



## ASSESSMENT REPORT TITLE PAGE AND SUMMARY

**TITLE OF REPORT:** Prospecting and Geochemical Assessment Report on the Porphyry Creek Property

**TOTAL COST:** \$12,086.96

**AUTHOR(S):** Doug Warkentin

**SIGNATURE(S):**

A handwritten signature in blue ink, appearing to read 'Doug Warkentin', written over a horizontal line.

**NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):** N/A

**STATEMENT OF WORK EVENT NUMBER(S)/DATE(S):** 5613005, 5627553, 5637314

**YEAR OF WORK:** 2016

**PROPERTY NAME:** Porphyry Creek

**CLAIM NAME(S) (on which work was done):** Brunswick, Armagosa, Sultana

**COMMODITIES SOUGHT:** Au, Ag, Cu, Mo, W

**MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:** 093M 059, 060, 061, 062, 064, 065, 066 and 068.

**MINING DIVISION:** Omenica

**NTS / BCGS:** NTS 093M04E

**LATITUDE:** 55° 07' 40"

**LONGITUDE:** 127° 36' 03" (at centre of work)

**UTM Zone:** 9      **EASTING:** 590000      **NORTHING:** 6109000

**OWNER(S):** Kyler Hardy, Tim Johnson, Doug Warkentin

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**REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. Do not use abbreviations or codes)**

Jurassic-Cretaceous, Bowser Lake Group, Kasalka Group, Stocks, Porphyritic Granodiorites, Hornfels, Stockwork, Veins, Molybdenite, Chalcopyrite, Pyrite, Scheelite

**REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:**

00092, 01134, 02855, 04839, 06849, 08332, 09587, 12712, 13340, 14632, 16012, 16455, 29082, 29502, 30096, 30431, 31728, 32516, 32636

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (in metric units)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo Interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for ...)			
Soil	ICP-MS 17 Samples	Brunswick, Sultana	\$5,322.14
Silt			
Rock	ICP-MS 13 Samples	Brunswick, Armagosa, Sultana	\$4,069.87
Other	Telus fines: ICP-MS 6 Samples	Brunswick	\$1,878.40
DRILLING (total metres, number of holes, size, storage location)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling / Assaying	ICP-MS 36 Samples	Brunswick, Armagosa, Sultana	\$816.55
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale/area)			
PREPARATORY / PHYSICAL			
Line/grid (km)			
Topo/Photogrammetric (scale, area)			
Legal Surveys (scale, area)			
Road, local access (km)/trail			
Trench (number/metres)			
Underground development (metres)			
Other			
		<b>TOTAL COST</b>	<b>\$12,088.98</b>

# Prospecting and Geochemical Testing Assessment Report

on the

## Porphyry Creek Property

Omineca Mining Division, British Columbia

NTS Map Sheet 93M/04

Project Centre: UTM NAD 83, Zone 9,  
590000 East, 6109000 North

**Registered Owners: Kyler Hardy, Tim Johnson, Doug Warkentin.  
Operators: Kyler Hardy, Tim Johnson, Crucible Resources Ltd.**

***Project Tenure Numbers: 1037653, 1038181, 1044459, 1045275, 1045347, 1045348  
1045349, 1045350, 1045351, 1045352, 1045353, 1045354, 1045355.***

***SOW Event Numbers: 5613005, 5627553 and 5637314***

Prepared By:  
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Submitted: February 9, 2017

## Table of Contents

1	Introduction.....	3
1.1	Location and Access.....	3
1.2	Mineral Tenure.....	4
1.3	Climate and Physiography .....	5
1.4	Property History .....	6
2	Geology.....	7
2.1	Regional Geology.....	7
2.2	Local Geology .....	10
3	Past Exploration.....	12
3.1	Introduction .....	12
3.2	Historical Exploration .....	12
3.2.1	Armagosa Creek.....	13
3.2.2	Brunswick/Red Rose Creek .....	13
3.2.3	Brian Boru Creek .....	14
3.2.4	Sultana.....	14
3.3	Porphyry Creek Property Exploration.....	14
3.3.1	2006/7 Prospecting.....	15
3.3.2	2008 Geochemical Survey .....	15
3.3.3	2010 Airborne Surveys .....	16
3.3.4	2010 and 2011 Sultana Geochemical and Drilling Programs.....	21
3.3.5	2014/15 Exploration Programs .....	23
3.3.6	2016 Metallurgical Test Program .....	25
4	2016 Field Program.....	25
4.1	Sultana Area .....	26
4.2	Red Rose Creek Area .....	27
5	Interpretations and Conclusions.....	28
5.1	Recommendations .....	28
6	Statement of Qualifications.....	29
7	Statement of Costs .....	30
8	Selected Bibliography.....	31
	Appendix 1 – Sample Location Maps.....	1
	Appendix 2 – Assay Reports.....	1

## List of Figures

Figure 1 - Porphyry Creek Location Map.....	3
Figure 2 – Porphyry Creek Project Tenures .....	4
Figure 3 - Five Belt Framework of the Canadian Cordillera (Geological Survey of Canada) .....	8
Figure 4 - Regional Geology of the Porphyry Creek Area .....	9
Figure 5 - Apparent Resistivity (7200 Hz) and AEM anomalies with East-Side Target Areas Indicated (Campbell 2010). .....	18
Figure 6 - Resistivity Map showing Priority Geophysical Anomalies .....	19
Figure 7 - Residual Magnetic Intensity with Major Inferred Structural Breaks/Contacts .....	20
Figure 8 - Cumulative Magnetic Linears (Campbell 2010).....	20

Figure 9 - 2014 Rock Sampling, Brunswick Area ..... 23  
Figure 10 - 2014 Soil Samples, Sultana Area ..... 24

**List of Tables**

Table 1 - Porphyry Creek Project Mineral Claims ..... 5  
Table 2 - Summary of BC Minfile Occurrences on the Property ..... 7  
Table 3 - Stream Sediment Values by Area..... 16  
Table 4 - Select Results from the 2010 and 2011 Sultana Drill Programs ..... 22  
Table 5 – 2016 Rock Sample Descriptions and Key Analytical Results ..... 26  
Table 6 – 2016 Soil and Talus Sample Locations and Principal Analytical Results ..... 27

# 1 Introduction

This report describes exploration and geochemical evaluation work carried out by the property owners on the Porphyry Creek Property, located in the Hazelton Mountains, British Columbia, Canada. The work was carried out during the summer of 2016.

The work was conducted during two separate site visits in late June and mid July, primarily targeting the Sultana and the red Rose Creek areas, respectively. The June visit was helicopter supported and included prospecting and rock sampling as well as collection of in-fill soil and talus samples to the north and east of the old Sultana workings. The July visit was a three day ground program based from a camp established near Red Rose Creek. This work included prospecting, rock sampling, dump sampling from the Brunswick mine and geochemical sampling of rock, soil and talus, mainly in the Brunswick mine area and above the townsite, southwest of the Red Rose mine.

## 1.1 Location and Access

The property lies within NTS map sheet 93M/04 with its geographic center at approximately Longitude 127°35'19" West, Latitude 55°07'10" North. It is located 10 km south of New Hazelton, and 40 km northwest of Smithers, which was used as a base of operations for the 2014 exploration program.



**Figure 1 - Porphyry Creek Location Map**

The Porphyry Creek project is a mineral property located along the rugged Rocher Deboule Mountain Range, south of New Hazelton, British Columbia. Direct road access into the area is limited, but services are readily available within 10 km of the property in New Hazelton and, about 40 km away, in Smithers. Parts of the property have limited ground access via poorly maintained 4WD roads and rough trails, but much of it is only accessible by helicopter. Past producing mines in the area are at high elevation, and glaciers cover some of the peaks.

The main road accessing the property is the old Rocher Deboule mine road, with branches accessing the Red Rose Mine and the Armagosa prospect. This road follows Juniper Creek northeast from Skeena Crossing on the Yellowhead highway about 10 km south of New Hazelton. The road is not maintained and is presently washed out in several locations, and is only passable by 4WD for about five kilometres beyond the highway intersection. Beyond that it is seasonally passable by All-Terrain Vehicle (ATV). An old exploration road also provides potential ATV access to the Sultana area from the east, along the south fork of Boulder Creek, in the south-eastern portion of the property, although its condition is also very poor.

## 1.2 Mineral Tenure

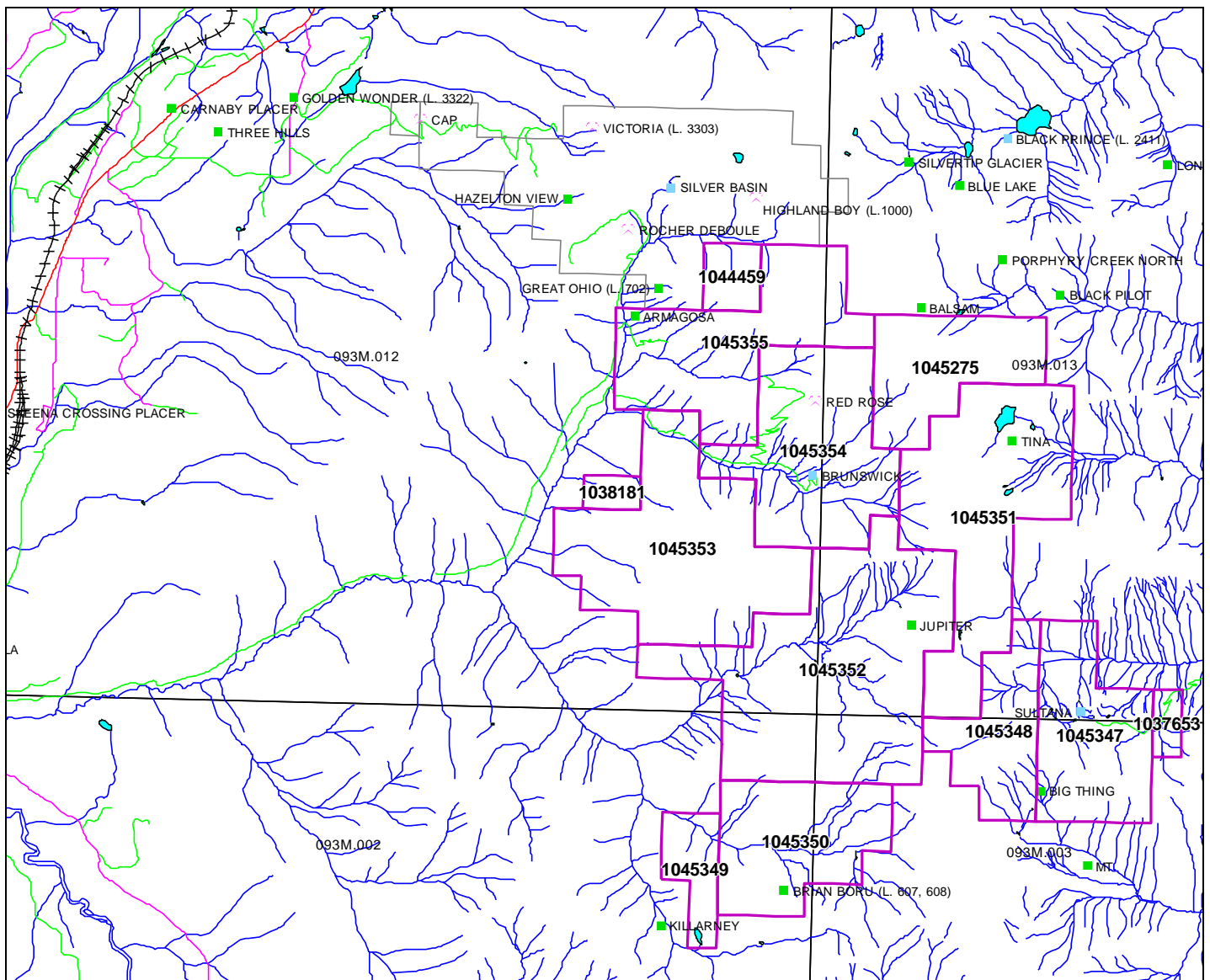


Figure 2 – Porphyry Creek Project Tenures

The Porphyry Creek project consists of 13 MTO claims covering an area of 4,811 hectares located within the Omineca Mining Division of northwest British Columbia. These claims are tabulated in Table 1 and graphically outlined in Figure 2. The tenures are held jointly by the author (60%), Timothy Johnson (20%) and Kyler Hardy (20%). Two additional partners have an agreement to acquire an equal interest in the portion of the claims owned by the author. The MTO claims that make up the property overlap a small group of active crown-granted mineral claims that surround the past-producing Red Rose tungsten mine. This group consists of 15 crown granted claims and fractional claims covering 182 hectares lying within the northern portion of MTO claim 1045354. The exact suite of minerals granted with these claims has not been investigated, but it is assumed that this area is fully excluded from the property.

**Table 1 - Porphyry Creek Project Mineral Claims**

Title Number	Claim Name	Map Number	Issue Date	Good To Date	Area (ha)
1037653	EAST SULTANA	093M	2015/aug/01	2017/apr/07	37.0
1038181	SLATER NW	093M	2015/aug/25	2017/apr/07	37.0
1044459	OHIO EAST	093M	2016/jun/01	2017/jun/05	73.9
1045275	PORPHYRY	093M	2016/jul/11	2017/apr/07	314.3
1045347	SULTANA	093M	2016/jul/15	2017/apr/07	370.2
1045348	BIG BORU	093M	2016/jul/15	2017/apr/07	259.1
1045349	KILLARNEY	093M	2016/jul/15	2017/apr/07	111.1
1045350	BRIAN BORU	093M	2016/jul/15	2017/apr/07	370.4
1045351	TINA	093M	2016/jul/15	2017/apr/07	647.4
1045352	JUPITER	093M	2016/jul/15	2017/apr/07	906.9
1045353	SLATER	093M	2016/jul/15	2017/apr/07	666.0
1045354	BRUNSWICK	093M	2016/jul/15	2017/apr/07	517.9
1045355	ARMAGOSA	093M	2016/jul/15	2017/apr/07	499.2
<b>Total</b>					<b>4811</b>

### 1.3 Climate and Physiography

The property includes many high elevation peaks, steep ridges and talus slopes that are free of forest cover; valleys and lower slopes are generally heavily forested. The relief is very mountainous, with elevations ranging from below 900 m to almost 2,400 m above sea level.

The Rocher Deboule Range is located on the eastern edge of the much larger Coast Mountain Range resulting in a mix of coastal and interior British Columbia weather patterns. Climate in the Hazelton area is reported as semi-arid and annual precipitation is less than 51 centimetres per year. However, the core of the Porphyry Creek property is significantly higher, and correspondingly experiences far more dramatic and inclement weather patterns.

Since there are heavy snow accumulations in winter, the recommended exploration work season for high elevations is between July and September. Lower elevation zones can be explored from May through October. It should be noted that accumulation of deep snow at higher elevations could result in a heavy spring runoff. With the onset of summer, snow melting is rapid and by July most of the property is snow free, apart from isolated areas of permanent snowfield. The summer months tend to be dry and hot, though pacific coastal storms do occasionally reach inland.



## 1.4 Property History

The area has had a long history of exploration and development, dating back to at least 1910. Between 1915 and 1954 the area saw substantial production from the Rocher Deboule and Red Rose mines, as well as lesser production from the Victoria, Cap, Highland Boy and Brunswick mines (Sutherland Brown, 1960). Exploration has been intermittent since the closing of these mines, with some substantial exploration programs occurring in the 1980's on the neighbouring Rocher Deboule/Victoria and Red Rose properties, and at the Killarney/Jones prospects (Brian Boru area) within the current project boundaries. Key points in the history of the property's developed prospects are as follows.

### Sultana Prospect

- First acquired by the Brewer Brothers in 1912, where considerable surface work was performed
- Abandoned, then restaked in 1921 by Messrs. Macdonald and Hicks, who expanded on the surface work and found 'ore' from 4 to 20 feet wide over a length of 125 feet.
- Optioned in 1923 to Granby Consolidated Mining and Milling Co. Ltd, who drilled one hole and then dropped the property.
- Restaked in 1939 by G. Christensen of Hazelton who did a small amount of surface work.
- Restaked again by G. Parent and associated of Hazelton in 1951.
- Work done by C.H.Macdonald in 1953, when the property was under option to Northern BC Mining Co. Ltd., who sampled several quartz-silver outcrops in the trenches.
- Property restaked in 1956 by J.W.Bryand and Bert Spisak for Canusa Mining Corp and renamed Snowshoe 1 to 8. Several short holes were drilled.
- Split into Silver Tip claims, staked in 1966/67 by C.E.Calson and Victor Bartell, and the 'S' claims staked in 1970 for Sultana Silver Mines Ltd., Sultana Silver drilled 5 short holes in 1968 and 3 deeper holes in 1969 (this group of claims included the MT Minfile occurrence).
- Detailed I.P., Geological and Geochemical survey conducted by Sultana Silver Mines in 1970.
- Acquired in 2009 by Duncastle Gold Corp, drilled a total of 3925 meters in 9 holes, conducted airborne electromagnetic, magnetic and radiometric surveys and soil geochemistry.

### Brian Boru Prospect

- Brian Boru first discovered in 1914-15 as a series of irregular sphalerite-pyrite veins containing variable amounts of lead, zinc, arsenic and gold.
- GAM claims staked in 1979 by Asarco Inc. Who mapped it in 1980 at 1:5000 and conducted a soil sampling program and magnetometer survey. In 1981 this was followed up by VLF, IP and magnetic studies and a soil grid.
- Further geological and geochemical surveys were done in 1984, 1985 and 1987 by Noranda.
- Optioned in 2008 by Duncastle Gold Corp as part of Porphyry Creek property. A stream sediment survey was conducted in 2008. An airborne geophysical survey was conducted in 2010.

### Brunswick Prospect

- Originally located in 1912 by J.Miller and sporadic work (locating veins, driving two small adits and possibly making small shipments of selected ore) was conducted prior to 1950.
- Acquired in 1950 by Skeena Silver Mines Ltd., who rehabilitated and extended old workings, drilled 4 holes and carried out additional prospecting. Additional small ore shipments were also made.
- Restaked in the early 1960's by J.T.Williamson, who conducted further geological mapping and sampling.
- Lower drift was advanced to 98 meters by Arcadia Exploration in 1972-73 under option.
- Staked in 1984 by R.Holland who prospected the surrounding area, finding an additional four mineralized vein systems.
- Optioned in 2008 by Duncastle Gold Corp. as part of the Porphyry Creek property. Prospecting and a stream sediment survey were conducted. An airborne geophysical survey was completed in 2010.

**Table 2 - Summary of BC Minfile Occurrences on the Property**

Occurrence	Status	Commodities	Production (tonnes)	Best Historical Grades (Date)
Armagosa	Showing	Cu, W		
Balsam	Showing	Cu		
Big Thing	Showing	Cu, Mo		
Brian Boru	Showing	Ag, Zn, Pb		220.5g/t Ag, 1.84% Pb, 11.27% Zn (1954)
Brunswick	Past Producer	Ag, Zn, Pb, Au, Cu	?	3802g/t Ag, 1g/t Au, 1.9% Cu, 17.3% Pb, 28.4% Zn (1954)
Jupiter	Showing	Cu, Mo		
Sultana	Prospect	Cu, Mo, Ag, Au		112oz/t Ag, 16% Cu, 0.06oz/t Au (1922)
Tina	Showing	Mo		

BC's Minfile database lists 8 separate occurrences on the Porphyry Creek property. A summary of the listed occurrences is given in Table 2. One of these occurrences, the Brunswick Mine, is listed as a prospect, but apparently had some minor production from two adits, driven to 20 and 52 meters and possibly from open cuts, prior to 1950. Development occurred mainly in the 1920's, and the total amount of ore produced is unknown, but 'thirty bags' of handpicked ore are reported from a later operator in 1954 (Kindle, 1954). Other occurrences that are reported to have some old development workings include the Armagosa, and the Brian Boru, consisting of small open cuts and short adits. The Sultana prospect has had more extensive past exploration, including substantial trenching (essentially small-scale mining) and limited drilling on a high grade silver vein (Campbell and Saunders, 1969 and 1970). This prospect was the main focus of an exploration and drilling program in 2010 and 2011 that identified extensive low grade copper and molybdenum mineralization below and to the northwest of the historical workings.

Beginning in 2008 Duncastle Gold Corp carried out geochemical and geophysical surveys over wider areas of the property, which was significantly larger than the current property area. This was followed by the drilling in the Sultana area. Areas on the west side of the property were prospected and a stream sediment geochemical survey was conducted in 2008. A property-wide airborne geophysical survey was carried out in 2010 that included magnetic, electromagnetic and radiometric measurements. Short site visits were also made to the MT showing, the Big Thing showing and various areas of geophysical interest around the Tina showing.

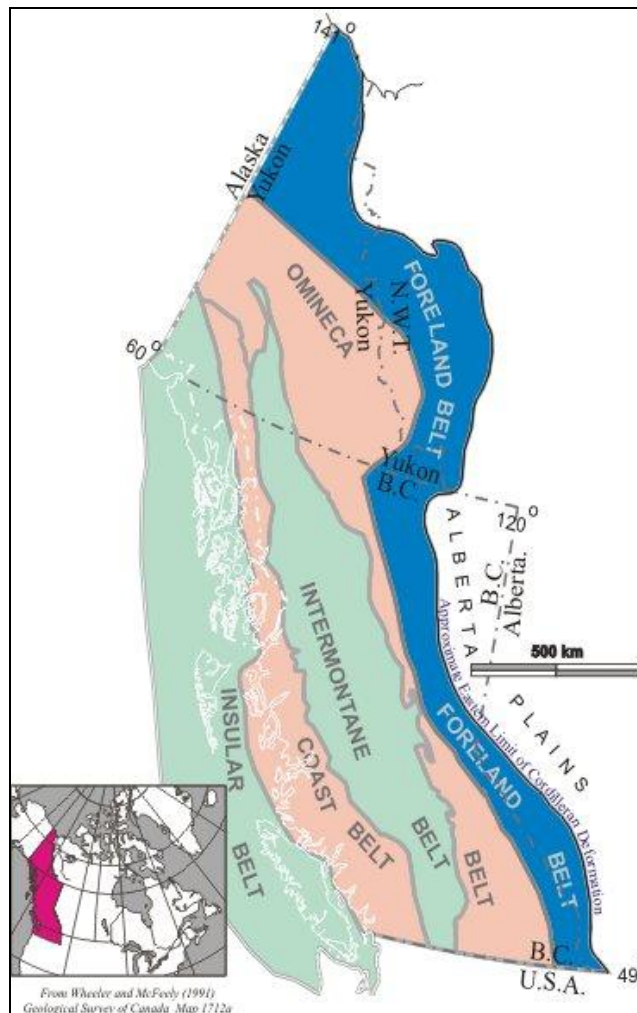
Other occurrences are alluded to in old reports which are not listed in Minfile and which have not yet been confirmed by site visits. These include Ag-Pb-Zn veins near the headwaters of Red Rose Creek (referred to as the Kaslo and Betty veins, ARIS 16012) upslope and to the east of the Brunswick Mine, and an Ag-Pb-Au vein (referred to as the Slate or Slater vein) south of Red Rose Creek near the divide between the Red Rose and Brian Boru basins (Ministry of Mines, 1914).

## 2 Geology

### 2.1 Regional Geology

British Columbia can be subdivided into five belts running roughly parallel with the north-westerly grain of the Cordillera. These five belts, from west to east, today are called the Insular, Coast, Intermontane, Omineca and Foreland belts accreted to North America (Figure 3). The

most easterly of these, the Foreland Belt, is the youngest, being formed when Proterozoic and Paleozoic sedimentary rocks were thrust up onto the continental margin to form the Rocky Mountains. The Omineca Belt is composed primarily of Devonian-Mississippian magmatic island arc sequences formed on the edge of North America. The intermontane belt is a complex assemblage of Carboniferous to early Jurassic aged rocks which are largely arc-related. Younger arc-related magmatic activity continued into the Tertiary. The Coastal Belt which is composed of plutonic and metamorphic rocks forms the suture zone between the Intermontane Belt and the exotically derived Insular Belt (Campbell, 2010).

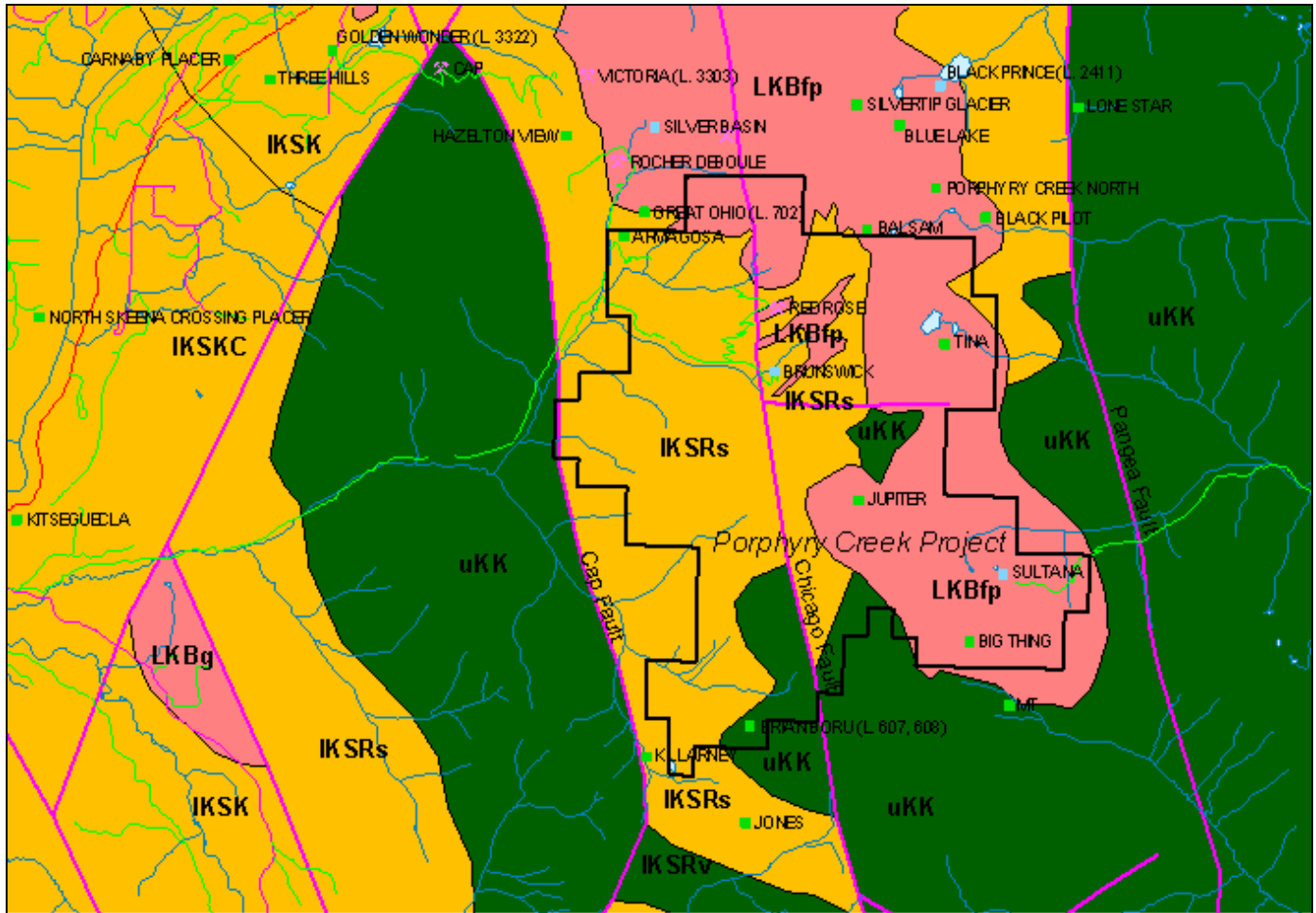


**Figure 3 - Five Belt Framework of the Canadian Cordillera  
(Geological Survey of Canada)**

The arc-related and complex nature of the rocks in the Intermontane Belt (in which the Porphyry Creek property lays) means that it hosts many economic porphyry deposits. The country rocks in the Porphyry Creek area are early Jurassic in age and are intruded by the Cretaceous Rocher Debole stock. This is the right timeframe for intense hydrothermal arc-related activity, making the prospects of discovering another mineral deposit very favourable.

Warkentin and Young (2008) report that the western part of the project area is underlain by the Lower Cretaceous Skeena Group - Red Rose Formation clastic sediments, and the Cretaceous Kasalka Group - Brian Boru Formation andesitic volcanics, while the eastern portion is underlain by Late Cretaceous Bulkley intrusives (the Rocher Debole stock), which forms a massive, prominently jointed body of porphyritic (biotite and K-Spar phenocrysts) diorite. Aplite,

pegmatite, porphyritic andesite, felsite, lamprophyre and granitoid dykes/sills are common throughout the pluton and extend into the surrounding country rock. NNW trending steeply dipping joint structures are prominent in the contact zone of the Cretaceous pluton and Jurassic volcanics/sediments. This NNW trending joint set parallels the contact, and there is a subsidiary set of joints perpendicular to the contact, which roughly traces the main mineral trend (i.e., 070° strike, moderate to steep N dip) of some of the historical deposits in the area.



- LKBfp – Late Cretaceous Bulkley Plutonic Suite: feldspar porphyry intrusive rocks
- LKBg – Late Cretaceous Bulkley Plutonic Suite: undivided intrusive rocks
- IKSK – Lower Cretaceous Skeena Group: Kitsumkalum Shale, mudstone, siltstone, shale fine clastic sedimentary rocks
- IKSKC – Lower Cretaceous Skeena Group: Kitsuns Creek Formation, coarse clastic sedimentary rocks
- IKSRs – Lower Cretaceous Skeena Group: Red Rose Formation, coarse clastic sedimentary rocks
- IKSRv – Lower Cretaceous Skeena Group: Rocky Ridge Formation, alkaline volcanic rocks
- uKK - Cretaceous Kasalka Group: andesitic volcanic rocks

**Figure 4 - Regional Geology of the Porphyry Creek Area**

Several prominent faults traverse the area, including the N–S trending Cap, Chicago Creek and Pangea faults (Warkentin and Young, 2008). The east side of the Chicago Creek fault has been uplifted and displaced several hundred meters to the south. There is also at least one prominent cross fault, the Mill fault, which lies to the south of the Red Rose Mine on the east side of the Chicago Creek fault and may follow close to Red Rose Creek on the west side. The regional geology of the claim area is shown in Figure 4.

## 2.2 Local Geology

The Porphyry Creek project area is primarily underlain by argillites and greywacke of the Red Rose formation, and by andesitic volcanics of the Kasalka Group. The Red Rose sediments strike northeast and dip 45° southeast and have been altered to hornfels in the vicinity of the porphyritic granodiorite intrusive body (the Rocher Debole stock) that underlies much of the eastern part of the project area. Smaller dioritic intrusions occur in the area of the Red Rose mine and the Brunswick prospect (see Figure 4).

Several major faults cross the area, two of which appear to intersect west of the Brunswick prospect. The Chicago Creek fault is a major north-south normal fault with an estimated displacement of 600 to 900 meters. It has been traced over a total length of nearly 35 kilometres. The Mill fault trends east-southeast, following Red Rose creek. It appears to have been displaced several hundred meters to the south by the Chicago creek fault. The Cap fault, which is also a major north-south fault, lies along the western boundary of the project area. Finally, the Pangea fault is another fault with a large displacement that runs N-S a short distance to the east of the property (Sutherland Brown, 1960).

A smaller fault zone known as the Red Rose Shear runs roughly parallel to, and is likely subsidiary to, the Chicago creek fault in the area around the Red Rose mine. The Red Rose tungsten vein occurs where this shear passes through an intrusive tongue of diorite. Outside the diorite the shear is mainly a narrow seam. The full extent of this shear is unknown, but its trend projects towards additional diorite tongues to the south of the mine and recent airborne data suggests it may extend at least as far south as the Mill fault. The diorite is distinct from the much larger granodiorite intrusive and significant bodies have only been mapped at the Red Rose mine and around the headwaters of Red Rose creek (Sutherland Brown, 1960).

Mineralization associated with many of the principal occurrences in the area is in the form of base and precious metals in quartz veins located in fractures and shears related to northeast or northwest trending fault sets. Most of the known mineral occurrences (aside from the southern Brian Boru showings) lie within 1,000 meters of the contact of the Rocher Debole intrusive stock with the surrounding country rock (Sutherland Brown, 1960). Significant historical production from the neighbouring Rocher Debole and Red Rose mines was principally for copper and for tungsten, respectively, but small quantities of gold, silver, cobalt, molybdenum, lead and zinc have also been recovered from these and other smaller deposits (Kindle, 1954). In 2010, the Rocher Debole intrusive stock itself was shown to host broad porphyry-style mineralization around the **Sultana** prospect, consisting of Cu and Mo in quartz-carbonate veinlets and rarely as disseminate blebs within the granodiorite. Vein and stockwork-type mineralization has also been identified in the northern part of the intrusive in the vicinity of the Roche Debole mine.

Veins can vary widely in their mineralization. At the Red Rose mine the upper part of the vein contained mainly scheelite with minor amounts of chalcopyrite. At lower levels, chalcopyrite was much more abundant and there were values in gold and molybdenite (Sutherland Brown, 1960). At the Rocher Debole mine, just outside the project boundary to the north, chalcopyrite was the principal economic mineral, with significant gold and silver values. At the Victoria mine, a short distance to the north, mineralization is primarily cobalt sulpharsenides with high gold values (occurring as small specks scattered throughout the sulpharsenides), and minor molybdenite (Kindle, 1954). A gold-bearing vein lying below the Red Rose mine to the south also carries cobalt values, and may be of the Victoria type. At the **Brunswick** mine, which is located on the Porphyry Creek property southwest of the Red Rose mine, the quartz veins are mineralised mainly with galena, sphalerite and tetrahedrite, with lesser amounts of chalcopyrite (Holland, 1987).

In the **Brian Boru** Creek area, semi-massive to massive sulphide mineralization reportedly occurs at or near the contact between andesitic and rhyolitic volcanics and also in narrow veins containing base metal sulphides. Mineralization is primarily massive sphalerite and pyrrhotite with significant amounts of galena and chalcopyrite in some of the smaller veins (Warkentin and Young, 2008).

At the **Sultana** prospect the historic target was a silver-rich “stockwork” that was exposed at surface and had been trenched and sampled (Campbell and Saunders, 1969 and 1970). The underlying rock in this area is mostly weakly Cu-Mo mineralized diorite which is intruded by dyke swarms of varying composition. Silicified andesite dykes intrude parallel to the main mineralized trend and close to the silver rich vein stockwork. Also in the area, aplite, pegmatite, granite porphyry and hornblende dykes intrude the stock. These dykes are also mineralized with Cu-Mo and magnetite to varying degrees (ARIS report 2855).

The MT showing is located at the southern boundary of the Rocher Debole stock. This was mapped in detail in 1967 (ARIS report 01134) as an extensively pyritized zone projecting southward from the stock into the Brian Boru formation volcanics. Country rock in this location varies from andesites to dacites with interstitial tuffs and agglomerates. Intruding into this volcanic sequence are three dyke swarms: altered feldspar porphyry, diorite and basalt.

Based on the known occurrences and historical exploration, there appear to be multiple potential sources of mineralization on the property.

Initial work on the property by the present owners (detailed in Warkentin, 2006) suggests a potential IOCG or skarn target in the volcanic-sedimentary stratigraphy on the western side of the property based on government RGS data and later stream sediment sampling, reconnaissance sampling of known occurrences and airborne geophysical data.

The most extensive recent work, conducted by Duncastle in 2010 and 2011, focused on the eastern side of the property and Cu-Mo mineralization associated with granodiorite to diorite intrusions which show a closer genetic relationship with a porphyry system.

The conceptual target was a zoned porphyry mineral system related to the intrusion of the Rocher Debole stock, a large composite intrusion of granodiorite to quartz monzonite composition. Mineral occurrences include “proximal” intrusion-hosted, bulk tonnage Cu-Mo deposits and “distal” polymetallic veins and shears within the adjacent volcano-stratigraphy. In regional surveys the intrusion appears as a broad, 10 kilometre long aeromagnetic anomaly associated with the access of the stock. Mineral occurrences are distributed around the margins of the aeromagnetic anomaly.

Drilling at the Sultana occurrence in 2010 and 2011 cut weak to moderately sericite-chlorite+/-epidote altered medium grained granodiorite indicative of the phyllic-propylitic alteration zone surrounding a porphyry style deposit. Fracturing and vein density encountered in the drilling appeared to be insufficient to produce Cu-Mo grades above the 0.1% range over significant lengths in drill core. The holes drilled to date have shown pervasive low grade copper and molybdenum mineralization over an area of approximately 200 by 300 meters, and extending to depths of more than 400 meters. Average grades are sub-economic, in the range of 0.03 to 0.05% Cu and .002 to .003% Mo, although there are sections showing significantly higher grades.

In addition to the Sultana prospect, there are several other areas on the east side of the property showing a positive response on airborne geophysical surveys. These represent additional possible porphyry targets that have yet to be explored in any meaningful way. These areas are indicated in Figure 5.

On the west side of the property, the BC government regional geochemical survey (RGS) database indicates that stream sediment sample 93M831097, taken from the lower part of Red Rose Creek, carried values greater than the 95<sup>th</sup> percentile for Cu, Au, Fe and La. These are important indicator elements for IOCG systems and their values make this one of the highest ranked samples for IOCG indicator elements in BC. This sample is likely affected by its location downstream from a former tungsten mine, but the values for these metals as well as for secondary IOCG indicators are very high (generally greater than 99<sup>th</sup> percentile), and these elements are also elevated in other stream RGS samples in the area that should not have been affected by past mining, including 93M831390 and 93M831391. In addition to the primary indicators these samples also show elevated levels of other IOCG indicator minerals such as cobalt, uranium and other REEs besides lanthanum.

At the least, these values indicate the presence of a potentially significant source of polymetallic mineralization in this part of the property large enough to affect several drainages. Stream geochemistry carried out by Duncastle in 2008 confirmed high Cu, Au and Fe in many drainages, along with other indicator minerals, but lanthanum values were not generally as elevated. The overall geochemical signature remains suggestive of IOCG as one possible source, comparing with examples occurring in Cordilleran rocks in South America.

### **3 Past Exploration**

#### **3.1 Introduction**

Exploration in the area has a long history, but since the end of production in the camp in the early 1950's, it was intermittent and mainly localized around known prospects prior to the acquisition and consolidation of the property by the current owners beginning in 2006. Section 1.4 provides a brief summary of the ownership and exploration history for the three most developed areas on the property. Additional details relevant to current interpretations are provided below.

Duncastle Gold optioned the property from the current owners in 2008. Previous to that the owners (Warkentin, 2006 and 2007) had compiled a historical database and conducted limited surface sampling in several high-grade target areas on the western portion of the property. A field program by Duncastle in 2008 continued to follow-up initial targets identified by the owners in the western portion of the property. Following significant additions to the eastern portion of the property by staking in 2009, additional historical data compilation was conducted in the winter of 2010 which identified several potential targets on the newer claims in the southeast. A 495 line-kilometre airborne geophysical survey was conducted over the newly consolidated property in 2010 (Campbell 2010) which identified multiple additional targets as summarized in Section 3.3. Duncastle then carried out a major exploration program, including a significant drill program totalling 3924 m at the Sultana prospect during 2010 and 2011.

#### **3.2 Historical Exploration**

Prior to 2006 the area was never explored as a single project, but could best be described as the southern and central portions of the Roche Deboule camp, which included two significant past producers, the Roche Deboule and Red Rose mines, and several other smaller shipping mines. The earliest recorded work in the area was just north of the property boundary at the Rocher Deboule and Great Ohio properties beginning in 1910. By 1915 a mill was in operation at the Rocher Deboule mine and development work was underway at several other prospects, including the Red Rose, Armagosa, Brunswick and Brian Boru.

The Rocher Deboule mine produced more than 36,000 tonnes of ore before closing in 1918. The mine produced a further 12,000 tonnes during a brief period of operation in 1952. During this early period small pits and adits were developed on mineralized showings at the Armagosa and Brian Boru prospects, and a tunnel was developed on the high grade Brunswick vein. A vein was also reportedly explored on the ridge to the south of Red Rose Creek, but the exact location is unknown. On the Red Rose property a gold bearing vein was developed to the south of the later tungsten mine, which was discovered in the 1920's and produced 1 million kg of tungsten from 113,000 tonnes of ore in two periods of operation between 1942 and 1954.

The most relevant recent exploration for current project areas is described below.

### **3.2.1 Armagosa Creek**

Little is known about the early exploration of this area, and the historical workings have not been described in detail in any published reports. There are reportedly two adits and a small shaft exploring a mineralized shear trending at 030 and dipping steeply to the northwest, following a steep ravine on the north side of Armagosa Creek. An entry in the 1912 BC Mines Annual Report mentions that the claims included part of the Great Ohio vein and two other veins 4 to 9 feet wide, the lower one carrying 2% copper. It is also reported that the area was explored in the early 1950's by Skeena Silver Mines Ltd. when veins containing Scheelite were discovered.

The only well documented exploration was by Southern Gold Resources Ltd. in 1987. As part of a larger exploration program at the Rocher Deboule mine to the north, talus fines and float were sampled along the north and south slopes of the ridge to the north of Armagosa Creek. Additional grab samples were collected from float and mineralized exposures in the vicinity of the Armagosa workings. Talus fines showed numerous strong Au, Cu, Pb and Ag anomalies along the north slope, most of which are now included within the current property boundaries. On the south slope, there was only one strongly anomalous sample for gold, although copper values were generally strong. One float sample of vein material, collected below the Armagosa workings, assayed 1.3 oz/t Au.

More recent exploration on the adjacent Rocher Deboule property reportedly discovered a well mineralized vein on the north side of the ridge, directly north of the Armagosa, a sample of which assayed over 20% Cu. The exact location is not known, but with recent staking this vein may now be within the property boundaries as well.

### **3.2.2 Brunswick/Red Rose Creek**

The Brunswick mine was located in 1912 and developed by two adits, with most of the early development carried out in the 1920's. A few tonnes of high grade ore was reportedly shipped during this period. In the early 1950's Skeena Silver Mines Ltd. extended the lower adit and carried out underground diamond drilling. In 1972 and 73 Arcadia Explorations Ltd. extended the lower tunnel to a length of approximately 100 meters and carried out trenching on the slope above the adits. The upper adit follows a 0.3 to 0.6 m wide quartz vein well mineralized with galena and sphalerite and carrying high silver values. The lower adit is driven on a less mineralized fault that appears to be a different structure than the upper vein. The work in 1972 exposed some higher grade vein material in the wall rock, but it was not certain if it was the downward extension of the upper vein. Samples of the upper vein assayed up to 67 opt Ag, and



ore as high as 100 opt Ag was reported from the early development period. The vein was not seen in surface trenches on the slope above.

In 1986 prospecting by Catoosea Resources Corp. identified two additional veins in the vicinity of the Brunswick mine and three other veins in drainages to the southeast in the upper part of the Red Rose Creek basin. Beyond these small programs, no significant work has been reported in the Red Rose Creek area since the closing of the Red Rose mine in 1954.

### **3.2.3 Brian Boru Creek**

The Brian Boru and surrounding prospects were originally staked in the period following the discovery of the Rocher Deboule deposit in 1910. The area saw considerable activity in that period and again in the 1920's. Multiple showings of lead and zinc with variable silver values were found in the basins of both the main creek and the south fork. Most were reported to be small lenses or veins of sphalerite and galena, but a more extensive flat lying band of sphalerite and pyrrhotite was reportedly developed with a 9 meter adit along the south slope of the north basin. This band was reported to be 4 feet wide and grade up to 20% zinc with some minor silver values.

There is no further record of work in this area until 1979, when the southern basin was staked by Asarco. This property included the Jones and Killarney Minfile occurrences but did not include the Brian Boru occurrence in the north basin. Between 1979 and 1985 Asarco, and later Noranda Exploration, conducted talus, rock and silt sampling, grid soil sampling and ground-based geophysics over much of the area. Numerous anomalies were found and some high grade occurrences were confirmed, but no significant ore zone was identified. Individual sample grades as high as 15% Zn and 20 opt Ag were reported.

### **3.2.4 Sultana**

Originally staked in 1910, the first work recorded was a single diamond drill hole and work on open cuts carried out by Granby Consolidated in 1923. Canusa Mining completed several short drill holes in 1956, and Sultana Silver Mines added 9 short holes between 1966 and 1969. Utah Construction and Mining carried out rock sampling and drilled two longer holes totalling 305 meters in 1970-71.

Aside from rock geochemistry sampling of the surrounding granodiorite by Utah in 1970, prior to 2010 work was focused primarily on a high-grade silver copper vein. The vein outcrop exposed in trenches is 20 meters long and up to 7 meters wide, strikes at 070 and dips at 45 degrees to the southeast. Assays over the entire width show silver values up to 600 g/t with more than 2% copper and minor gold values. Numerous small drill intercepts showed some continuity below surface, but the size appeared to diminish with depth. Utah's geochemistry defined an area of 90 by 150 meters that showed the presence of Cu-Mo mineralization, providing an initial indication of potential for wider low-grade mineralization.

## **3.3 Porphyry Creek Property Exploration**

The Porphyry Creek property was acquired by the current owners through staking beginning in 2006. Prior to optioning the property to Duncastle Gold Corp in 2008 small programs of prospecting and geochemical sampling were completed in 2006 and 2007. Duncastle expanded the property by staking to 13,560 Ha between 2008 and 2012, carried out prospecting, geochemical surveys, an airborne geophysical survey and two drilling programs. The property

was returned to the current owners in 2014 and a small surface program was conducted that year. Much of the expanded claims acquired by Duncastle have since been allowed to lapse.

### **3.3.1 2006/7 Prospecting**

Initial work by the current owners in 2006 and 2007 consisted of visits to some of the known prospect areas and collection of rock and stream sediment samples. Areas visited included the Brunswick mine, the Armagosa area and the Brian Boru basin. High grade vein material was obtained from near the Brunswick mine, assaying 48 oz/ton Ag, and some strong geochemical responses were obtained from stream sediments in the Armagosa area, including one assay of 0.52 g/t Au from the west end of the ridge.

Stream sediment sampling in the northern Brian Boru basin showed no significant lead-zinc anomalies from the north side or upper end of the basin, but two samples at the upper, or eastern end of the basin showed anomalous copper and precious metals values in streams draining the upper slopes to the east. One sample returned a value of 8.3 g/t Ag.

Stream sediments from the Armagosa area were all from small streams draining the north side of the creek at the western end of the valley. All showed strong copper values (200-500 ppm). All were also anomalous in Au, Mo and As, with the two western-most samples showing very high Au and As values (520 and 140 ppb Au and 3100 and 500 ppm As). These two were also anomalous in La, while the two more easterly samples, closer to the reported location of the old workings, showed very high Fe content (7 and 10%) and anomalous W values. Float rock collected from a talus slope a short distance to the west of the Armagosa workings showed elevated As and Mo, along with minor precious metal values in abundant brecciated quartz vein float. Stronger precious metal values (0.03 oz/t Au and 1.0 oz/t Ag), with high Cu and As (<1.0%) were found in massive sulphide float from the talus.

Samples of tailings from the Red Rose mine showed considerable remaining W value (0.3%) as well as elevated Cu, Mo and Au values.

### **3.3.2 2008 Geochemical Survey**

After optioning the property, Duncastle's first site exploration work consisted of a helicopter-supported prospecting and stream sampling program on the west side of the property in 2008. Both rock and stream sediment samples showed elevated values from numerous locations. Rock sampling confirmed the high silver and base metal values from vein material at the Brunswick mine (up to 75 oz/t Ag and 30% combined Pb and Zn) and also showed the high zinc content in massive sulphide mineralization at the old Brian Boru prospect (up to 22% Zn and 4.4 oz/t Ag). Rock sampling also returned some significant values from areas with poorly documented or no known mineral occurrences, including the east end of the ridge north of Armagosa Creek, the area below the Jupiter Minfile occurrence and the eastern part of the northern Brian Boru basin.

The rock samples were primarily float, so new specific zones of mineralization were not identified, but included wide areas of the property. Of the anomalous samples only one was of sufficient grade to be of interest as vein mineralization (9% Zn and 3.3 oz/t Ag in the Jupiter area), but numerous samples carried elevated Cu at levels of interest for bulk tonnage targets (ranging from 0.10% to 0.75% Cu). In some cases these samples showed disseminated mineralization in volcanic rocks rather than vein mineralization, and in at least two samples the Cu was accompanied by gold values. These included a sample with 0.7% Cu and 0.47 g/t Au near the headwaters of Armagosa Creek and a sample with 0.30% Cu and 0.24 g/t Au on the south side of the Slate Creek valley, less than two kilometers west of the Jupiter Minfile location.

Overall, of 43 samples collected across the property, 15 returned values above 0.10% Cu, with another 5 showing anomalous values for other metals of interest but a Cu content below 0.1%.

Stream sediment sampling showed multiple strongly anomalous areas for a spectrum of economic and indicator elements. The most widespread anomalous elements were Cu and As, but Au anomalies were also fairly common. Medium to strong anomalous values were also seen for Mo, Pb, Zn, Ag, Fe, Sb, Co and W, but these tended to be more localized. For Cu, 30 of 58 samples were over 100 ppm, with 10 of the remaining 28 over 85 ppm. For most elements values tended to be much more anomalous in the northern part of the survey area outside of a few strongly mineralized drainages below the Brian Boru prospect. All of the 23 samples collected from the Armagosa and Red Rose drainages contained greater than 90 ppm Cu and As, with many above 200 ppm.

Table 3 shows a summary of stream sediment results by area, incorporating results from the 2007 work into the 2008 database. Other elements also showed a similar pattern. The zoning of higher values to the north would be even more pronounced if not for a few very high values found near the Brian Boru prospect.

**Table 3 - Stream Sediment Values by Area**

Property Area	Samples	High Au (ppb)	Ave Au (ppb)	High Ag (ppb)	Ave Ag (ppb)	High Cu (ppm)	Ave Cu (ppm)	Ave As (ppm)	Ave Co (ppm)	Years
Armagosa	9	520	95.3	1047	178	505.4	340	700	25	2007/8
Red Rose	18	758.3	88.2	8823	1174	707.7	291	339	49	2008
Jupiter	12	52.6	22.8	1288	397	182.3	78	187	14	2008
Slate	8	14.9	6.2	339	228	150.6	101	93	31	2007/8
Brian Boru	20	116.7	10.8	8300	827	3423	279	47	19	2007/8
<b>Total</b>	<b>67</b>		<b>41.8</b>		<b>450</b>		<b>154</b>	<b>231</b>	<b>23</b>	

### 3.3.3 2010 Airborne Surveys

In July of 2010 Duncastle conducted a helicopter-borne electromagnetic, resistivity, magnetic and radiometric survey of the property. The survey was flown by Fugro Airborne Surveys Corp. using a DIGHEM electromagnetic system and consisted of 495 line-kilometers flown using a 200 meter spacing. In addition to Fugro's reporting, the data was analyzed and interpreted by Intrepid Geophysics Ltd.

Results confirmed a strong magnetic response associated with the intrusive stock underlying the eastern part of the property and showed generally low resistivity associated with the older volcanic and sedimentary rocks on the west side. Within that broad framework numerous anomalies were identified through all of the parameters measured. At the time the principal focus was on potential porphyry zones within or adjacent to the Rocher Deboule stock and Intrepid identified a total of six anomalous conductive zones in that area (Figure 5). In addition, two singular magnetic high zones were identified.

Figure 5 also shows ranked EM anomalies and the resistivity at 7200 Hz after excluding areas where data was potentially compromised by the difficult terrain. This shows the strong resistivity response in the west half of the property, and the concentration of EM anomalies particularly in the northwest part of the property. Nine areas of elevated radiometric response were identified, and later interpretation of the Th/K ratio identified several areas of potential strong potassic alteration, with the strongest covering much of the northwest part of the property. The broader compilation indicates no fewer than 12 'Areas of Interest' for follow-up on the

property. Figure 6 summarizes these priority anomalies with the uncorrected apparent resistivity as the background.

Intrepid also employed algorithms for Textural and Phase Analysis and Structure Detection from the magnetic data both to interpret potential structural breaks such as faults and contacts, and to identify 'Zones of Complexity' that could be conducive to emplacement of mineralization. Figure 8 shows the inferred structural features resulting from this analysis. In addition to these features, the detailed analysis indicated extensive smaller magnetic linear features within the intrusive stock, indicative of significant structural complexity. Outside of the stock these were largely absent aside from the larger features shown in Figure 8, with the exception of an area to the west of the Red Rose mine. This area roughly corresponds with the area of the strongest Th/K ratio anomaly.

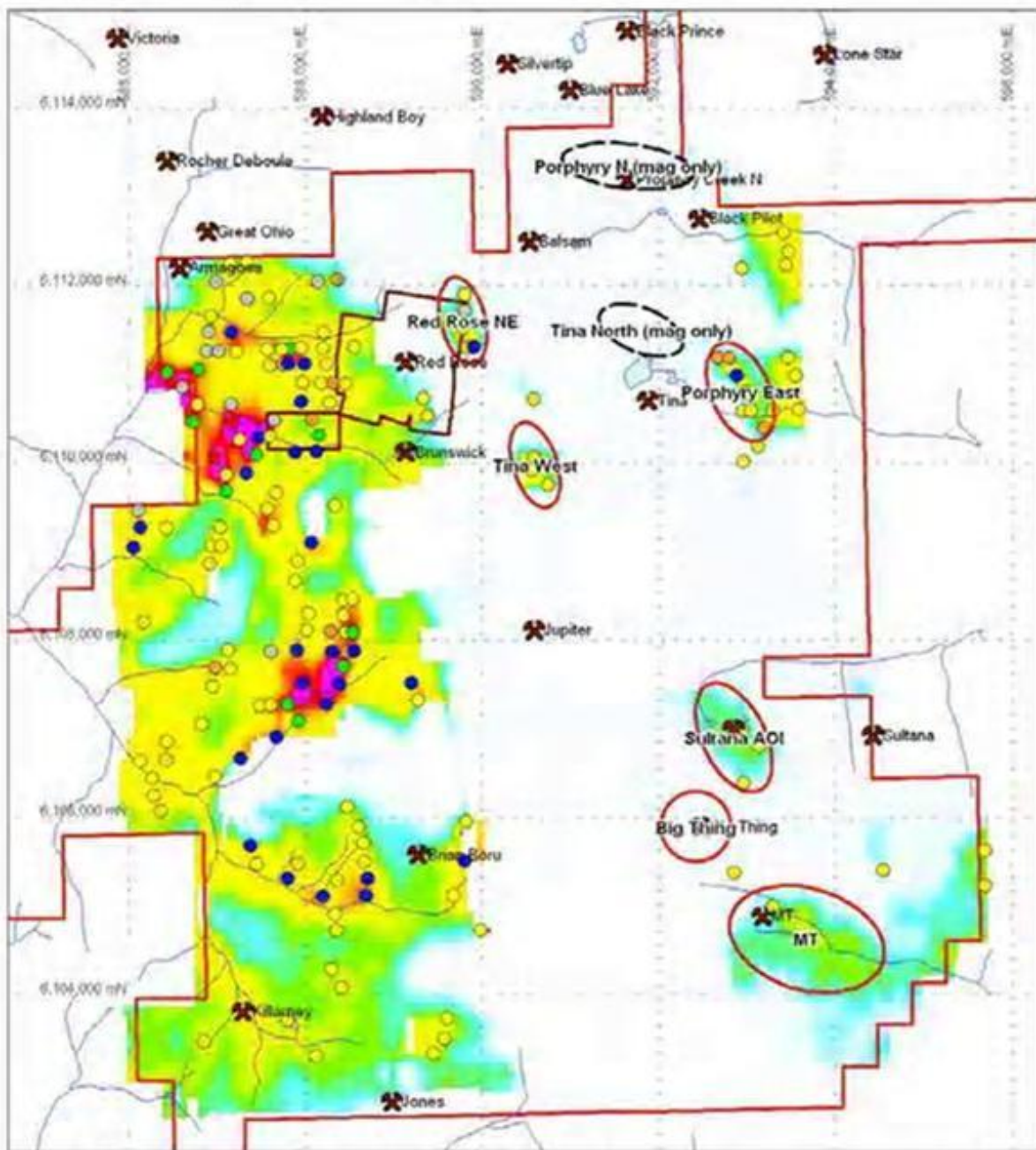
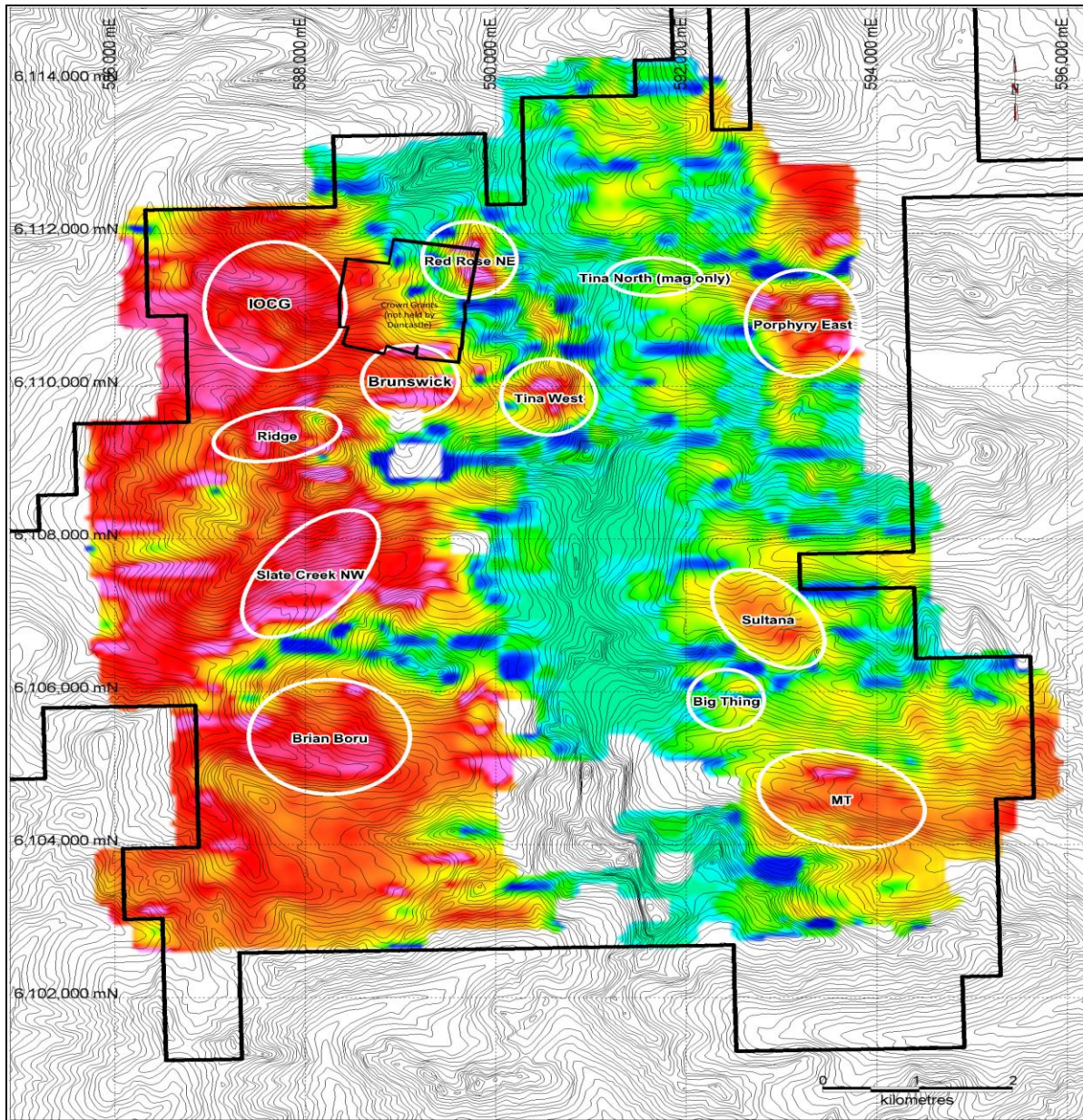


Figure 5 - Apparent Resistivity (7200 Hz) and AEM anomalies with East-Side Target Areas Indicated (Campbell 2010).



Intrepid's interpretation of this analysis was that the property appears to feature a major NW-SE structural fabric that cuts across the general trend of the regional geology. This runs through the central area of the intrusive stock, but also appears to extend into the sediments to the west.



**Figure 6 - Resistivity Map showing Priority Geophysical Anomalies**

As noted, Duncastle and Intrepid focused their interpretations on the intrusive covering the eastern part of the property. This resulted in a substantial exploration program at the Sultana prospect, but only brief visits to other identified prospects, where no obvious surface deposits were encountered. These other targets remain essentially untested. It is also worth noting that regional geochemistry shows strong copper-gold anomalies for the streams draining the areas of these geophysical anomalies.



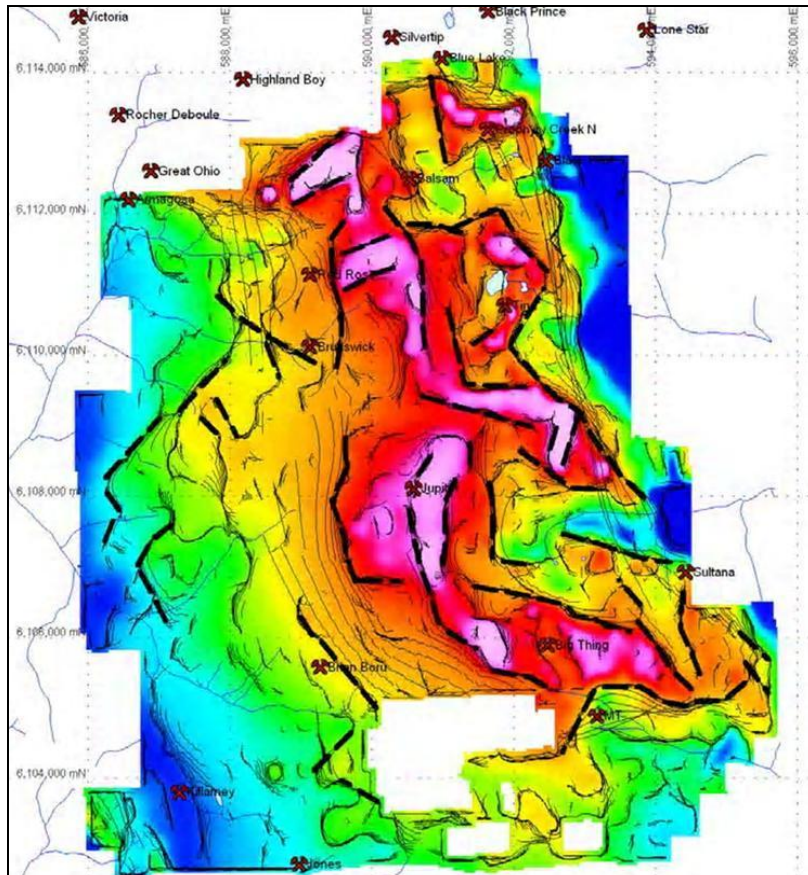


Figure 7 - Residual Magnetic Intensity with Major Inferred Structural Breaks/Contacts

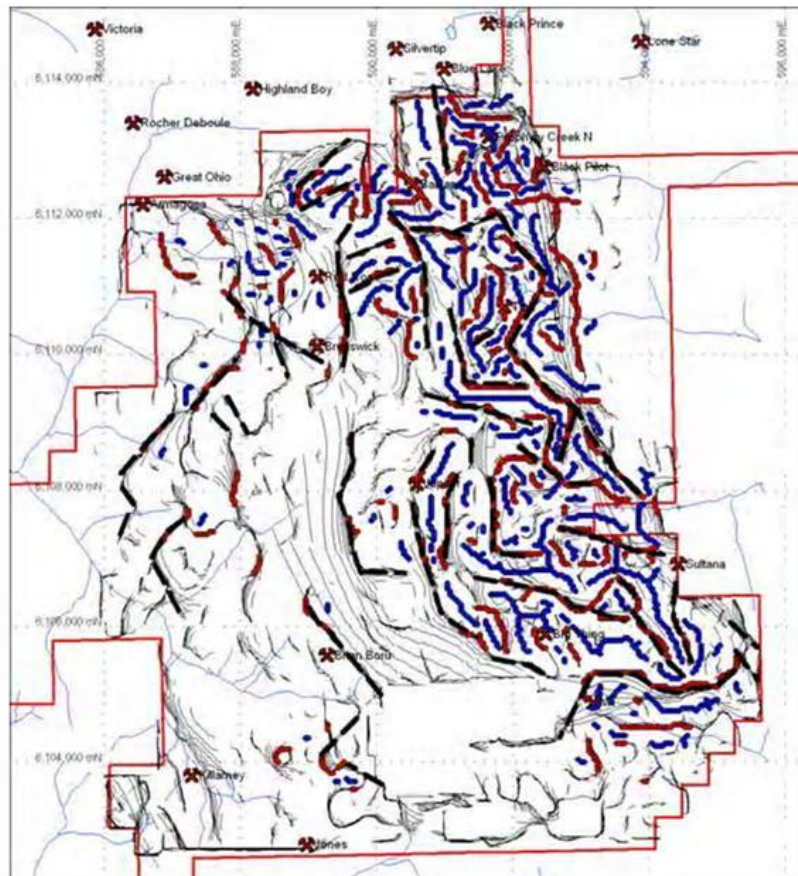


Figure 8 - Cumulative Magnetic Linears (Campbell 2010)

Analysis of the geophysics of the west side of the property was only incidental and no attempt was made at interpretation despite the presence of numerous anomalies. Some of the implied structural features (Figure 8) correspond fairly well with mapped contacts of the intrusive body, but the major NNW-SSE faults mapped over the area (e.g. the Chicago fault) are largely absent, aside from some possible intermittent segments that only loosely correspond to the mapped location. The more northerly of these segments seems more likely to be either the intrusive contact or the red Rose shear, as it lies to the east of the Brunswick and Red Rose mine locations.

The northwest part of the property is an area of particular interest from these interpretations. The strong NW-SE linears noted in the intrusive appear to show some continuity into the sediments to the west, and may be related to the 'Mill fault' shown on older geological mapping as roughly paralleling Red Rose creek. This corresponds loosely with the location of a strong NW trending magnetic discontinuity passing just south of the Brunswick mine and running up the ridge between Red Rose and Armagosa Creeks. The northeast side of this line is the only part of the property showing strong complexity, as indicated by the magnetic linear analysis, that is not directly associated with the intrusive. This area also corresponds to the strong Th/K anomaly extending to the property boundary in the northwest and shows an abundance of EM conductors, particularly in the section south of Armagosa Creek.

#### **3.3.4 2010 and 2011 Sultana Geochemical and Drilling Programs**

Geological and structural mapping and soil sampling was conducted at the Sultana prospect as part of the 2010 exploration program. Hydrothermal argillic and sericitic alteration were evident within the Sultana showing. Chalcopyrite, pyrite, tennantite/tetrahedrite, and molybdenite were found on fracture surfaces in outcrop and had also been reported in the historic drill hole logs from this area. Rock samples of quartz veins taken in the Sultana area assayed up to 18.25g/t Au, 865g/t Ag, 17.87% Cu, 0.57% Zn and 1.08% Mo.

As a result of the encouraging preliminary surface evaluation and historical information the Sultana occurrence was targeted for further work. A follow-up soil sampling program was conducted on the Sultana prospect which totalled 480 samples. The samples were taken 5 to 10 meters apart along several lines spaced 25 to 50 meters apart. The short sample intervals were chosen due to the close spacing of quartz veins carrying pyrite and chalcopyrite observed at the Sultana showing. The program covered a total area of about 250 x 400 meters (Westphal, 2010c).

The results of the soil sampling were extremely encouraging, returning values up to 3363 ppm Cu and 834 ppm Mo, with anomalous values over much of the grid. There were also intermittent high lead, silver and gold values. The mean and maximum value for both Cu and Mo were unusually high, suggesting high-grade mineralization close to the surface. Rock samples taken in the area confirmed this, with values up to 1.08% Mo. Because of the excellent soil results, a three-hole drill program totalling 1,330 m was conducted before the end of the field season.



**Table 4 - Select Results from the 2010 and 2011 Sultana Drill Programs**

<b>interval (m)</b>	<b>width (m)</b>	<b>Au</b>	<b>Mo</b>	<b>Cu</b>	<b>Pb</b>	<b>Zn</b>
<b>PC10-01</b>		<b>PPB</b>	<b>PPM</b>	<b>PPM</b>	<b>PPM</b>	<b>PPM</b>
0-444	444	4.8	70	547	24	37
111-117	6.0	162.0	2985	2988	876	913
339-444	105	4.1	107	1036	5	27
405-444	39	4.1	41	1673	8	35
<b>PC10-02</b>						
0-303	303	2.2	18	369	4	32
111-117	6.0	2.0	37	526	3	23
201-204	3.0	11.0	11	3439	7	49
<b>PC10-03</b>						
0-582	582	1.9	24	330	3	21
186-204	18	2.8	16	597	5	22
516-576	60	2.9	32	555	2	24
<b>interval (m)</b>	<b>width (m)</b>	<b>Au</b>	<b>Mo</b>	<b>Cu</b>	<b>Ag</b>	<b>W</b>
<b>PC11-04</b>		<b>PPB</b>	<b>PPM</b>	<b>PPM</b>	<b>PPM</b>	<b>PPM</b>
5-617	612	4.4	92	741	0.6	19
324-375	51	6.0	210	1149	1.0	21
479-488	9.0	7.6	331	1673	1.1	21
586-594	8.0	4.1	172	1396	0.9	82
611-617	5.7	9.3	394	1686	1.2	97
<b>PC11-05</b>						
4-588	584	6.8	59	620	0.8	13
388-424	36	9.0	293	1140	1.5	20
<b>PC11-06</b>						
4-469	465	4.9	79	713	0.7	25
141-170	29	10.2	220	1406	0.8	82
247-294	47	9.9	146	1189	2.7	37
<b>PC11-07</b>						
5-402	397	4.6	82	553	0.5	15
318-343	25	6.5	25	1410	1.2	35
<b>PC11-08</b>						
4-271	267	3.8	71	460	0.4	9.1
241-246	5.0	3.2	811	646	0.4	5.7
<b>PC11-09</b>						
5-248	243	3.6	25	293	0.3	9
114-120	6.0	8.5	4.5	911	1.08	22
144-146	2.0	9.5	2	1687	1	44

Drill sites were chosen based on soil anomalies and geophysics. All three holes showed widespread low grade Cu-Mo mineralization with occasional higher grade intervals. Hole PC10-01 gave the best results, and ended with 40 meters of some of the highest grade intervals. Results are summarized in Table 4.

These results encouraged a follow up program in the summer of 2011. The 2011 drilling consisted of 6 NQ drill-holes totalling 2,594 meters. These holes mainly cut altered medium grained granodiorite typical of the phyllic-propylitic zone of a porphyry system. All the holes were mineralized throughout their entire length, but mostly the grades returned were sub-economic. The average grades for each hole are shown in Table 5, along with some of the sections showing higher grades. Weighted average grades for holes PC11-04 to -08 ranged from

0.046% Cu and 0.007% Mo in hole PC11-08 to 0.074% Cu and 0.009% Mo in hole PC11-04. The latter hole was over a total length of over 600 meters.

Significant higher grade zones were encountered in holes PC11-04 to PC11-07, with sections of 25 to 50 meters grading above 0.10% Cu and up to 0.029% Mo. Hole PC11-09 was drilled to the north, away from the zone targeted by other holes, and returned significantly lower grades.

Results of the 2011 drilling expanded the moderately anomalous porphyry style Cu-Mo zone to some 300m in strike length (N-S) and up to 200m in width (E-W). Interpretations of metal gradients and previous geophysics based on these drill results led to a recommendation for further surface geochemistry and ground-based geophysics to better identify likely higher grade portions of the porphyry system, which appears to occupy a much larger area than that drilled.

### 3.3.5 2014/15 Exploration Programs

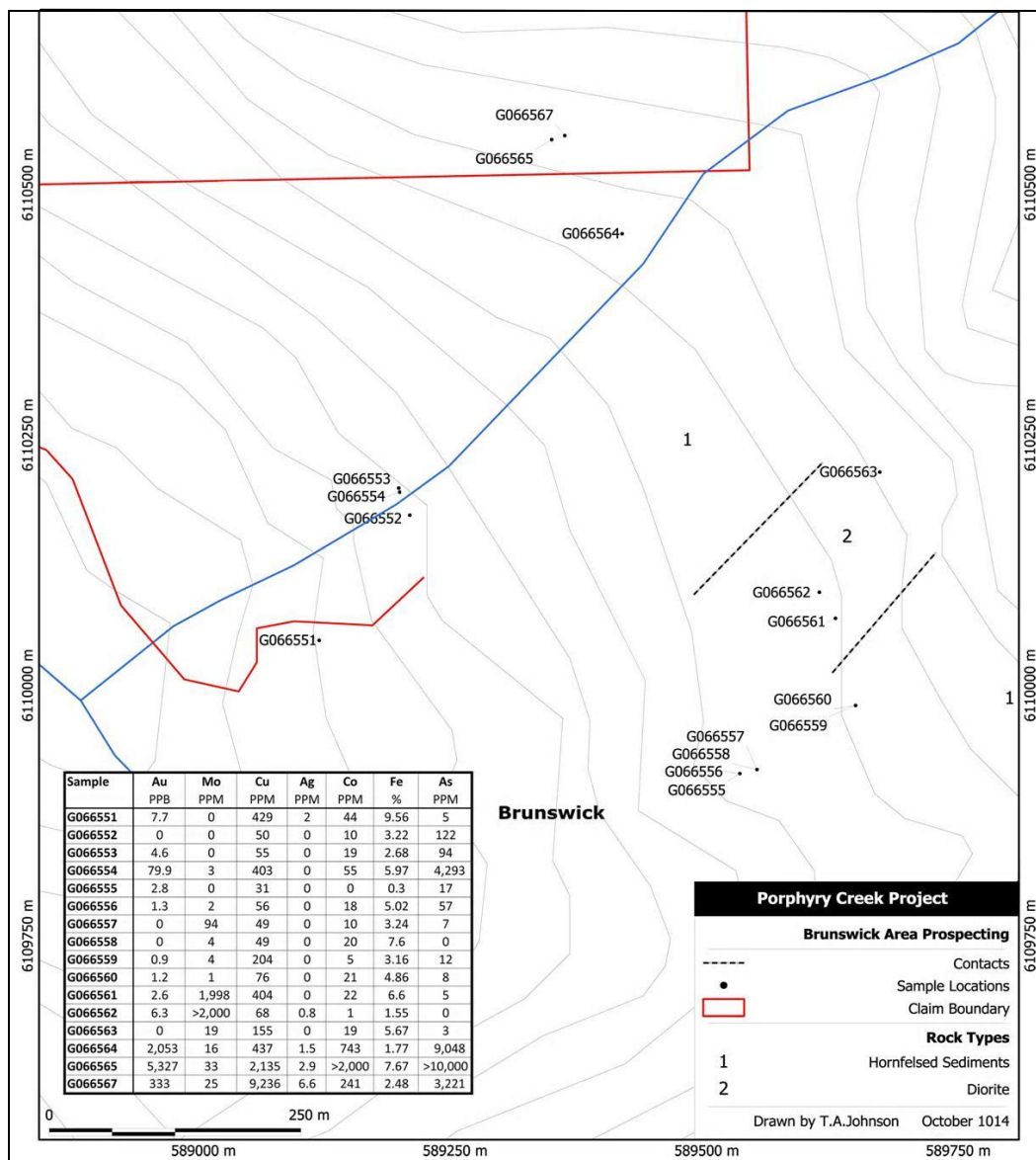


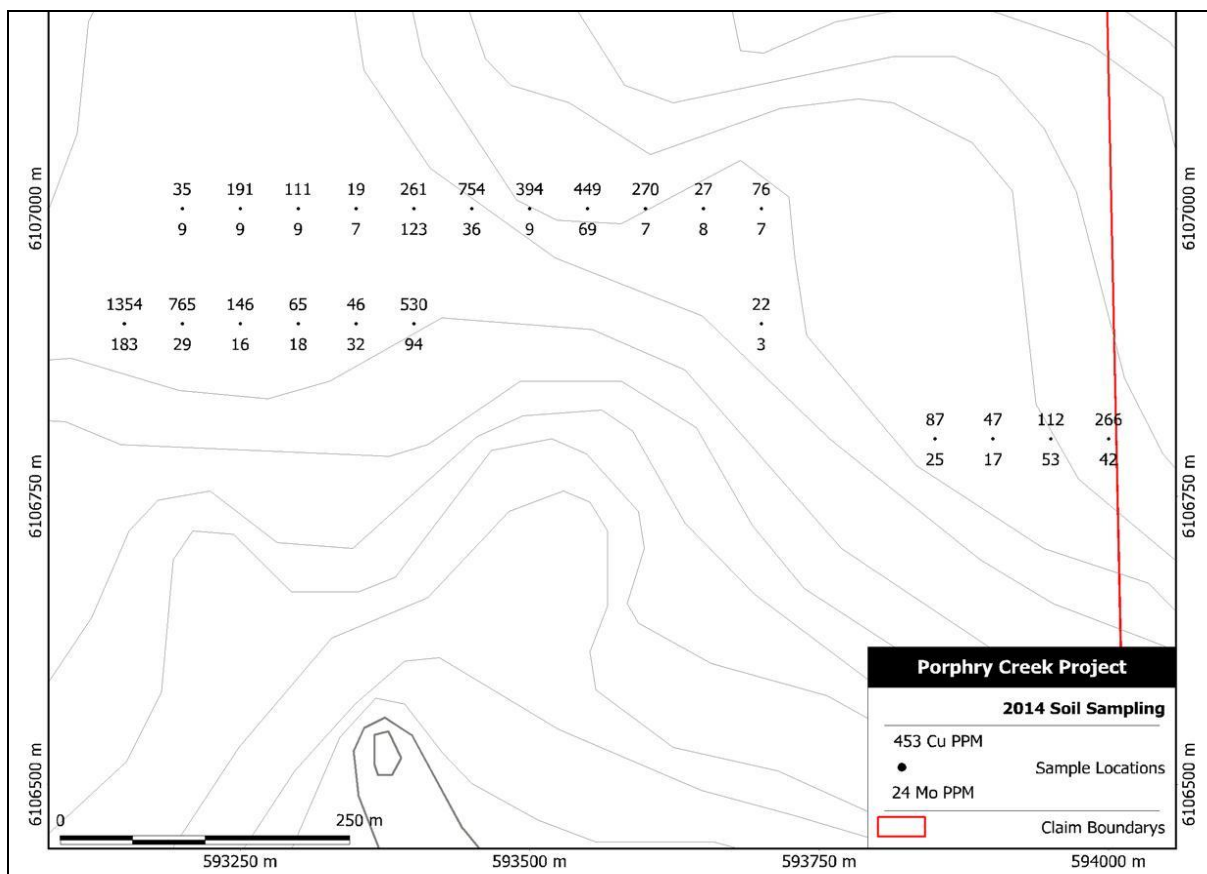
Figure 9 - 2014 Rock Sampling, Brunswick Area

At the end of June, 2014, Duncastle Gold Corp relinquished its option on the property, returning 100% ownership to the original owners. In July a limited work program was carried out to follow up on exploration by Duncastle and to begin to develop other potential exploration targets. Site work consisted of prospecting and mapping in the area of the Brunswick prospect, examining Sultana area drill core, carrying out a limited extension of the soil geochemical sampling in the Sultana area, and reclaiming drill sites left from drilling in the Sultana area. A total of 16 rock samples (Figure 9) and 26 soil samples (Figure 10) were collected. All rock samples were collected from the Brunswick area and all soil samples were collected from the Sultana area.

In 2015 four rock samples were collected from an area to the east of the Sultana showing, while on the west side of the property four rock samples and twelve geochemical samples were collected in the Red Rose Creek and Slater Creek areas. Three samples of historical tailings from the Red Rose mine were also collected.

Rock samples showed some molybdenite mineralization in an area of diorite talus to the east of the Brunswick workings, which may be suggestive of mineralization associated with the intersection of the Red Rose shear with a tongue of diorite in this area. Samples of quartz vein material collected in the vicinity of the old gold prospect adit south of the Red Rose mine showed significant values in gold and copper, and indicated the probable presence of cobalt sulpharsenide mineralization similar to that seen at the Victoria mine located to the north of the Rocher Deboile mine.

Rock sampling near the Sultana showing indicated the presence of Cu-Mo mineralization further east than previously documented.



**Figure 10 - 2014 Soil Samples, Sultana Area**

Soil sampling extended eastward from the old Sultana trenches and showed additional sections of strongly anomalous Cu and Mo values in this direction. The highest values, at the west end of the middle grid line, were likely affected by trench mineralization, but two other distinct anomalies were indicated.

In the Slater Creek area the geochemical survey showed that anomalous results are related to the larger drainages only, and that the values do appear to improve upstream particularly for Slater Creek itself, providing direction for further work. In the Red Rose Creek area geochemical sampling provided limited but positive initial indications of a possible Au-Cu anomaly in the area above the old town site. The results also showed that talus fines and soil sampling show similar responses in this area, so that both could be useful for future exploration.

Sampling of historical tailings from the Red Rose mine showed that this material carries significant values in tungsten with gold and copper values also elevated. This work also showed that there is much more of this material present than previously known in the small impoundment near the townsite. The tailings are of interest both for their mineralogical representation of vein systems in the area and as a potential supplemental resource to small high grade deposits in the area.

### **3.3.6 2016 Metallurgical Test Program**

Early in 2016 a series of metallurgical tests was carried out on a composite sample prepared by combining samples collected from the Red Rose mine's tailings. Two multi-stage flotation tests and two leach tests were conducted. One gravity separation test was also included. The results showed that high recoveries of gold and tungsten could be obtained by flotation methods, but other base metals did not respond as well, likely due to surface oxidation. Calculated gold grades were also significantly higher than assayed grades, a possible indication of nugget effect.

The work indicated that the relatively low tungsten recoveries obtained during the operation of the Red Rose mine were likely process related and not due to factors related to the ore mineralogy. Also, while there was some mention of increasing base and precious metal values in ore from lower levels, this work provided an indication that non-tungsten values were quite significant.

## **4 2016 Field Program**

The 2016 site work program consisted of two separate site visits, one to the Sultana area in the southeast part of the property, and the other to the Red Rose Creek area in the northwest. The Sultana area was visited by helicopter during June 21<sup>st</sup> to 23<sup>rd</sup> to prospect additional surface targets and to expand on a soil sampling grid initiated in 2014. A total of 4 rock samples were collected, two above the Sultana showing to the south and 2 further south in the headwaters of Corya Creek. 15 soil samples were collected, mainly to the north and east of the Sultana showings and north of the 2014 grid. From July 19<sup>th</sup> to 21<sup>st</sup> work was carried out in the Red Rose Creek area from a camp established near the creek in the upper part of the valley. Prospecting was carried out around the Brunswick mine and above the former Red Rose townsite, as well as to the northwest along the lower part of Armagosa Creek. A total of 9 rock and float samples were collected, including 5 from the Brunswick area, 2 above Red Rose and 2

from Armagosa Creek. In addition, two short lines of geochemical samples were collected along the steep slope above the townsite as a follow-up to some preliminary sampling carried out in 2015. Soil was collected where possible, but samples were primarily talus fines. A total of 6 talus fines samples and 2 soil samples were collected.

Rock samples were crushed and split to produce a 250 gram fraction which was pulverized to minus 200 mesh. From each pulverized rock pulp, a 0.5 gram subsample was digested in hot aqua regia and analyzed by ICP-MS for 36 elements. Prior to analysis, soil and talus fines samples were dried and screened at 80 mesh. A 0.5 gram subsample of each minus 80 mesh fraction was digested in hot aqua regia and analyzed by ICP-MS for 36 elements. Any samples (1 only) showing an over-limit value for target elements were reanalyzed by ICP-ES following hot aqua regia digestion of a separate 0.4 gram sample. All samples were analyzed by Bureau Veritas Commodities Ltd. (formerly Acme Labs) in Vancouver.

Rock sample information is summarized in Table 5. Sample locations with the most relevant analytical results are also shown on the four area maps in Appendix 1. Geochemical sample locations and key analytical values are shown on the Red Rose Area (Map 1) and Sultana Area (Map 3) maps in Appendix 1. Full analytical results for all samples are provided in Appendix 2.

#### 4.1 Sultana Area

Rock sampling in the Sultana area focused on exposures showing visible sulphides or other strong alteration. A 2 meter wide pyritic dike (1041851) showed no significant values, but a massive actinolite vein (1041852) carried anomalous copper and silver values, and also carried minor rare earth values along with high iron. The two samples collected further south (1041853 and 1041854) also carried high iron values, accounting for the visible mineralization, but neither carried any economic mineral values.

**Table 5 – 2016 Rock Sample Descriptions and Key Analytical Results**

Sample #	Date	Description	UTM Location		Width m	Au g/t	Ag g/t	Co ppm	Cu ppm	Pb ppm	Zn ppm	W ppm	Mo ppm	As ppm
			East	North										
<b>Brunswick Mine Area</b>														
CR160719-1	7/19/2016	Narrow decomposed qtz vein	589125	6110095	0.2	0.014	<0.1	12	72	2.0	39	0.4	2.4	93
CR160719-2	7/19/2016	Pyritic silicified conglomerate	589132	6110092		0.004	0.2	15	294	3.5	25	0.3	4.7	236
CR160719-3	7/19/2016	Qtz float in talus - multiple peices	589597	6110104		0.212	0.3	6	27	7.6	38	0.1	1.8	0.62%
CR160719-4	7/19/2016	Layered qtz vein float to 10 cm	589609	6110080		0.030	0.2	19	339	3.0	18	0.6	17.1	14
CR160719-B	7/19/2016	Chips - upper adit dump boulder	589130	6110088		0.228	728	12	0.66%	6.52%	23.4%	<0.1	3.5	0.16%
<b>Red Rose Creek Area</b>														
CR160720-1	7/20/2016	Narrow qtz bands in volcanics	588196	6110615	0.2	<.001	<.01	10	66	3.1	76	0.1	2.4	51
CR160720-2	7/20/2016	Qtz float in talus	588163	6110610	-	<.001	<.01	3	17	1.0	15	<.01	1.3	18
<b>Armagosa Creek Area</b>														
CR160720-3	7/20/2016	Stream float	586578	6111501	-	<.001	<.01	13	63	2.0	17	0.1	1.0	34
CR160720-3A	7/20/2016	Stream float - pyritic	586578	6111501	-	<.001	<.01	16	99	4.1	23	0.2	4.6	142
<b>Sultana Area</b>														
1041851	6/21/2016	Talus bldr, fine grained dike w sulph.	593529	6106927	2		<.05	4	12	28	41	<2	<2	<5
1041852	6/21/2016	Massive actinolite vein in grano.	593238	6106486	0.3		1.7	37	677	12	97	<2	<2	<5
1041853	6/22/2016	Talus - altered phyllic rock w pyrite	593904	6104439			<.05	10	6	11	10	6	4	17
1041854	6/22/2016	Talus - w hematite, minor cpy	593843	6104436			<.05	32	7	21	15	<2	2	27



Of the 15 soil samples collected in the Sultana area, more than half were anomalous for one or more elements of interest, and four samples (S1, S2, S5 and S6) showed very strongly anomalous Cu and Mo together with some elevated values for other elements. Sample S9 was also strongly anomalous in Mo, but more weakly anomalous in Cu. Samples S5 and S6 were also strongly anomalous in Pb, with S5 also carrying a very high Ag value. S1 and S2 were taken upslope (south) from a strong Cu-Mo zone found in 2014, while S5 and S6 were taken downslope (north) from the same zone. Values appear to decline to the northwest.

**Table 6 – 2016 Soil and Talus Sample Locations and Principal Analytical Results**

Sample #	Date	Description	UTM Location		Au	Ag	Co	Cu	Pb	Zn	W	Mo	As
			East	North	g/t	g/t	ppm	ppm	ppm	ppm	ppm	ppm	ppm
<b>Red Rose Creek Area</b>													
CR160720-G1	7/20/2016	Well dev B soil over talus	588075	6110484	0.008	0.4	10	65	15	121	1.4	7.2	100
CR160720-G2	7/20/2016	Soil in trees, edge of slide chute	587888	6110551	0.008	0.6	15	108	16	116	7.1	6.2	125
CR160720-T1	7/20/2016	Talus fines	588178	6110606	0.005	0.3	27	112	17	155	0.6	9.5	124
CR160720-T2	7/20/2016	Below stream-few fines	588203	6110601	0.017	0.6	85	183	74	473	2.2	12.9	581
CR160720-T3	7/20/2016	End of short spur road	588221	6110593	0.009	0.4	23	124	32	155	0.9	10.5	234
CR160720-T4	7/20/2016	Some soil dev on talus	588207	6110478	0.010	1.3	29	140	64	278	0.6	9.5	334
CR160720-T5	7/20/2016	Fair B soil dev under slide rock	588017	6110495	0.002	0.2	14	69	11	148	2.6	7.4	93
CR160720-T6	7/20/2016	Tree well, west edge of slide chute	587750	6110578	0.004	0.4	42	178	22	205	0.2	7.3	144
<b>Sultana Area</b>													
S1	6/21/2016	Talus fines	593312	6106845	<0.3	9	465	13	40	<2	63	29	
S2	6/21/2016	Talus fines	593355	6106835		0.3	5	413	20	43	3	76	31
S3	6/21/2016	Well dev. B horizon	593338	6107072		0.4	4	49	13	21	<2	5	11
S4	6/21/2016	Well dev. B horizon	593331	6107121		0.6	2	73	8	22	2	11	10
S5	6/21/2016	Well dev. B horizon	593391	6107072		5.3	18	586	347	361	7	24	115
S6	6/21/2016	Area of blocky talus	593434	6107037		0.7	14	311	96	158	<2	71	70
S7	6/21/2016	Area of blocky talus	593507	6107057		0.9	5	13	8	19	<2	4	<2
S8	6/22/2016	Soil	593487	6106969		<0.3	1	18	11	9	<2	3	3
S9	6/22/2016	Soil	593532	6106959		0.8	3	70	10	23	<2	35	13
S10	6/22/2016	Soil	593227	6107057		0.9	3	37	42	22	<2	12	9
S11	6/22/2016	Soil	593217	6107110		<0.3	2	8	6	5	<2	2	<2
S12	6/22/2016	Soil	593269	6107119		1.1	5	76	11	25	5	8	13
S13	6/22/2016	Soil	593266	6107202		<0.3	1	6	<3	8	<2	2	<2
S14	6/22/2016	Soil	593216	6107214		<0.3	2	17	18	13	<2	3	3
S15	6/22/2016	Soil	593175	6107158		0.7	1	24	27	28	<2	6	6

## 4.2 Red Rose Creek Area

Rock samples were collected from several areas in and around the Red Rose Creek Valley. Five of the samples were collected in the vicinity of the Brunswick Mine. Near the upper adit of the mine, these included a sampling of a weathered quartz vein a few meters northwest of the adit, above Balsam Creek (CR160719-1) and a grab sample of the pyritic conglomerate which overlies the area above the adit, obscuring the vein at surface (CR160719-2). A chip sample was also collected from well mineralized coarse vein material from a small dump area below the adit (CR160719-B). The quartz vein was barren, while the conglomerate was slightly anomalous for Cu. The Brunswick vein material, however assayed high for Ag and Pb (728 g/t and 6.5%) and very high for Zn (23.4%). It also carried significant Au and Cu values. As was relatively high in this sample while Mo, W and Co were very low, distinguishing the mineralization from both the Red Rose mine mineralization and the historical gold vein that lies between them.

To the east, two samples of quartz vein float were collected from talus (CR160719-3 and -4). The first carried anomalous gold values and high arsenic content but minimal other values. The second sample carried minor anomalous copper

Two samples (CR160720-1 and -2) were both lightly mineralized quartz vein samples collected near an upper switchback of the Red Rose mine road. The first was from a narrow vein exposure on a steep slope and the other was from talus. Neither sample returned significant values.

The final two rock samples were collected from stream float in the lower part of Armagosa Creek. These were meant primarily as geochemical samples to provide chemical signatures for mineralized rocks in the area. The samples consisted of lightly mineralized quartzites and volcanics (CR160720-3 and -4) with iron staining and some visible pyrite in the latter sample. While neither carried economic values, the pyritic volcanics showed elevated Cu and As content.

Geochemical sampling returned very encouraging values, with anomalous values in all samples, and significantly elevated Cu and As in most. Values ranged from 65 to 183 ppm for Cu and 93 to 581 for As. Au was not high, but was slightly elevated in a few samples, ranging from 2.2 to 16.7 ppb. In one of the upper samples (CR160720-T2) gave the highest values for Cu, As and Au, and was also the most anomalous sample for Co, Mo, Pb and Zn. This sample appeared to lie along a small drainage, and therefore may reflect polymetallic mineralization within that drainage. The drainage may also reflect the presence of a fault or contact.

## **5 Interpretations and Conclusions**

The Sultana work was incremental in nature, with the soil sampling expanding a previously identified zone of Cu-Mo anomaly. It also helped to define the shape of the zone, potentially indicating a source area along the slope to the south, or a north northwest striking structure extending northward from that area.

Around the Brunswick mine, rock samples confirmed the high grade nature of the Brunswick vein and provided a geochemical signature for that type of vein, but no actual exposures were found. Float confirmed the presence of other quartz veins in the area, but the values were not high, and the geochemical signature was also different than the Brunswick vein. Of the remaining rock samples, the only significant information was an indication of an elevated background of Cu and As in volcanic rocks in the Armagosa Creek area.

The geochemical sampling above the townsite was successful in expanding and strengthening a Cu-As anomaly, with minor gold values, identified in 2015. The strongest values so far are centred on a small drainage just west of the Red Rose mine road, and an upper sample includes anomalous Co along with high As, suggesting potential for a Victoria-style vein system in the area. The mineralization also does not appear to be limited to this narrow zone, as the sample collected furthest to the west (CR160720-T6) had close to the highest Cu value and still carried anomalous As and Co content.

### **5.1 Recommendations**

This work program did not identify any significant new occurrences, but the elevated values found in several locations continued to build the data base and expand areas of interest. The property has broad underexplored potential and considerable additional prospecting, geochemical sampling and geophysical testing will be required to begin to define the real potential. The values seen in the geochemical sampling, particularly to the west of the Red Rose mine road, provide a good starting point for further exploration, particularly for high grade occurrences similar to those already known in the area.

## 6 Statement of Qualifications

*Doug Warkentin P.Eng*

I, Douglas Warkentin, P.Eng., a professional engineer with a business address at 745 East 30<sup>th</sup> Ave., Vancouver, B.C., certify that:

I have been a Registered Member of the Association of Professional Engineers and Geoscientists of the Province of British Columbia since 1992.

I am a graduate of the University of British Columbia, Vancouver, B.C. and hold a degree of Bachelor of Applied Science in Mining and Mineral Process Engineering.

I have practiced my profession as a Metallurgist and Mineral Process Engineer for 29 years.

I am currently employed as a Metallurgical Engineer by Kemetco Research Inc., Vancouver B.C., and have previously been employed as a Mineral Process Engineer by Vista Mines Inc., Coastech Research Inc., NTBC Research Corp., Biomet Mining Ltd., Blue Sky Mines Ltd., and Vizon Scitec Inc. I have also served as a Director of Duncastle Gold Corp., a TSX-Venture listed company.

Since 2001 I have also acted as an independent engineering consultant for a number of mining clients.

I am a qualified person for the purposes of National Instrument 43-101 in relation to metallurgical testing and evaluation programs.

I personally conducted the testwork, and directly supervised all sample handling and preparation related to the Porphyry Creek Project that is described in this report.

I am the sole author of this report.

I am not aware of any material fact or material change with respect to the subject matter of this technical report that is not reflected in this report, the omission to disclose which would make this report misleading.

Dated at Vancouver, B.C., this 9<sup>th</sup> day of February 2017.

Doug Warkentin, PEng.  
Metallurgical Engineer



## 7 Statement of Costs

June 21 <sup>st</sup> to 23 <sup>rd</sup>		
Tim Johnson – Prospector 3 days @ 500/day		1500.00
July 16 <sup>th</sup> to 22 <sup>nd</sup>		
Doug Warkentin - Prospector 70 hrs @ 55/hr		3850.00
	Total Labour	<b>5,350.00</b>
Travel		
Tim Johnson – Return air fare Smithers –Vancouver		680.00
Doug Warkentin – 2020 km @ .45/km		909.00
Vehicle rental (3 days @ 60)		180.00
Hotel (5 days @ 100.48)		502.40
	Total Travel	<b>2,271.40</b>
Helicopter Rental (1.2 hrs @ \$1590/hr)		1908.00
Helicopter Fuel (180 L @ \$1.59 L)		286.20
Satellite Phone Rental		110.88
Meals and Supplies		308.88
	Total Site Access and Camp	<b>2,613.96</b>
Sample Preparation (17 samples @ \$10.68 ea)		181.60
Assays (36 samples @ \$17.64 ea)		634.90
Data Compilation		220.00
Report		825.00
	Total Reporting	<b>1,861.50</b>
	Total	<b>12,096.86</b>

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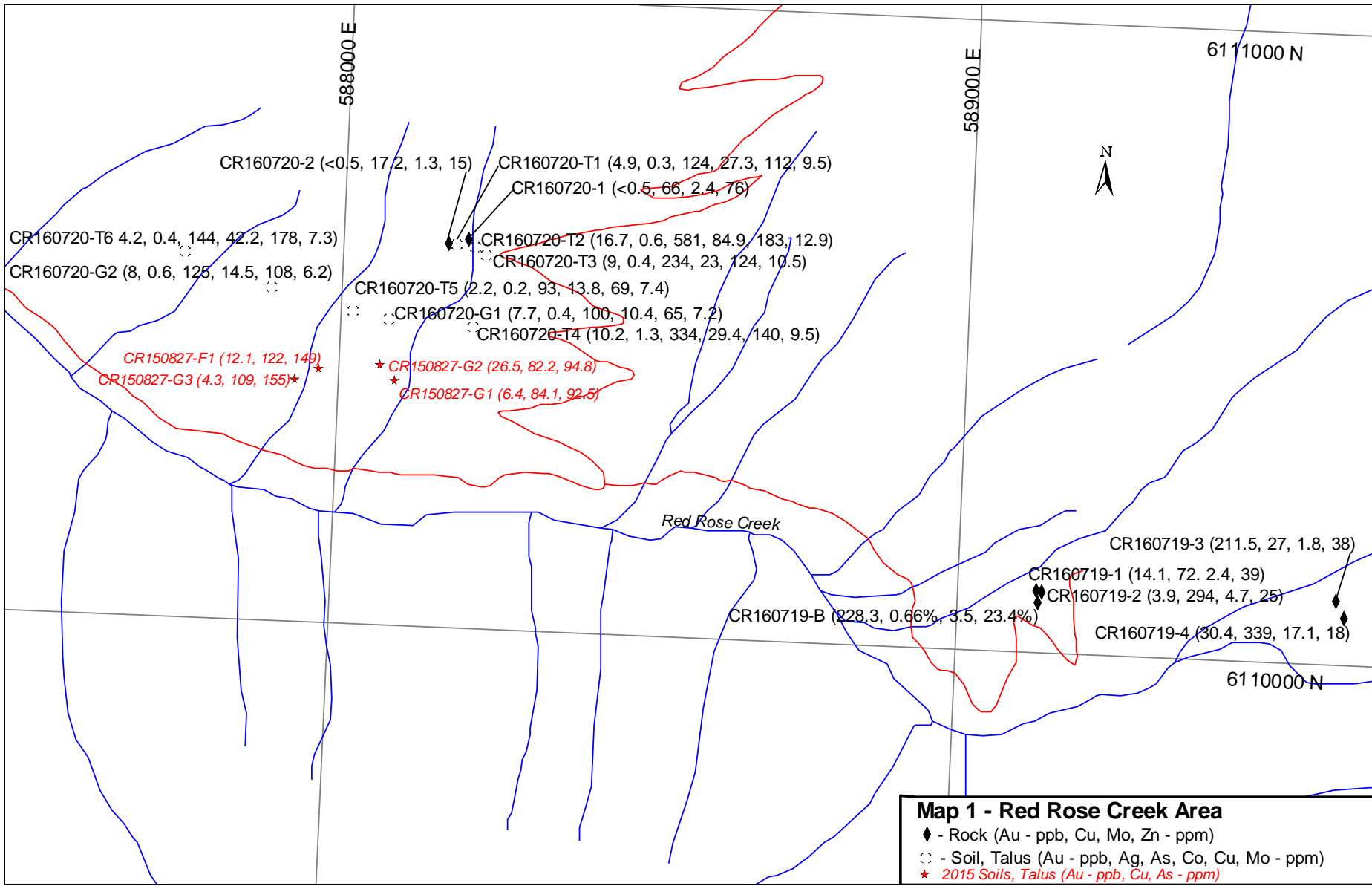
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Westphal, M (2010b): Internal company memorandum on the drilling results at the Sultana Prospect

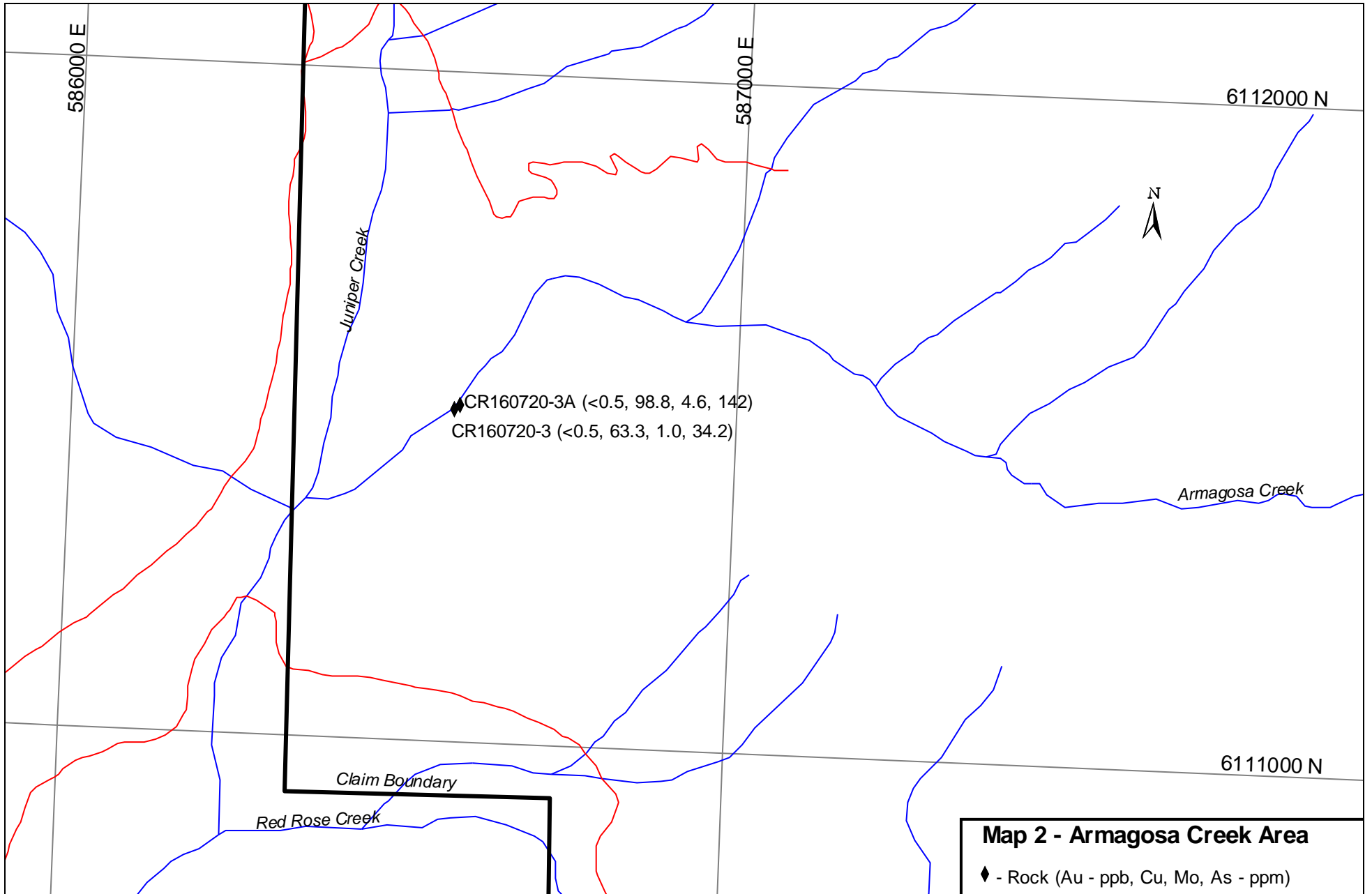
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## **Appendix 1 – Sample Location Maps**

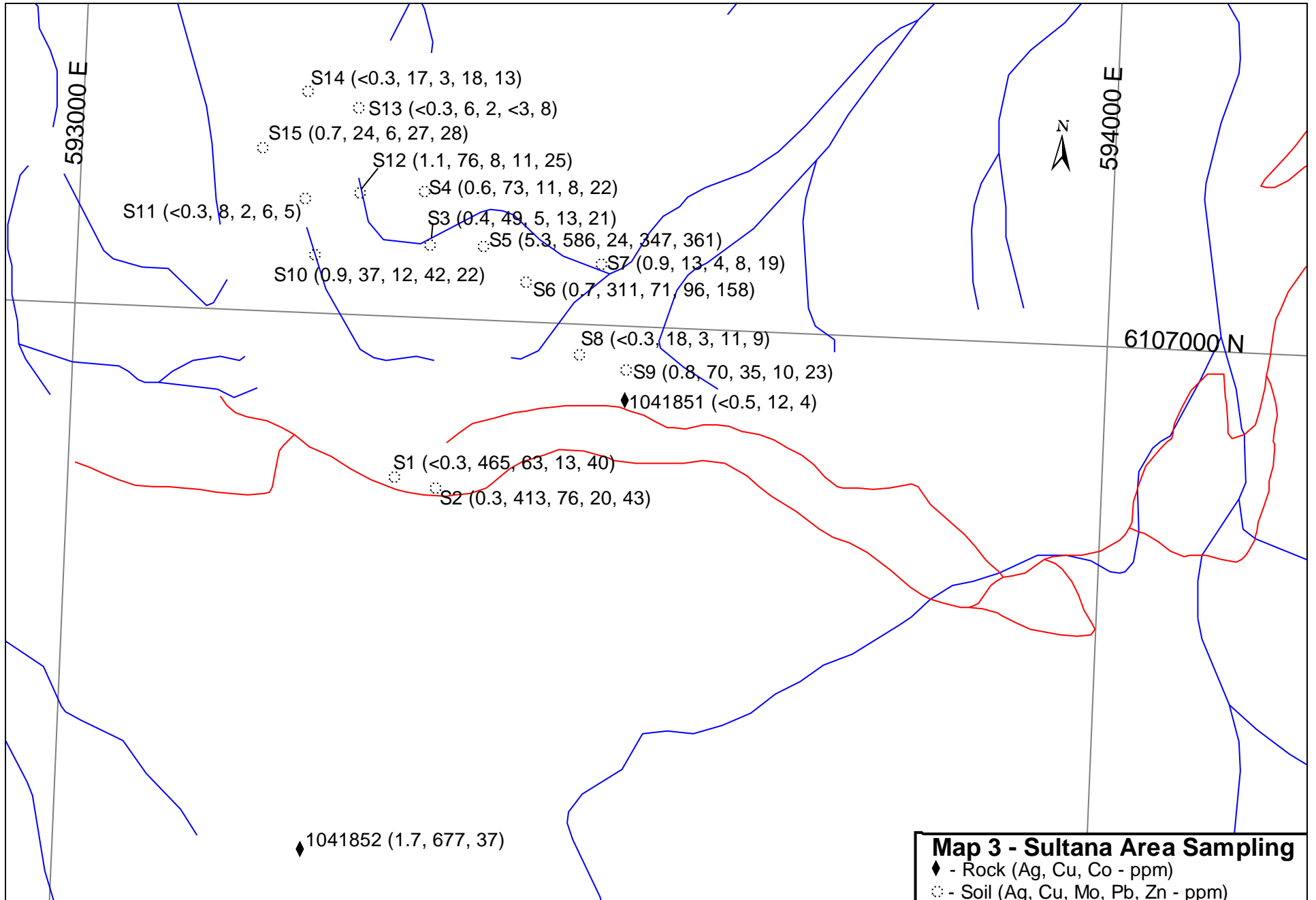


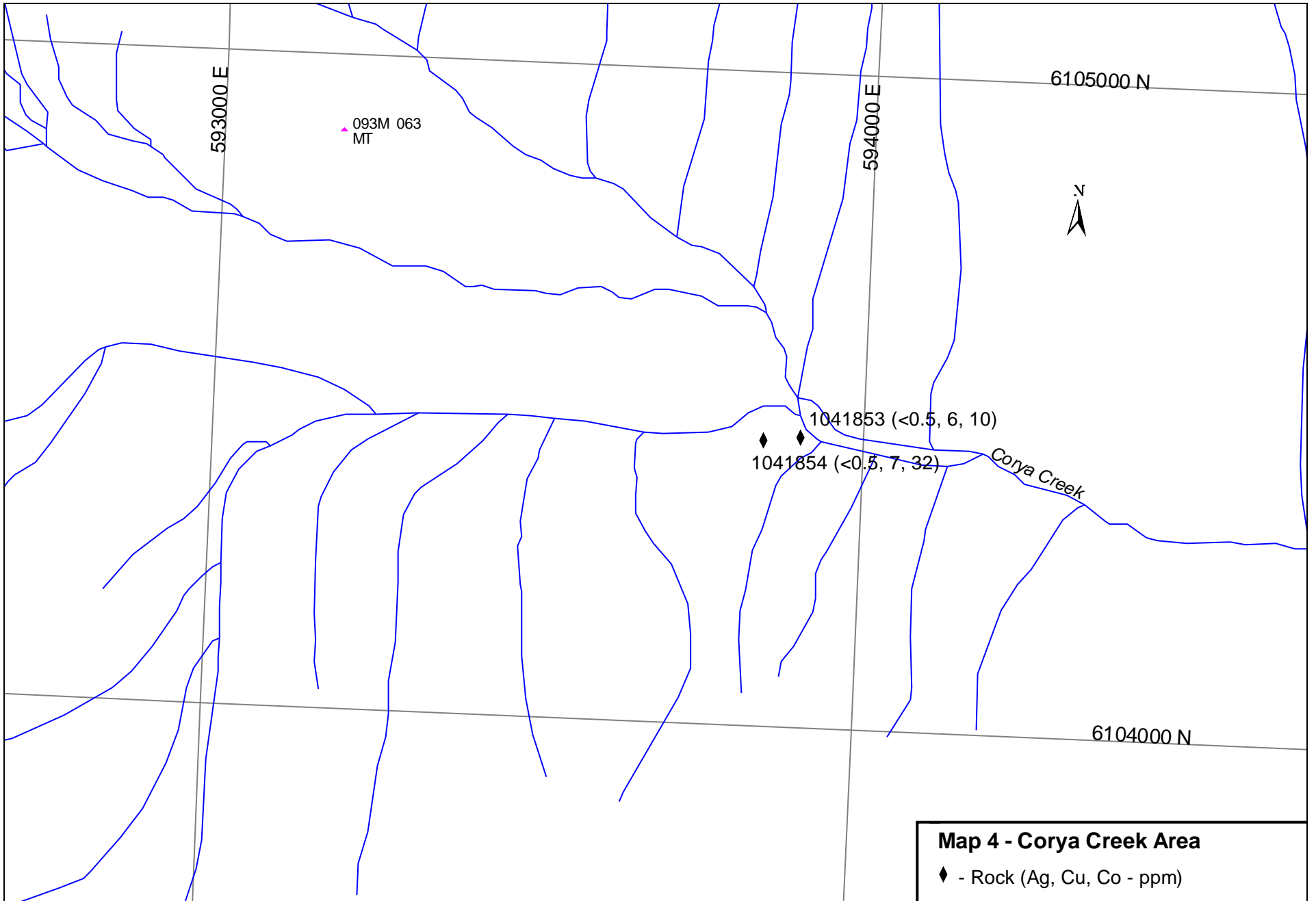
Scale 1:9000





Scale 1:8000





**Map 4 - Corya Creek Area**  
◆ - Rock (Ag, Cu, Co - ppm)

Scale 1:8000

## **Appendix 2 – Assay Reports**



**BUREAU VERITAS** MINERAL LABORATORIES  
Canada

[www.bureauveritas.com/um](http://www.bureauveritas.com/um)

Bureau Veritas Commodities Canada Ltd.  
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA  
PHONE (604) 253-3158

**Client:** **Tim Johnson**  
2674 Pylades Dr.  
Ladysmith BC V9G 1E5 CANADA

Submitted By: Tim Johnson  
Receiving Lab: Canada-Vancouver  
Received: July 21, 2016  
Report Date: July 28, 2016  
Page: 1 of 2

## CERTIFICATE OF ANALYSIS

VAN16001208.1

### CLIENT JOB INFORMATION

Project: None\_Given  
Shipment ID:  
P.O. Number  
Number of Samples: 4

### SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
PRP70-250	4	Crush, split and pulverize 250 g rock to 200 mesh			VAN
MA300	4	4 Acid digestion ICP-ES analysis	0.25	Completed	VAN
DRPLP	4	Warehouse handling / disposition of pulps			VAN
DRRJT	4	Warehouse handling / Disposition of reject			VAN

### SAMPLE DISPOSAL

PICKUP-PLP Client to Pickup Pulps  
PICKUP-RJT Client to Pickup Rejects

### ADDITIONAL COMMENTS

Bureau Veritas does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

Invoice To: Tim Johnson  
2674 Pylades Dr.  
Ladysmith BC V9G 1E5  
CANADA

CC:



This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only. All results are considered the confidential property of the client. Bureau Veritas assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted. \*\*\* asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.



**BUREAU VERITAS** MINERAL LABORATORIES  
Canada

[www.bureauveritas.com/um](http://www.bureauveritas.com/um)

Bureau Veritas Commodities Canada Ltd.  
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA  
PHONE (604) 253-3158

**Client:** **Tim Johnson**  
2874 Pylades Dr.  
Ladysmith BC V9G 1E5 CANADA

Project: None\_Given  
Report Date: July 28, 2016

Page: 2 of 2 Part: 1 of 2

# CERTIFICATE OF ANALYSIS

**VAN16001208.1**

Method	Analyte	Unit	WGHT	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300
			Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Th	Sr	Cd	Sb	Bi	V	Ca
		MDL	kg	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%
		0.01	2	2	5	2	0.5	2	2	5	0.01	5	20	2	2	0.4	5	5	2	0.01	0.002
1041851	Rock	0.89	<2	12	28	41	<0.5	3	4	814	2.03	<5	43	8	282	0.5	8	<5	35	1.89	0.082
1041852	Rock	0.88	<2	677	12	97	1.7	63	37	2348	8.50	<5	36	5	14	0.5	<5	<5	330	9.28	0.796
1041853	Rock	0.52	4	6	11	10	<0.5	12	10	182	4.78	17	<20	5	69	<0.4	<5	<5	75	1.32	0.098
1041854	Rock	0.60	2	7	21	15	<0.5	20	32	96	10.09	27	<20	4	107	<0.4	<5	6	138	0.55	0.014



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**Client:** **Tim Johnson**  
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Ladysmith BC V9G 1E5 CANADA

**Project:** None\_Given  
**Report Date:** July 28, 2016

**Page:** 2 of 2 **Part:** 2 of 2

**CERTIFICATE OF ANALYSIS**

**VAN16001208.1**

Method	Analyte	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300	MA300
		La	Cr	Mg	Ba	Ti	Al	Na	K	W	Zr	Sn	Y	Nb	Be	Sc	S
Unit		ppm	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
MDL		2	2	0.01	1	0.01	0.01	0.01	4	2	2	2	2	1	1	0.1	
1041851	Rock	19	6	0.46	1415	0.18	7.67	3.04	2.68	<4	92	<2	11	15	1	4	<0.1
1041852	Rock	70	21	9.69	4	0.44	1.81	0.57	0.21	<4	21	6	116	24	3	69	<0.1
1041853	Rock	3	21	1.01	102	0.10	5.97	0.40	1.50	6	27	5	10	3	1	8	3.3
1041854	Rock	<2	16	1.44	12	0.15	4.62	0.46	0.08	<4	16	5	6	5	<1	11	9.5





**BUREAU VERITAS** MINERAL LABORATORIES  
Canada

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Bureau Veritas Commodities Canada Ltd.  
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA  
PHONE (604) 253-3158

**Client:** **Tim Johnson**  
2674 Pylades Dr.  
Ladysmith BC V9G 1E5 CANADA

Submitted By: Tim Johnson  
Receiving Lab: Canada-Vancouver  
Received: July 21, 2016  
Report Date: July 27, 2016  
Page: 1 of 2

## CERTIFICATE OF ANALYSIS

VAN16001207.1

### CLIENT JOB INFORMATION

Project: None\_Given  
Shipment ID:  
P.O. Number  
Number of Samples: 15

### SAMPLE DISPOSAL

PICKUP-PLP Client to Pickup Pulps

### SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
BAT01	1	Batch charge of <20 samples			VAN
Dry at 60C	15	Dry at 60C			VAN
SS80	15	Dry at 60C sieve 100g to -80 mesh			VAN
AQ300	15	1:1:1 Aqua Regia digestion ICP-ES analysis	0.5	Completed	VAN
DRPLP	15	Warehouse handling / disposition of pulps			VAN

### ADDITIONAL COMMENTS

Bureau Veritas does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

Invoice To: Tim Johnson  
2674 Pylades Dr.  
Ladysmith BC V9G 1E5  
CANADA

CC:



This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only. All results are considered the confidential property of the client. Bureau Veritas assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted. \*\*\* asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.



Bureau Veritas Commodities Canada Ltd.  
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA  
PHONE (604) 253-3158

**Client:** **Tim Johnson**  
2674 Pylades Dr.  
Ladysmith BC V9G 1E5 CANADA

**Project:** None\_Given

**Report Date:** July 27, 2018

**Page:** 2 of 2

**Part:** 1 of 2

# CERTIFICATE OF ANALYSIS

**VAN16001207.1**

Method	Analyte	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300
		Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	
MDL		1	1	3	1	0.3	1	1	2	0.01	2	2	1	0.5	3	3	1	0.01	0.001	1	1
S1	Soil	63	465	13	40	<0.3	8	9	228	2.29	29	<2	11	<0.5	<3	<3	50	0.12	0.068	7	18
S2	Soil	76	413	20	43	0.3	6	5	141	2.13	31	<2	55	<0.5	6	4	41	0.45	0.121	10	16
S3	Soil	5	49	13	21	0.4	4	4	98	1.96	11	<2	12	<0.5	4	<3	49	0.08	0.068	6	14
S4	Soil	11	73	8	22	0.6	3	2	63	2.13	10	<2	105	<0.5	<3	<3	65	0.06	0.097	6	19
S5	Soil	24	588	347	361	5.3	8	18	478	3.35	115	5	15	<0.5	94	<3	40	0.15	0.129	12	13
S6	Soil	71	311	96	158	0.7	9	14	651	4.06	70	<2	10	<0.5	22	<3	63	0.14	0.122	11	19
S7	Soil	4	13	8	19	0.9	6	5	70	1.65	<2	<2	7	<0.5	<3	<3	48	0.12	0.046	3	17
S8	Soil	3	18	11	9	<0.3	2	1	73	0.78	3	<2	10	<0.5	<3	<3	24	0.04	0.063	4	7
S9	Soil	35	70	10	23	0.8	3	3	63	1.52	13	<2	97	<0.5	<3	<3	50	0.63	0.049	5	10
S10	Soil	12	37	42	22	0.9	4	3	135	2.21	9	<2	8	<0.5	<3	<3	52	0.05	0.108	6	11
S11	Soil	2	8	6	5	<0.3	<1	2	9	0.43	<2	<2	16	<0.5	<3	<3	17	0.02	0.016	5	6
S12	Soil	8	78	11	25	1.1	4	5	138	2.85	13	<2	17	<0.5	3	<3	63	0.05	0.063	5	15
S13	Soil	2	6	<3	8	<0.3	2	1	70	1.09	<2	<2	9	<0.5	<3	<3	42	0.03	0.040	4	11
S14	Soil	3	17	18	13	<0.3	3	2	203	1.47	3	<2	10	<0.5	<3	<3	42	0.05	0.062	5	9
S15	Soil	6	24	27	28	0.7	1	1	46	0.81	6	<2	11	<0.5	<3	<3	43	0.04	0.039	5	6



Bureau Veritas Commodities Canada Ltd.  
9050 Shaughnessy St Vancouver BC V6P 6E5 CANADA  
PHONE (604) 253-3158

**Client:** **Tim Johnson**  
2674 Pylades Dr.  
Ladysmith BC V9G 1E5 CANADA

**Project:** None\_Given  
**Report Date:** July 27, 2016

# CERTIFICATE OF ANALYSIS

**VAN16001207.1**

Method	Analyte	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300	AQ300
		Mg	Ba	Ti	B	Al	Na	K	W	S	Hg	Tl	Ga
Unit		%	ppm	%	ppm	%	%	%	ppm	%	ppm	ppm	ppm
MDL		0.01	1	0.001	20	0.01	0.01	0.01	2	0.05	1	5	5
S1	Soil	0.39	58	0.052	<20	1.54	<0.01	0.08	<2	<0.05	<1	<5	7
S2	Soil	0.39	144	0.014	<20	1.60	<0.01	0.07	3	0.08	<1	<5	7
S3	Soil	0.18	45	0.034	<20	1.75	<0.01	0.04	<2	0.08	<1	<5	7
S4	Soil	0.17	74	0.031	<20	1.63	<0.01	0.04	2	<0.05	<1	<5	7
S5	Soil	0.33	62	0.017	<20	1.15	<0.01	0.11	7	<0.05	<1	<5	<5
S6	Soil	0.39	55	0.032	<20	2.00	<0.01	0.08	<2	<0.05	<1	<5	<5
S7	Soil	0.33	65	0.092	<20	0.61	0.01	0.10	<2	<0.05	<1	<5	<5
S8	Soil	0.08	33	0.029	<20	0.78	<0.01	0.04	<2	<0.05	<1	<5	6
S9	Soil	0.19	97	0.027	<20	1.24	<0.01	0.05	<2	0.08	<1	<5	13
S10	Soil	0.13	35	0.016	<20	1.35	<0.01	0.04	<2	0.10	<1	<5	9
S11	Soil	0.02	31	0.011	<20	0.44	<0.01	0.02	<2	<0.05	<1	<5	<5
S12	Soil	0.21	38	0.036	<20	2.31	<0.01	0.03	5	0.06	<1	<5	9
S13	Soil	0.03	29	0.025	<20	0.61	<0.01	0.02	<2	<0.05	<1	<5	5
S14	Soil	0.10	39	0.030	<20	1.26	<0.01	0.03	<2	0.08	<1	<5	7
S15	Soil	0.05	29	0.031	<20	1.00	<0.01	0.02	<2	<0.05	<1	<5	10



**BUREAU VERITAS** MINERAL LABORATORIES  
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Bureau Veritas Commodities Canada Ltd.  
9050 Shaughnessy St Vancouver British Columbia V6P 6E5 Canada  
PHONE (604) 253-3158

**Client: Crucible Resources Ltd.**  
745 East 30th Ave  
Vancouver British Columbia V5V 2V8 Canada

Submitted By: Doug Warkentin  
Receiving Lab: Canada-Vancouver  
Received: August 30, 2016  
Report Date: September 16, 2016  
Page: 1 of 3

## CERTIFICATE OF ANALYSIS

VAN16001524.1

### CLIENT JOB INFORMATION

Project: PC/Franklin/Hearn  
Shipment ID:  
P.O. Number  
Number of Samples: 35

### SAMPLE DISPOSAL

PICKUP-PLP Client to Pickup Pulps  
PICKUP-RJT Client to Pickup Rejects

### SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
PRP70-250	19	Crush, split and pulverize 250 g rock to 200 mesh			VAN
SLBHP	18	Sort, label and box pulps			VAN
AQ200	30	1:1:1 Aqua Regia digestion ICP-MS analysis	0.5	Completed	VAN
AQ250_EXT	5	1:1:1 Aqua Regia digestion Ultratrace ICP-MS analysis	0.5	Completed	VAN
DRPLP	35	Warehouse handling / disposition of pulps			VAN
DRRJT	19	Warehouse handling / Disposition of reject			VAN
FA330-Au	1	Fire assay fusion Au by ICP-ES	30	Completed	VAN
KP300	1	Phosphoric acid leach, ICP-ES analysis	0.5	Completed	VAN

### ADDITIONAL COMMENTS

Bureau Veritas does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

Invoice To: Crucible Resources Ltd.  
745 East 30th Ave  
Vancouver British Columbia V5V 2V8  
Canada

CC:



This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only. All results are considered the confidential property of the client. Bureau Veritas assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted. \*\*\* asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.



Bureau Veritas Commodities Canada Ltd.

9050 Shaughnessy St Vancouver British Columbia V6P 6E5 Canada  
PHONE (604) 253-3158

**Client:** **Crucible Resources Ltd.**  
745 East 30th Ave  
Vancouver British Columbia V5V 2V8 Canada

**Project:** PC/Franklin/Hearn  
**Report Date:** September 16, 2016

**Page:** 2 of 3

**Part:** 1 of 5

# CERTIFICATE OF ANALYSIS

## VAN16001524.1

Method	Analyte	Unit	MDL	WGHT	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	
				Wgt	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P
				kg	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%
				0.01	0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001
CR160719-1	Rock			0.28	2.4	72.4	2.0	39	<0.1	18.9	11.6	297	3.63	92.7	14.1	2.6	42	<0.1	0.6	0.4	87	0.45	0.089
CR160719-2	Rock			0.45	4.7	293.9	3.5	25	0.2	3.1	15.4	208	3.84	236.4	3.9	4.8	15	<0.1	2.5	0.3	24	0.44	0.128
CR160719-3	Rock			0.68	1.8	26.8	7.6	38	0.3	3.5	5.6	111	2.07	6246.1	211.5	2.1	16	0.3	18.5	<0.1	27	0.18	0.043
CR160719-4	Rock			1.24	17.1	339.3	3.0	18	0.2	11.3	18.7	131	2.38	13.9	30.4	0.9	16	<0.1	0.3	0.4	24	0.31	0.016
CR160720-1	Rock			0.41	2.4	66.0	3.1	76	<0.1	17.8	9.7	426	2.84	51.1	<0.5	1.9	146	0.3	0.4	0.1	55	1.44	0.174
CR160720-2	Rock			0.72	1.3	17.2	1.0	15	<0.1	2.1	2.5	107	2.63	17.8	<0.5	1.3	68	<0.1	<0.1	<0.1	17	0.36	0.054
CR160720-3	Rock			0.93	1.0	63.3	2.0	17	<0.1	23.9	12.5	511	3.38	34.2	<0.5	2.1	112	<0.1	0.4	0.2	42	2.82	0.034
CR160720-3A	Rock			0.51	4.6	98.8	4.1	23	<0.1	50.9	16.0	93	2.57	142.0	<0.5	1.9	9	0.1	1.1	0.3	31	0.08	0.025
CR160723-1	Rock			0.47	4.7	111.6	15.0	69	0.3	18.2	23.5	498	4.75	10.6	11.4	3.0	102	0.4	0.5	0.6	199	0.89	0.187
CR160723-2	Rock			0.56	2.0	40.9	4.6	16	0.1	1.2	1.8	348	2.97	56.2	0.9	1.9	76	<0.1	0.4	0.3	113	0.45	0.178
CR160805-1	Rock			0.52	0.3	58.8	2.0	32	<0.1	22.5	15.9	1065	3.27	8.6	<0.5	0.7	45	<0.1	0.2	<0.1	118	1.33	0.081
CR160805-2	Rock			2.09	2.9	193.0	4.3	41	0.2	44.5	33.8	965	5.27	8.5	3.8	1.0	108	0.2	0.2	<0.1	112	4.53	0.065
CR160805-3	Rock			0.62	5.4	151.8	1777.1	438	1.4	5.3	8.6	425	3.99	35.9	7.3	0.7	13	0.6	1.3	0.3	160	0.13	0.113
CR160805-4	Rock			0.41	32.7	177.4	80.5	73	69.5	6.1	12.2	422	3.90	33.5	1414.2	0.5	34	0.2	3.2	0.2	110	0.69	0.112
CR160806-1	Rock			0.49	1.1	19.4	23.5	80	0.2	31.1	12.9	679	3.47	1.1	3.4	5.6	102	0.2	0.1	<0.1	108	1.32	0.179
CR160806-2	Rock			1.79	1.0	16.2	10.6	76	0.2	12.3	18.9	825	4.12	0.8	2.2	4.7	311	<0.1	<0.1	<0.1	120	3.17	0.261
CR160806-3	Rock			0.42	0.4	14.6	16.8	91	<0.1	12.0	18.5	747	3.72	1.5	0.6	9.9	173	0.3	<0.1	<0.1	101	1.46	0.259
CR160806-4	Rock			0.64	2.2	51.3	39.9	213	1.0	9.7	16.2	728	4.04	88.0	7.2	1.0	17	1.1	1.3	<0.1	30	1.25	0.084
CR160806-5	Rock			0.31	0.4	15.2	18.3	79	<0.1	8.4	13.6	618	3.78	1.8	3.2	8.8	295	0.2	<0.1	<0.1	109	1.85	0.267
CR160720-G1	Rock Pulp			0.01	7.2	65.3	15.2	121	0.4	23.8	10.4	623	5.53	100.0	7.7	0.2	63	0.8	3.3	0.6	71	0.21	0.130
CR160720-G2	Rock Pulp			0.02	6.2	108.3	15.5	116	0.6	34.0	14.5	402	6.98	125.0	8.0	0.2	46	0.5	3.9	0.5	49	0.08	0.165
CR160720-T1	Rock Pulp			0.03	9.5	112.2	17.2	155	0.3	55.2	27.3	408	8.85	124.1	4.9	1.6	57	0.3	4.0	0.7	72	0.07	0.143
CR160720-T2	Rock Pulp			0.02	12.9	182.7	73.5	473	0.6	139.4	84.9	1469	12.40	581.0	16.7	1.7	90	2.8	13.7	1.2	67	0.22	0.135
CR160720-T3	Rock Pulp			0.07	10.5	124.0	31.5	155	0.4	50.7	23.0	534	9.00	234.4	9.0	1.6	78	0.6	6.9	1.3	77	0.15	0.158
CR160720-T4	Rock Pulp			0.04	9.5	139.9	64.4	278	1.3	80.4	29.4	491	9.00	333.9	10.2	1.1	71	1.1	16.0	1.0	58	0.16	0.130
CR160720-T5	Rock Pulp			0.04	7.4	69.2	11.3	148	0.2	30.5	13.8	352	6.92	93.4	2.2	1.0	31	0.3	2.1	0.8	67	0.07	0.128
CR160720-T6	Rock Pulp			0.04	7.3	177.6	22.2	205	0.4	58.5	42.2	1088	12.19	144.0	4.2	1.5	74	0.6	4.1	0.6	67	0.14	0.139
CR160723-G1	Rock Pulp			0.02																			
CR160723-G2	Rock Pulp			0.02																			
CR160723-G3	Rock Pulp			0.02																			



Bureau Veritas Commodities Canada Ltd.  
9050 Shaughnessy St Vancouver British Columbia V6P 6E5 Canada  
PHONE (604) 253-3158

**Client:** **Crucible Resources Ltd.**  
745 East 30th Ave  
Vancouver British Columbia V5V 2V8 Canada

**Project:** PC/Franklin/Hearn  
**Report Date:** September 16, 2016

**Page:** 2 of 3

**Part:** 2 of 5

# CERTIFICATE OF ANALYSIS

**VAN16001524.1**

Method	Analyte	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ250	AQ250	AQ250
		La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te	Mo	Cu	Pb
Unit		ppm	ppm	%	ppm	%	ppm	%	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
MDL		1	1	0.01	1	0.001	20	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	0.2	0.01	0.01	0.01
CR180719-1	Rock	9	20	0.88	355	0.235	<20	2.49	0.132	1.03	0.4	<0.01	6.5	0.6	0.07	8	<0.5	<0.2			
CR180719-2	Rock	11	3	0.64	125	0.192	<20	1.22	0.089	0.42	0.3	<0.01	4.3	0.3	0.94	6	1.3	<0.2			
CR180719-3	Rock	8	5	0.38	105	0.097	20	0.72	0.056	0.35	0.1	<0.01	3.4	0.2	0.19	3	<0.5	<0.2			
CR180719-4	Rock	2	5	0.34	79	0.086	<20	0.78	0.076	0.28	0.6	<0.01	1.2	0.1	0.49	3	0.6	0.4			
CR180720-1	Rock	10	2	0.67	95	0.174	<20	3.03	0.378	0.35	0.1	<0.01	4.0	0.2	<0.05	9	<0.5	<0.2			
CR180720-2	Rock	3	3	0.40	19	0.014	<20	1.16	0.132	0.05	<0.1	<0.01	1.9	<0.1	<0.05	4	<0.5	<0.2			
CR180720-3	Rock	3	30	1.05	56	0.045	<20	0.96	0.056	0.43	0.1	<0.01	6.0	0.2	0.46	3	<0.5	<0.2			
CR180720-3A	Rock	4	25	0.83	55	0.034	<20	1.16	0.047	0.51	0.2	<0.01	2.9	0.3	1.20	3	0.9	<0.2			
CR180723-1	Rock	8	49	1.36	64	0.207	<20	1.86	0.089	0.52	<0.1	<0.01	14.6	1.6	2.83	8	9.6	0.4			
CR180723-2	Rock	10	5	0.79	207	0.170	<20	0.88	0.109	0.26	<0.1	<0.01	5.8	2.6	0.83	5	2.4	<0.2			
CR180805-1	Rock	11	72	1.20	81	0.140	<20	1.49	0.065	0.03	0.4	<0.01	14.1	<0.1	0.10	6	<0.5	<0.2			
CR180805-2	Rock	7	54	0.92	237	0.007	<20	1.66	0.028	0.10	<0.1	<0.01	8.6	<0.1	0.51	7	1.8	<0.2			
CR180805-3	Rock	6	25	1.05	31	0.018	<20	1.61	0.077	0.06	0.3	0.02	8.3	<0.1	0.09	8	1.9	<0.2			
CR180805-4	Rock	4	8	0.75	49	0.083	<20	1.20	0.096	0.23	0.2	0.05	6.0	0.1	0.52	5	11.0	0.3			
CR180806-1	Rock	54	19	1.04	108	0.371	23	1.70	0.064	0.16	0.3	<0.01	4.4	<0.1	<0.05	10	<0.5	<0.2			
CR180806-2	Rock	69	39	1.08	90	0.324	<20	2.13	0.177	0.13	0.2	<0.01	7.1	<0.1	<0.05	8	<0.5	<0.2			
CR180806-3	Rock	83	29	0.90	181	0.350	<20	1.93	0.053	0.22	0.2	0.01	6.6	<0.1	<0.05	11	<0.5	<0.2			
CR180806-4	Rock	5	8	1.11	50	0.031	<20	2.18	0.010	0.25	0.2	0.02	2.1	<0.1	0.92	4	<0.5	<0.2			
CR180806-5	Rock	82	33	0.91	231	0.342	<20	2.51	0.074	0.25	0.2	0.02	7.6	<0.1	<0.05	12	<0.5	<0.2			
CR180720-G1	Rock Pulp	6	18	0.28	138	0.018	<20	1.96	0.014	0.08	1.4	0.07	1.4	0.2	0.12	7	1.4	<0.2			
CR180720-G2	Rock Pulp	4	19	0.41	69	0.015	<20	2.59	0.015	0.06	7.1	0.10	1.9	0.1	0.18	6	2.8	<0.2			
CR180720-T1	Rock Pulp	6	34	0.83	101	0.052	<20	6.03	0.017	0.16	0.6	0.05	6.7	0.2	0.14	10	4.7	<0.2			
CR180720-T2	Rock Pulp	7	31	0.91	82	0.034	<20	4.72	0.033	0.19	2.2	0.04	6.1	0.3	0.22	8	6.1	<0.2			
CR180720-T3	Rock Pulp	7	35	0.86	116	0.057	<20	5.47	0.022	0.20	0.9	0.04	6.5	0.3	0.14	10	3.8	<0.2			
CR180720-T4	Rock Pulp	6	24	0.64	76	0.025	<20	4.12	0.016	0.15	0.6	0.07	4.6	0.2	0.15	7	4.0	<0.2			
CR180720-T5	Rock Pulp	5	37	0.62	62	0.058	<20	6.01	0.012	0.07	2.6	0.08	5.4	0.2	0.10	9	3.0	<0.2			
CR180720-T6	Rock Pulp	5	33	0.82	90	0.031	<20	4.12	0.020	0.17	0.2	0.04	6.3	0.2	0.25	8	2.4	<0.2			
CR180723-G1	Rock Pulp																		5.14	68.29	24.60
CR180723-G2	Rock Pulp																		7.22	121.09	46.96
CR180723-G3	Rock Pulp																		5.88	50.73	24.26