1) commonly mantled by acicular crystals of a paler but strongly pleochroic brown mineral (Unidentified #2), with lesser carbonate, quartz, plagioclase, a dark green mineral Unidentified #3) plus accessory sphene, possible columbite-tantalite, and possible REE minerals (?).

Unidentified #1 forms coarse, deep red-brown to orange-brown, strongly pleochroic rounded sub/euhedral crystals up to ~5 mm across with strong positive relief and possibly moderate to high birefringence (mostly masked by the colour of the mineral). There appear to be several cleavages, possibly at about right angles, and extinction is mostly more or less parallel to them. Interference figures are difficult to interpret due to the strong colour but suggest biaxial negative with moderate to small 2V. All these optical characteristics fit a mineral called iddingsite, which is usually an alteration product of olivine, but this is tentative until SEM or XRD analysis can be undertaken.

Unidentified #2 forms slender lath-like euhedra (perfect terminations) up to about 1.5 mm long with random orientations that seem to mantle the margins of #1. The crystals are strongly zoned and show strong pleochroism varying from pale brown to medium/deep reddish brown not quite as intense as in #1. Relief is slightly less positive than #1 and birefringence is moderate; extinction appears to range from near-parallel to significant (35º+) and interference figure may be biaxial negative with moderate to large 2V. These characteristics more or less fit amphibole but in no case can the typical amphibole cleavage be seen, so this must be regarded as tentative.

Interstitial to these minerals and poikilitically enclosing them are intergrowths of carbonate and quartz or locally plagioclase, all forming subhedra <2 mm in diameter. The carbonate (tested where it is most abundant, in a clot) reacts to HCl and is clear, so is likely mostly calcite; it also occurs in late veinlets. Quartz displays undulose extinction rather like twinning but also has uniaxial positive character. Plagioclase shows polysynthetic twinning with small extinction angle suggestive of oligoclase but does not occur adjacent to quartz so refractive indices cannot be compared.

Accessory sphene forms somewhat rounded euhedra <0.5 mm with pale colour/pleochroism. A bladed opaque forming sheafs of euhedra to 1 mm with distinct

anisotropism could be columbite-tantalite (?), slightly altered to hematite. A semi-transparent greenish mineral forming sub/euhedra to 0.6 mm (unidentified #3) has high relief and birefringence similar to allanite (REE-bearing epidote) but reflectance appears to be rather high. An opaque with lower R forming euhedra to 0.5 mm with cubic outlines may be a REE-bearing oxide mineral.

In summary, the mineralogy of this sample is so poorly understood from optical microscopy that it needs to be subjected to further analysis by SEM to identify many of the relatively uncommon minerals present in it. Speculatively it could consist largely of iddingsite surrounded by amphibole, with interstitial carbonate-quartz-plagioclase and accessory sphene-columbite-allanite-REE mineral.

COPE10AR-22: FOLIATED/LAYERED SYENITE/MONZONITE GNEISS (PLAGIOCLASE-KSPAR-PHLOGOPITE-PYRRHOTITE/LIMONITE-CARBONATE-RELICT CLINOPYROXENE-SPHENE±REE OXIDES?

Assays for this sample are mainly similar to or slightly less elevated for REE, Nb, and Th; hand specimen shows grey-brown, fine-grained rock of uncertain derivation cut by fractures of and partly oxidized to limonite. The rock is distinctly magnetic, shows minor (but slow) reaction to cold dilute HCl, and minor yellow stain for K-feldspar in the etched offcut. Modal mineralogy in polished thin section is approximately:

Plagioclase (oligoclase?)	45%
K-feldspar	20%
Phlogopite	20%
Pyrrhotite (partly oxidized to pyrite/marcasite, limonite)	5%
Carbonate (dolomite, ankerite?)	3%
Relict clinopyroxene (carbonate altered)	2%
Limonite (after pyrrhotite)	2%
Clay?/sericite (after feldspars)	1%
Sphene	1%
REE minerals (?)	1%

This sample consists of somewhat foliated/layered, fine- to medium-grained plagioclase-phlogopite-Kspar, with accessory pyrrhotite (partly oxidized to limonite), carbonate, relict clinopyroxene (partly altered to carbonate), sphene, and possible REE minerals.

Plagioclase forms either relatively fine-grained (interlocking, randomly oriented, rounded subhedra mostly <0.5 mm in diameter) aggregates or coarse-grained euhedra up to ~5 mm with extinction Y^010 small (2-5º), suggestive of a composition near oligoclase (?). It is slightly clouded by minute flakes of clay?/sericite.

Phlogopite occurs mainly as sub/euhedral flakes either up to ~1 mm in diameter, commonly aligned along or and concentrated in the foliation/layering, or as fine shreddy flakes mostly <0.15 mm with more random orientations, intergrown with or interstitial to the finer-grained plagioclase. The mica has very pale brown pleochroism.

K-feldspar forms mostly fine-grained, interlocking sub/anhedra <0.5 mm, but in patches up to almost 1 cm across, commonly partly clouded by minute particles of clay (?).

Pyrrhotite occurs as scattered bleb-like aggregates 2.5 mm across composed of subhedra mostly <1 mm in size (partly oxidized around the margins and along cleavage to FeSx phases including pyrite and marcasite with lamellar or "birds-eye" textures, and then limonite), or as small subhedra mostly <0.25 mm, both associated with phlogopite as relatively coarse or fine flakes respectively. In places the pyrrhotite has a discontinuous vein-like form and/or is associated with carbonate forming either rounded subhedra to 1.5 mm (dolomite?) or strongly limonite-stained aggregates to 1.5 mm of subhedra <0.1 mm (ankerite?). Locally some of the latter carbonate can be seen to be pseudomorphous after clinopyroxene forming ragged, irregular subhedra up to 1.2 mm long, associated with accessory sphene as rounded sub/euhedra mostly <0.5 mm long and with relict (oxidized) pyrrhotite. Pyrrhotite and sphene are also locally strongly associated/intergrown.

In places an oxide phase (low R value) forming aggregates to 0.2 mm long composed of dark red-brown, possibly isotropic subhedra to 50 um long, associated with or containing inclusions of pyrrhotite, may represent REE-bearing oxides since they do not appear to be

anisotropic as for limonite. However, this would require SEM confirmation.

In summary, this appears to represent somewhat foliated/layered syenite or monzonite gneiss (plagioclase, lesser Kspar, somewhat layered phlogopite) with accessory pyrrhotite partly oxidized to pyrite/marcasite and limonite, carbonate (possibly dolomite and ankerite?) (in part after relict clinopyroxene), minor sphene, and possible REE mineral oxides (?).

PHOTOMICROGRAPH CAPTIONS

COPE10AR-3: Leucocratic syenite composed of alkali feldspar (af; both albitic plagioclase and K-feldspar), minor brown biotite (bi) partly altered to chlorite (ch), cut by veins of green biotite (grbi) and pyrite, or magnetite (mt) and minor monazite? (mz?). Transmitted plane light, field of view 3.0 mm wide.

COPE10AR-3R: Veinlet of magnetite (mt) with minor possible monazite (mz?) and REE minerals or limonite (REE/lm?) cut by vein of pyrite (py) that may be in part after magnetite that has replaced lamellar hematite (?), green biotite (grbi) and minor carbonate (cb). Reflected light, uncrossed polars, field of view 2.75 mm wide.

COPE10AR-20: Unidentified #1 (massive, coarse, red-brown pleochroic) surrounded by lath-shaped, pale brown pleochroic unidentified #2 and deep green #3, poikilitically enclosed in matrix of quartz (qz) and carbonate (ca). Transmitted plane light, field of view 3.0 mm wide.

COPE10AR-20R: Unidentified opaque minerals that could be columbite-tantalite or ilmenite (cm/il?) as euhedral laths partly altered to hematite (hm), cubic possible REE minerals, in matrix of carbonate (ca) containing lath-like unidentified #2 (amphibole?) and minor plagioclase (pl), cut by carbonate (cb) vein swarms. Reflected light, uncrossed polars, field of view 2.75 mm wide.

COPE10AR-22: Syenite/monzonite composed of coarse plagioclase (twinned, pl, likely around oligoclase, with inclusions of Kspar , Kf), finer-grained Kspar, phlogopite (ph), accessory pyrrhotite (po, opaque) and sphene (sp). Transmitted light, crossed polars, field of view 3.0 mm wide.

COPE10AR-22R: Pyrrhotite (po) partly oxidized around margins to pyrite/marcasite (py/mc), minor possible REE-bearing oxides, and sphene (sp) associated with phlogopite (ph) set in matrix of alkali feldspar (af). Reflected light, uncrossed polars, field of view 2.75 mm wide.

APPENDIX B

zone name	comments	sample no	% Mo	ppm Mo	ppm Cu	ppm Zn	ppm Ce	ppm La	ppm Nd	ppm Nb	ppm Pr
Glacier Mine	K-spar, kaol, chlorite, trace pyo	COPE10AR-1	0.63	4743	93	35	165.2	79.7	49	94.9	15.1
Glacier Mine	K-spar, kaol, chlorite, trace pyo	COPE10AR-2	0.49	3681	23	38	132.1	44.3	36.2	74.2	12
Glacier Mine	K-spar, kaol, chlorite, trace pyo	COPE10AR-3	0.95	6820	200	181	1855	1105	531.2	3760	155.3
Glacier Mine	450 cm wide peg-aplite zone	COPE10AR-4	1.33	>10000	29	74	297.8	187.3	80.3	3450	26.6
East ext, Glacier	K-spar, chlorite	COPE10AR-5	0.56	4041	12	140	142.9	79.7	45.1	18500	14.2
East ext, Glacier	K-spar, chlorite	COPE10AR-6		61	5	129	66.9	44.3	20.4	144.3	6.2
East ext, Glacier	K-spar, chlorite	COPE10AR-7		36	11	68	190.1	102	83.2	86	21.6
East ext, Glacier	K-spar, kaol, chlorite, trace pyo	COPE10AR-8		170	133	16	70.6	39.9	28.3	105.1	8.1
East ext, Glacier	K-spar, kaol, chlorite, trace pyo	COPE10AR-9	0.77	6197	36	425	103.3	51.8	36.2	641.9	10.7
East ext, Glacier	K-spar, kaol, chlorite, trace pyo	COPE10AR-10	1.2	>10000	24	19	116.3	66	33.5	43.9	11.2
East ext, Glacier	K-spar, kaol, chlorite, trace pyo	COPE10AR-11	0.1	874	87	113	396.1	170.1	128.8	84.2	39.8
Sub-portal	angular float, 1% magnetite	COPE10AR-12		14	3	189	1110	729.7	190.4	250.7	92.6
Sub-portal	4% magnetite, K-spar	COPE10AR-13		13	6	827	202	124	59.2	432.1	18.4
J-5	increased limonite-chlorite with Mos2	COPE10AR-14	0.19	1619	7	36	35.5	20.1	11.3	18.2	3.5
Sub-portal	3 m north is open cut	COPE10AR-15	0.21	2862	8	126	96.3	47.4	39.4	23.8	10.7
Portal	limonitic shear zone	COPE10AR-16		27	60	99	147.8	84.9	51.9	29.3	15.1
Glacier East	angular float, 5% magnetite	COPE10AR-17		7	6	122	514.2	271.5	113.7	151.1	43.7
Glacier East	limonite, zircon, coarse grain mag	COPE10AR-18		4	7	288	283.4	129.4	133.3	179.2	34.6
Glacier East	1% diss chalcocite, oxides fract filling	COPE10AR-19		43	2712	398	754	742.5	183.1	259.4	76.5
Glacier East	red-yellow-brown gossan in cliff	COPE10AR-20		1	8	134	131000	102000	17650	527.4	7700
Glacier East	vuggy biotite schist, shear zone	COPE10AR-21		185	110	219	571.1	239	195.4	174.6	59.6
West Marble Ridge	350 cm wide py-pyo-ank skarn band	COPE10AR-22		20	37	124	18450	18200	2550	31.4	1185
West Marble Ridge	275 cm wide py-pyo-ank skarn band	COPE10AR-23		19	90	165	1270	1205	176.3	73.5	87.1
West Marble Ridge	limonitic aplite-carbonate breccia contact	COPE10AR-24	0.21	1779	14	107	183	164.1	37.4	22.1	13.3
West Marble Ridge	limonitic aplite-carbonate breccia contact	COPE10AR-25		6	11	719	593	722.3	99.9	147.1	43.3
West Marble Ridge	limonitic aplite-carbonate breccia contact	COPE10AR-26	0.22	1742	51	428	1440	1520	166.8	35.3	89.2
West Marble Ridge	limonitic aplite-carbonate breccia contact	COPE10AR-27	0.92	6808	28	50	23.5	15	7.5	32.1	2.3
West Basin	K-spar, kaol, chlorite, trace pyo	COPE10AR-28	0.43	3529	80	199	191.4	129.7	45.8	89.6	15.8
West Basin	K-spar, kaol, chlorite, trace pyo	COPE10AR-29	0.18	5257	66	52	261.6	170.1	78.4	38.7	24.2
West Basin	K-spar, kaol, chlorite, trace pyo	COPE10AR-30	3.4	>10000	80	38	175.1	99.4	70	126.8	20.6
West Basin	purple fluorite as late-stage fracture filling	COPE10AR-31		40	15	248	451.7	215.1	107.8	194	39.9
West Basin	granny smith green apatite pegmatite	COPE10AR-32		18	39	836	270.5	243.3	51.1	619.9	19.2
West Basin	angular float, edge of glacier	COPE10AR-33		22	13200	70	306.1	169.9	100.1	138.5	30.6

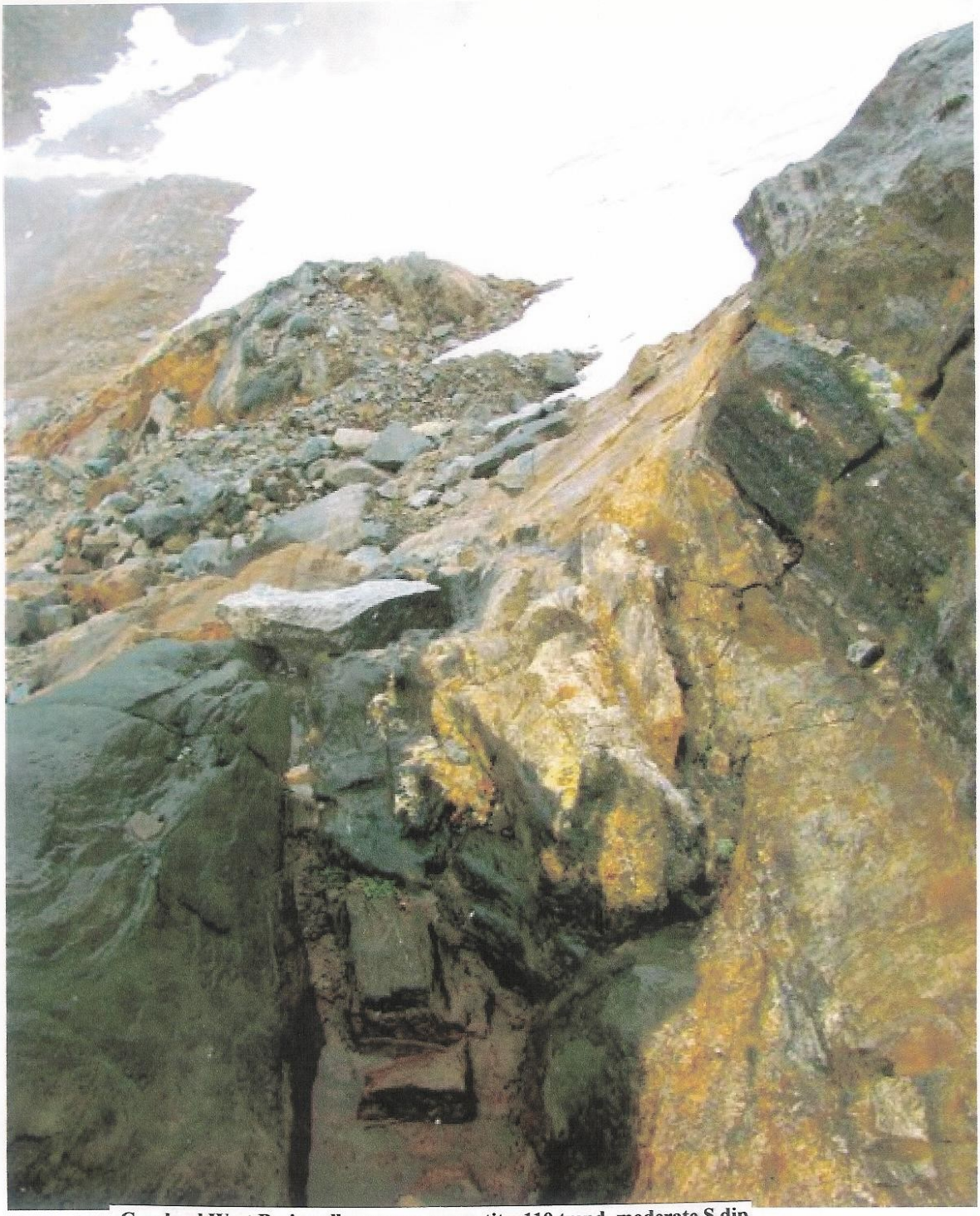
Copeland Marble breccia ridge looking W, (rock chip samples COPE10AR-22 & 23)

Copeland Glacier Zone, looking SE, East Glacier Zone (COPE10AR-20) in background

Copeland Glacier Zone, rock chip sample COPE10AR-5

Copeland West Basin looking west

Copeland Glacier Zone looking ESE, rusty zone has Mo & Nb bearing mineralization



Copeland West Basin yellow-green pegmatite, 110 trend, moderate S dip