

# 2015 TECHNICAL ASSESSMENT REPORT ON THE GEOLOGY AND GEOPHYSICS OF THE CARMACKS COPPER PROJECT, YUKON

Submitted on May 30<sup>th</sup> 2016

Whitehorse Mining District, Yukon Territory

NTS 115107

62° 20' N 136° 41' W

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March 2016

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### 1. INTRODUCTION AND TERMS OF REFERENCE

In 2015 Copper North Mining Corp. conducted an exploration program on the Carmacks Copper project. The program comprised diamond drilling, trenching and ground magnetic surveys on the main lease-claim block. All of the drilling was completed within the lease block. Work done on leases cannot be applied to adjacent contiguous claims. Therefore, the drilling is not described in this report and is not being claimed for assessment work. The magnetic surveys and trenching were conducted on both claims and leases. All trenching and magnetic surveys are described in this report for the sake of completeness. However, the costs of the magnetic surveys and trenching have been split on the basis of the distribution across claims and leases. Only costs incurred on claims are being claimed as eligible assessment work.

The exploration program was managed by Jack Milton, Ph.D., of Copper North Mining Corp., and the exploration team comprised Jesse Hallé, B.Sc., P. Geo., Emily Hallé, B.Sc, and Nikolett Kovacs, B.Sc. The exploration program was carried out in two phases: Phase 1 occurred in the summer between May 31<sup>st</sup> and August 24<sup>th</sup> 2015; Phase 2 was carried out in the autumn between 26<sup>th</sup> October and 11<sup>th</sup> November 2015. Drilling and magnetic surveys were carried out in each phase. Trenching occurred only in Phase 1, as frozen ground prevented trenching in Phase 2.

#### 2. LOCATION AND ACCESS

The Carmacks Copper property is located at Williams Creek, in the Dawson Range, approximately 200 km north of Whitehorse, or 37 km northwest of Carmacks, Yukon (Figure 1). It is located on NTS mapsheet 115107 at 62° 20' N 136° 41' W.

Access to the property is by road. The Freegold road runs from Carmacks northwest for approximately 34 km and then the northward Carmacks Copper access road heads for 13 km to the Carmacks Copper camp, crossing Merrice Creek and Williams Creek. The gravel-surface Freegold road is maintained by the government and was readily accessible from spring through fall. The Carmacks Copper access road is narrow and has rough and steep sections, requiring a 4x4 vehicle, especially after heavy rains.

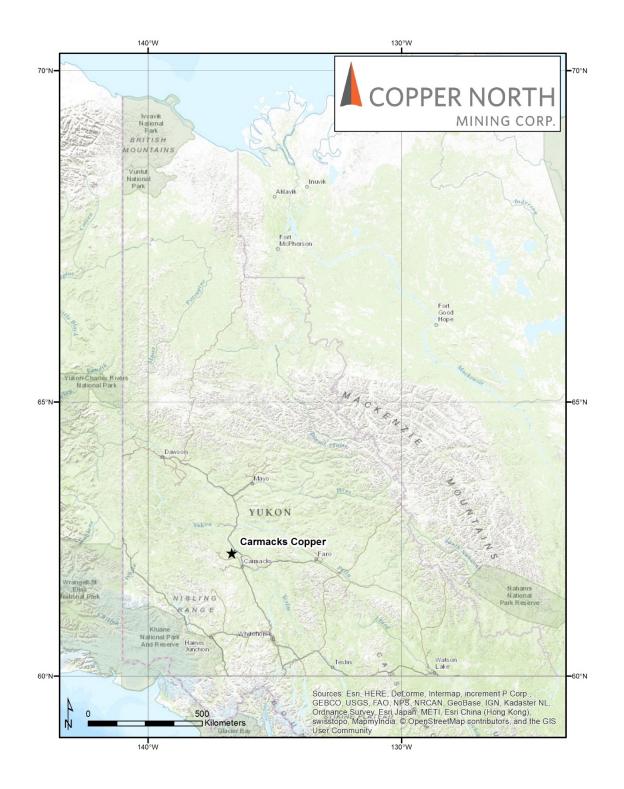


Figure 1 Location of the Carmacks Copper project, Yukon Territory, Canada.

### 3. PHYSIOGRAPHY AND CLIMATE

The property is located in the Dawson Range Mountains. The area is characterized by gently rolling hills that are generally less than 1800 m elevation and are covered by black spruce, white spruce, pine, poplar, birch and alder trees at lower elevations and alpine grasses and scrub willows at higher elevations and in the alpine terrain.

North facing slopes are generally underlain by permafrost and are generally swampy or boggy with much less tree growth and thick sphagnum moss cover. South facing slopes are generally drier and, in some locations, are free of permafrost.

The climate of the property area is generally fairly dry in the summer months with most precipitation occurring in July and early August. In the winter months snow accumulation is generally less than 2 m. Temperatures generally range from -40 °C in the winter to 30 °C in the summer. Snow begins accumulating in mid to late September and is mostly melted by mid to late May. Forest fires can pose a hazard during fire season in dry years.

#### 4. CLAIM INFORMATION

The claims and leases comprising the Carmacks Project are held directly by Carmacks Mining Corp., a wholly-owned subsidiary of Copper North Mining Corp. The Carmacks Project claims are in the Whitehorse Mining District and were acquired in accordance with the Yukon Quartz Mining Act. The Carmacks Project consists of 213 quartz mineral claims and 20 quartz mineral leases, covering approximately 3,662 hectares (ha) (Figure 2).

The claims are registered for 100% ownership in the name of Carmacks Mining Corp., a wholly owned subsidiary of Copper North Mining Corp. The claim location map is shown in Figure 2. The detailed claim information is tabled in Appendix 1.

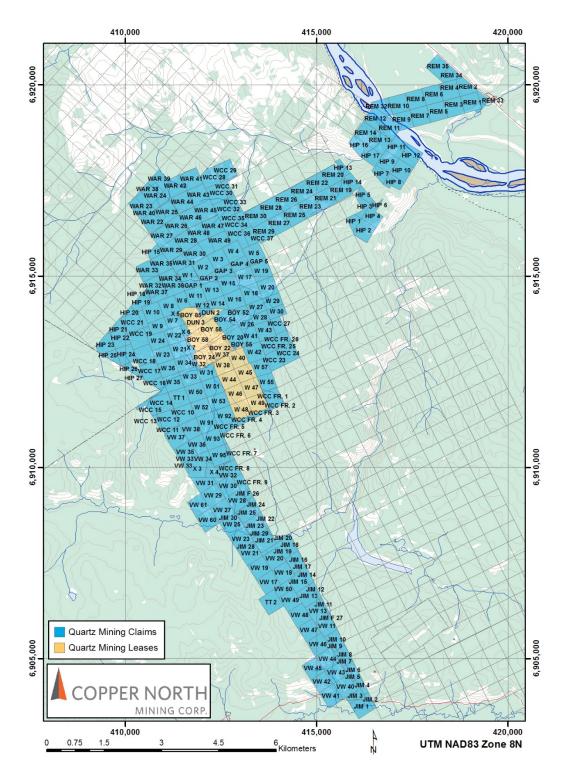


Figure 2 Claim location map for the Carmacks Copper project claims (blue) and leases (beige) that comprise the main claim/lease block. Other Copper North Mining Corp. claims that straddle the Yukon River, the HIP-REM claims, are located to the north-east of the main block.

### 5. HISTORY

The following history section relates to the Carmacks Copper project and most recorded activity, unless otherwise stated, took place on the main claim-lease block.

The exploration history of the region dates back to the Klondike Gold Rush of 1898, when placer miners traveling the Yukon River started prospecting along the route. The earliest exploration work in the area was directed to the few outcrops in the Williams Creek, Merrice Creek, Nancy Lee Creek and Hoochekoo Creek canyons. The first claims staked in the region were staked west of the Yukon River on Nancy Lee Creek. There are a number of small adits and workings on the claims targeting vein copper mineralization. A few tons of copper ore were shipped to the Granby Smelter in 1917. These claims are now Crown Grants.

In 1969, the Casino Porphyry Deposit was discovered, which prompted a staking rush in the region. In March of 1970, the Boy Claims were staked by Whitehorse businessmen, G. Wing and A. Arsenault. The original claims consisted of 134 units. The property was optioned to the Dawson Range Joint Venture (DRJV), later that year. The DRJV consisted of Straus Exploration Inc., Great Plains Development of Canada Ltd., Trojan Consolidated Minerals Ltd. and Molybdenum Corporation of America.

The DRJV conducted a program of prospecting and geochemical sampling in the summer of 1970 and discovered two outcrops with copper oxide mineralization; the No. 1 and No. 2 zones. The discovery prompted the staking of a further 185 claims, some trenching and drilling of two x-ray diamond drill holes in the No. 1 Zone for a total of 103 feet (31.4 m).

In 1971, the DRJV conducted a program consisting of 24.5 km of road building, bulldozer trenching, 108 line-km of grid geochemistry, 27 line-km of VLF-EM geophysical surveying, 48 km of line-cutting, geological mapping, an airphoto survey and 5,583 m of diamond drilling in 25 holes in five separate zones (Zones 1, 2, 3, 5 and 6). Highlights of this program included drill indicated reserves in the No. 1 Zone of 16,334,000 tons grading 1.15% copper at a 0.6% copper cut-off (this reserve figure is not 43-101 compliant). The program also identified copper oxide mineralization in the No. 3 and 4 zones.

In 1972, the DRJV conducted a program consisting of an additional 2.1 km of road construction, bulldozer trenching, 31 km of line cutting, 150 line-km of soil sampling, and 1,531 m of diamond drilling in 8 holes in the No.1, No 4, and No. 8 zones. A recommendation for additional drilling in the No.3, No. 12 and No. 13 zones was made following the exploration program. However, the mining industry went into a slump and no further work was performed for 17 years.

In 1982, the DRJV returned its' interest in the property to Archer, Cathro & Associates, which later sold the property to Archer, Cathro & Associates (1981) Ltd. In 1989, Archer, Cathro optioned the property to Western Copper Holdings Ltd. And Thermal Exploration Company. Western Copper and Thermal conducted metallurgical test work later that year.

In 1990, Western Copper and Thermal upgraded the access road to the property and drilled 322 m in three holes in the Zone 1. Each of the 3 holes intersected copper oxide mineralization. The following year the two companies conducted a program consisting of 3,464 m of diamond drilling in 36 holes; 35 in Zone 1 and 1 in Zone 4. They also dug 22 trenches in zones 1 and 4 for a total of 1,856 m of trenching, surveyed 83.2 line-km of magnetic and VLF-EM geophysics,

and initiated baseline environmental studies. The program was successful in delineating and expanding the area of mineralization in Zone 1 and identifying additional copper oxide mineralization in Zone 4.

In 1992, Western Copper and Thermal drilled 1,164 m in 11 holes in zones 1, 4, 12 and 13 and drilled 856 m in 11 Reverse Circulation holes at various locations on the property. The companies also conducted additional metallurgical test work, baseline environmental testing, a biophysical assessment of the area and contracted Knight Piesold Ltd to conduct geotechnical studies on the deposit consisting of test pit excavation, overburden sampling, oriented diamond drill core logging and geologic mapping.

In 1994, the companies expanded the grid on the property and conducted further magnetic and VLF-EM surveying, soil sampling and prospecting. A new area of copper mineralization was identified at the far northern part of the property, the 4000 Zone.

Also in 1994, Kilborn Engineering Pacific Ltd. was contracted to conduct a Feasibility Study. The study indicated that, based on the copper price at the time, the project was viable using open pit mining methods and solvent extraction-electrowinning.

In 1995, the company contracted Knight and Piesold Ltd. to initiate a preliminary mine design and also initiated clearing and grubbing of a site access road and leach pad area. The company submitted a mine permit application later that year.

While the company was awaiting a mine permit, they contracted Kilborn Engineering to produce a basic engineering report, in 1997. The permit was not forthcoming and, due to changing market conditions the company withdrew the permit application. The property sat dormant until the re-initiation of permitting in 2005 and exploration in 2006. During this time the property was consolidated into a single company and it changed its' name to Western Silver Corporation.

In February, 2006 Western Silver Corporation was taken over by Glamis Gold and a new company, Western Copper Corporation, was formed. The Carmacks Copper Property was spun off to Western Copper as part of the arrangement.

In 2006, Western Copper resumed mineral exploration activities on the Carmacks Copper Project after it had lain dormant for 11 years. The company conducted and exploration program that consisted of 7,100 m of diamond drilling in 34 holes, 1,201 m of Rotary Air Blast drilling (RAB) in 61 holes, access road upgrade work, 9.2 km of line-cutting, re-initiation of environmental baseline studies, surveying of drill hole collars and claim posts and re-initiation of the mine permitting process.

In 2007, Western Copper drilled 17,829 m in 123 diamond drill holes, 790 m in 33 overburden geotechnical drill holes and 55 m in one hydro-geological monitoring well. The company also performed line cutting, IP geophysical surveying, prospecting, continuation of baseline environmental studies and engineering work.

In 2008, Western Copper conducted additional geotechnical investigations in preparation for development. A soil sampling and prospecting program was carried out on the HIP-REM claims in 2008, collecting 125 soil samples over the course of 5 days. However, no copper mineralization was identified on the claims.

In April 2009, Western Copper received a Quartz Mining License for the project. On May 10, 2010 the company was notified that the Water License had been denied with a list of deficiencies in the application and design process.

In 2011, Copper North Mining Corp. was spun out from Western Copper, with the Carmacks Copper Project being it's key asset. In 2012 a feasibility study was completed for a copper-only heap-leach operation. In 2014, gold and silver recovery were added to the project, encapsulated in a new Preliminary Economic Assessment.

In Copper North's 2014 exploration program, trenching in zone 2 led to the discovery of an additional ~500 metre strike length that was subsequently tested by 10 short diamond drillholes.

#### 6. REGIONAL GEOLOGY

The regional geology is shown in Figure 3. Much of the regional geology is taken from Nelson et al. (2013), Allan et al. (2013) and Colpron et al. (2015).

The Carmacks region lies within the Intermontane Belt, which in the Carmacks map-area includes the Yukon-Tanana, Stikine and Quesnellia Terranes that have been intruded by multiple plutonic suites and are covered by younger volcanic rocks or sedimentary sequences of the Whitehorse Trough.

The Yukon-Tanana Terrane includes greenschist to amphibolite metamorphic rocks, plutonic rocks and volcanic rocks of dominantly Devonian, Carboniferous or Permian age. The Stikine and Quesnellia Terranes include rocks of the Joe Mountain Formation and Lewes River Group. The Joe Mountain Formation comprises Middle Triassic mafic-ultramafic intrusives, basalts and volcaniclastic rocks. The Lewes River Group is Upper Triassic and comprises augite phyric basalts, basaltic andesites and volcaniclastic rocks of the informal Povoas Formation and the upper part of the Lewes River Group includes epiclastic rocks and limestones.

The Carmacks Copper project is located within a portion of the Granite Mountain Batholith that is part of the ~204-195 Ma Minto Suite. The Minto Suite is one of several late Triassic-early Jurassic plutonic suites that intrude the Yukon-Tanana, Stikine and Quesnellia Terranes and the contacts between them. The Minto Suite hosts the copper-gold mineralization at the Minto Mine. Weakly-foliated, mesocratic, biotite-hornblende, Granite Mountain Batholith granodiorite contains screens or pendants of strongly foliated feldspar-biotite-hornblende-quartz amphibolite-gneisses that host the Carmacks Copper deposit.

The Whitehorse Trough lies to the east of the Hoochekoo Fault, east of the Carmacks Copper Project. The Whitehorse Trough comprises Lower Jurassic and younger greywacke, shale and conglomerate, derived from the underlying Upper Triassic rocks (Laberge Group). Mesozoic strata of the Whitehorse Trough are in fault contact with the adjacent terranes, or rest unconformably on them.

The late Cretaceous Carmacks Group and mid-Cretaceous Mount Nansen Group volcanic rocks overlie portions of all older rocks and obscure relationships between the older rocks.

The predominant northwest structural trend is represented by the major Hoochekoo, Tatchun and Teslin faults to the east of the Carmacks Copper Project and the Big Creek Fault to the

west. East to northeast younger faulting is represented by the major Miller Fault to the south of the Carmacks Copper Project.

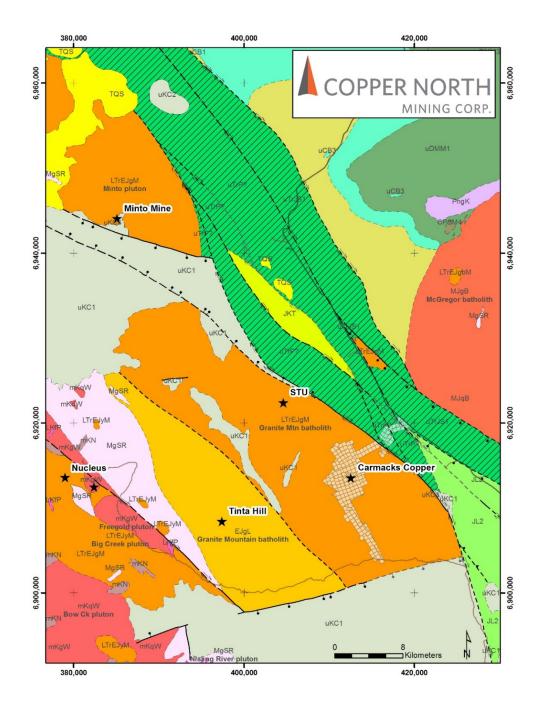


Figure 3 Regional geology surrounding the Carmacks Copper project. Copper North's claims are overlain on the bedrock geology map from the YGS. Significant mineral occurrences are marked with stars. Legend for geology on following page.

#### **Bedrock Geology**

#### TERTIARY(?) AND QUATERNARY

TQS: SELKIRK: resistant, brown weathering, columnar jointed, vesicular to massive basalt flows; minor pillow basalt; basaltic tuff and breccia (Selkirk Volcanics)

#### LATE CRETACEOUS TO TERTIARY

LKfP: PROSPECTOR MOUNTAIN SUITE: quartz-feldspar porphyry

#### **MID-CRETACEOUS**

mKdW: WHITEHORSE SUITE: hornblende diorite, biotitehornblende quartz diorite and mesocratic, often strongly magnetic, hypersthene-hornblende diorite, quartz diorite and gabbro (Whitehorse Suite, Coast Intrusions)

mKgW: WHITEHORSE SUITE: biotite-hornblende granodiorite, hornblende quartz diorite and hornblende diorite; leucocratic, biotite hornblende granodiorite locally with sparse grey and pink potassium feldspar phenocrysts (Whitehorse Suite, Casino granodiorite, McClintock granodiodrite, Nisling Range granodiorite)

mKqW: WHITEHORSE SUITE: biotite quartz-monzonite, biotite granite and leucogranite, pink granophyric quartz monzonite, porphyritic biotite leucogranite, locally porphyritic (K-feldspar) hornblende monzonite to svenite, and locally porphyritic leucocratic quartz monzonite (Mt. McIntyre Suite, Whitehorse Suite, Casino Intrusions, Mt. Ward Granite, Coffee Creek Granite)

mKN: MOUNT NANSEN: massive aphyric or feldspar-phyric andesite to dacite flows, breccia and tuff; massive, heterolithic, quartz- and feldspar-phyric, felsic lapilli tuff; flow-banded quartzphyric rhyolite and quartz-feldspar porphyry plugs, dykes, sills and breccia (Mount Nansen Gp., Byng Creek Volcanics, Hutshi Gp.)

#### UPPER CRETACEOUS

uKC1: CARMACKS: augite olivine basalt and breccia; hornblende feldspar porphyry andesite and dacite flows; vesicular, augite phyric UPPER TRIASSIC TO LOWER JURASSIC andesite and trachyte; minor sandy tuff, granite boulder conglomerate, agglomerate and associated epiclastic rocks (Carmacks Gp., Little Ridge Volcanics, Casino Volcanics)

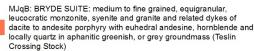
uKC2: CARMACKS: andesite

uKC4: CARMACKS: medium-bedded, poorly sorted, coarse- to finegrained sandstone, pebble conglomerate, shale, tuff, and coal; massive to thick bedded locally derived granite or quartzite pebble to boulder conglomerate (Carmacks Gp.)

#### UPPER JURASSIC AND LOWER CRETACEOUS

JKT: TANTALUS: massive to thickly bedded chert pebble conglomerate and gritty quartz-chert-feldspar sandstone; interbedded dark grey shale, argillite, siltstone, arkose and coal; at one locality includes red-weathering dacite to andesite flows at base (Tantalus)

#### MID-JURASSIC



MJgB: BRYDE SUITE: medium grained, hornblende monzodiorite, hornblende-biotite quartz monzodiorite and minor hornblendite; pink, potassium feldspar megacrystic, hornblende granite to granodiorite and associated easterly trending mafic dyke swarms (Mt. Bryde Pluton; Bennett Granite)

#### EARLY JURASSIC

LTrEJyM: MINTO SUITE: syenite

LTrEJgM: MINTO SUITE: medium- to coarse- grained, variably foliated to massive biotite-hornblende granodiorite; biotite-rich screens and gneissic schlieren: foliated hornblende diorite to monzodiorite with local K-feldspar megacrysts (Minto Suite)

LTrEJgbM: MINTO SUITE: gabbro

EJgL: LONG LAKE SUITE: massive to weakly foliated, fine to coarse grained biotite, biotite-muscovite and biotite-hornblende quartz monzonite to granite, including abundant pegmatite and aplite phases; commonly K-feldspar megacrystic (Long Lake Suite)

LOWER AND MIDDLE JURASSIC, HETTANGIAN TO **BAJOCIAN** 

JL2: TANGLEFOOT:

#### **UPPER TRIASSIC, CARNIAN AND OLDER (?)**



uTrP?: POVOAS: augite or feldspar phyric, locally pillowed andesitic basalt flows, breccia, tuff, sandstone and argillite; local dacitic breccia and tuff with minor limestone; greenschist, chlorite schist, chlorite-augite-feldspar gneiss, amphibolite (Povoas)

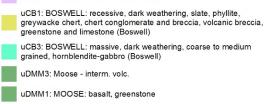
uTrJS1: SEMENOF:

#### LATE DEVONIAN TO MISSISSIPPIAN

MgSR: Simpson Range - tonalite, diorite

#### UPPER CARBONIFEROUS, LOWER AND MIDDLE PENNSYLVANIAN

PngK: KELLY STOCK: tonalite orthogneiss



#### CARBONIFEROUS TO PERMIAN

CPSM4: SLIDE MOUNTAIN: ultramafic

### 7. LOCAL GEOLOGY

Most of the geological information for the Carmacks Copper Project comes from geophysics, drill core and trenches, as there is only limited outcrop on the property found along spines on the ridges and hill tops. Float, derived locally because the area was not glaciated by continental glaciation, can be seen in the old trenches on the property and along the cuts of the drill roads.

The Carmacks copper-gold-silver deposit is enclosed within the late Triassic-early Jurassic Granite Mountain Batholith. The copper mineralization is hosted by amphibolite, gneisses, and intrusive rocks that range from granodiorite to diorite. Copper mineralization occurs along a linear trend, following a brittle-ductile deformation zone.

The deposit is sub-divided into several zones, each comprising a tabular raft of amphibolitegneisses that dip steeply to the east and are up to 100 metres wide, strike up to 700 metres and persist down-dip to at least 450 metres, being open at depth. Exploration has identified at least 14 mineralized zones comprising steep easterly dipping zones that occur along a strike length of at least 5 kilometres. The discoveries also include local zones of mineralization that appear subparallel to the main mineralized structure. The rafts of copper bearing amphibolite-gneisses are enclosed within a younger granodiorite batholith as roof pendants or partially digested rafts. The copper mineralization at depth comprises copper sulphides bornite and chalcopyrite. Gold and silver accompany the copper mineralization; higher gold grades are associated with the more bornite-rich areas.

The typical host rock for the hypogene mineralization is a dark grey to black hornblende-biotite amphibolite with a pervasive foliation. The amphibolite varies from massive to bearing relict hornblende phenocrysts (or hornblende after pyroxene) and may represent variation in the, possibly volcanic, protolith. Locally, the amphibolite becomes more gneissic where mineralogical and colour segregation occurs. The content of mafic minerals is variable from ~50% to ~100%. Locally, the amphibolite lacks a penetrative fabric and appears to have recrystallized to microdiorite from the heat of the adjacent granodiorite intrusions. Sulphide mineralization in the amphibolite is typically foliaform with some discordant sulphide veinlets. Diorite is also host to sulphide mineralization, where chalcopyrite and bornite occur interstitially between hornblende crystals as a net-texture. Alteration phases include proximal potassic (K-spar-Bt) alteration and hematization.

Deformation is seen to increase towards the mineralized zones, suggesting that an underlying structure may be a control on the mineralization. There is a complex magmatic-deformation history involving multiple phases of granitoid intrusions, boudinage and faulting. There are at least two stages of pegmatite-aplite intrusions, each associated with epidote alteration.

The mineralization is cross-cut by barren late phases of the Granite Mountain Batholith including K-feldspar porphyritic granodiorite, aplite and pegmatite. The porphyritic phases contain phenocrysts of K-(potassium) feldspar, plagioclase and/or quartz. In some instances, the K-feldspar phenocrysts range up to 3 cm long. Post mineralization granitic pegmatite and aplite dykes are widespread in the area and range from a few centimetres to approximately three metres in thickness. Hornblende is present in dioritic intrusive rocks and locally in the granodioritic phases. Quartz, K-feldspar and plagioclase are present in all intrusive phases. Plagioclase is subhedral and very locally displays growth zoning. Petrographic examination

indicates Granite Mountain granodiorites have a varied mineralogical content with areas of silica under-saturation and plagioclase oversaturation. These variations may be the result of the assimilation of precursor rock to the amphibolite-gneiss units.

The combined strike length from the northern end of Zone 1 to the southern tip of zone 12 is just over 2 km. The character of the deposit changes along strike leading to a division into northern and southern halves. The northern half is more regular in thickness, dip angle, width and down dip characteristics. The southern half splays into irregular intercalations, in zones 7 and 7A, terminating against sub-parallel faults down dip.

Zones 12 and 13 are located 1.2 km south of Zone 1 and occur over a strike length of 1.2 km and up to 100 m in width. The mineralization in Zones 12 and 13 is hosted by less mafic amphibolite and gneisses than those found in Zone 1. The gneisses are highly silicified and K-feldspar altered; the gneissic texture may be the result of alteration along closely spaced parallel planes, rather than the product of high strain. The gap between Zones 12 and 13 has not been drill tested and it is unclear as to whether mineralization is continuous between the two zones. In Zone 12, the mineral zones bifurcate and split into several parallel zones and are affected by post mineralization faulting.

The Carmacks Group is a late Cretaceous, post-mineralization sequence of andesitic-basaltic volcanic rocks and basal conglomerates and sandstones. The Carmacks Group is present in across the property in several areas, but most prominently affects mineralization in Zones 13 and 14 where it forms a fault-bounded segment of cover rocks. Thin mafic dykes that were feeders for Carmacks Group volcanic are uncommon.

### 8. 2015 EXPLORATION PROGRAM

The 2015 exploration program comprised 241.6 line-km of ground magnetic surveying, excavator trenching and diamond drilling. The drill program comprised 3,271 metres of drilling between 35 holes. Most of the drilling was for HTW core, with a small fraction reduced to NTW.

### 9. MAGNETIC SURVEY METHODS

The survey method requires a minimum of two magnetometers; one of which is employed as a static monitor of the total magnetic field intensity while the other is moved across the survey area in a regular manner. The difference between the value of the total magnetic field intensity at the rover (moving magnetometer) and the base (static magnetometer) is a record of the spatial variations of the magnetic field over the survey area. Typically the resulting data are gridded to provide a continuous surface representing the variation in the magnetic field. Generally, areas of relatively high total magnetic field intensity correlate with rocks of relatively high magnetic susceptibility and areas of relatively low total magnetic field intensity correlate with rocks or overburden of relatively low magnetic susceptibility. Magnetic susceptibility is directly related to the approximate proportion of magnetite and pyrrhotite and to a limited extent other minerals present in the sample.

A magnetometer and accompanying base station (each a GSM-19) from GEM Systems were rented from Terraplus Inc. of Markham, Ontario.

From the Manufacturer:

Overhauser effect magnetometers are essentially proton precession devices - except that they produce an order-of magnitude greater sensitivity. These "supercharged" quantum magnetometers also deliver high absolute accuracy, rapid cycling (up to 5 readings / second), and exceptionally low power consumption. The Overhauser effect occurs when a special liquid (with unpaired electrons) is combined with hydrogen atoms and then exposed to secondary polarization from a radio frequency (RF) magnetic field. The unpaired electrons transfer their stronger polarization to hydrogen atoms, thereby generating a strong precession signal -- that is ideal for very high sensitivity total field measurements. In comparison with proton precession methods, RF signal generation also keeps power consumption to an absolute minimum and eliminates noise (i.e. generating RF frequencies are well out of the bandwidth of the precession signal).

In addition, polarization and signal measurement can occur simultaneously - which enables faster, sequential measurements. This, in turn, facilitates advanced statistical averaging over the sampling period and/or increased cycling rates (i.e. sampling speeds).

The base station was located at a site well away from human-induced magnetic interference and its location remained constant for the entirety of the surveying period. A hand-held GPS located the base station at 412,084E, 6,913,973N, to the east of mineral Zone 1. A GSM-19 walk-mag backpack with an overhead mounted sensor was used as the rover (Figure 4).

The GSM-19 rover magnetometer was equipped with a GPS and real-time DGPS receiver allowing both accurate positioning and instrument clock synchronization. The Canada- wide DGPS service (CDGPS) broadcast was used for differential positioning; it is transmitted on L-band frequencies from the MSAT-1 communications satellite. The manufacturer quoted accuracy of the GPS receiver is less than 1 m.

The sensor on each GSM-19 instrument is a scalar magnetometer capable of measuring the earth's total magnetic field intensity. The Overhauser version allows sample rates down to 0.2 s with an absolute accuracy of +/- 0.1 nT. Instrument internal clock synchronization was accomplished by establishing link to one of the GPS enabled GSM-19 magnetometers at the beginning of each the survey day using a data cable.

No cut lines were used any of the lines. Instead, the GPS Navigation feature on the GSM system was employed which pre-programs the survey grid and guides the user along each line to its end using a track display and audio indicator. Plan maps showing the topographic contours and survey lines were created and distributed to the survey crew prior to commencing operations.

The survey position data were collected in NAD 83 UTM Zone 8N coordinates. Sample locations were recovered using real-time differentially corrected GPS sampling at one Hz.

The magnetic data on the rovers were collected at a continuous one Hertz sample rate while the magnetic data on the base were collected at a continuous 0.33 Hertz sample rate (one sample each three seconds). The rover data were collected in "walking mode" where time, magnetic field and position values are continuously recorded while the base station data were recorded in "base mode" where only the time and magnetic field data are continuously recorded.

The data were recorded to the GSM-19 data loggers in real-time and downloaded to a laptop computer at the end of each day. Basic data processing and quality control procedures were conducted at the end of the survey after the crew returned to the camp. The data processing flow included the following steps:

1. Download data from rover and base GSM-19W to laptop using GEMLINK

2. Use GEMLINK diurnal variation correction tool to correct TFM data using a datum of 57000 nT

- 3. Import of ASCII data files to Microsoft Excel
- 4. Add Grid and Line columns to spreadsheets
- 5. Review and edit data for any irregularity, errors or noise
- 6. Grid diurnally corrected magnetic data

7. Determine total line kilometers from straight line path between start and end points of each line.

Significant effort was required to extract useful position data for some lines. The GSM-19W GPS unit suffered from periods of inaccurate position data. In most cases a "clean" line path was easily resolvable as inaccurate positions were manifested as outliers.

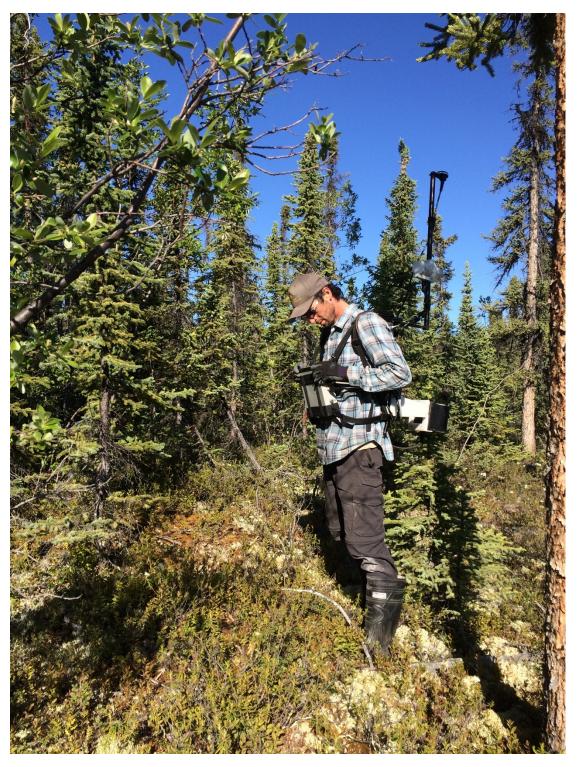


Figure 4 Overhauser walk-mag GSM-19 magnetometer rover backpack mounted unit with GPS in action at the Carmack Copper Project (this unit also has a modular VLF sensor, which was not used in the program).

### 10. MAGNETIC SURVEY RESULTS

The ground magnetic survey was conducted over two phases: Phase 1, June 9<sup>th</sup> to July 16<sup>th</sup> and Phase 2, November 1<sup>st</sup> to November 10<sup>th</sup> 2015. A total of 241.6 line-km were surveyed. In each phase, discrete grids were surveyed and given a letter designation: A, B, C etc.. The grids are contiguous, with the exceptions of grids BN and G (and Grid I, which is located on the HIP-REM claims and described in a separate assessment report). The same base station location was used for all grids. The same make and model of magnetometer, but a different serial number unit, was used as a rover for Phase 1 and Phase 2. This allowed all data collected to be compiled in to a single database and gridded as a whole to produce an overall magnetic map encompassing all grids. All digital data are given in Appendix 2.

The line locations, line numbers and grids are shown in Figure 5. The line data are taken from the GPS unit built in to the magnetometer. Erratic location data were recorded in some areas: these tended to be the stands of mature pine trees with thick canopy-cover that interfered with the GPS system. Daily production ranged between 1.9 and 11.1 line-km and depended on the thickness of the vegetation and weather conditions.

Grid	Location	Number of Lines	Length of Lines (m)	Line Spacing (m)	Line Azimuth
А	Zone 1, north	20	130	10	066
в	Area of no outcrop north of Zone 1	62+	1270	20	066
С	Zone 4 to 2000S Zone	56	550	20	066
C South	Zone 12 north	13+	1000	40	066
D	Zone 12 and 13	6+	1180	50	066
E	Zones 8, 6, and 5	21+	430	40	066
F	Zone 2	8	1270	40	066
G	Zone 1 East	21	800	40	066
н	Zone 14 and N to Will'm Ck.	37	1000	40	066
1	Yukon River	4	500	50	110

Date	Grid	Personnel	Metres of Line Read	Notes
09-Jun-15	Δ	JM	2600	
12-Jun-15		JH, EH	2540	
13-Jun-15		JH, EH	3810	
14-Jun-15		JH, EH	4960	
15-Jun-15		JH, EH	11,100	
16-Jun-15		JH, EH	11,100	
17-Jun-15		JH, EH	3540	
18-Jun-15		JH, EH	5100	
19-Jun-15		JH, EH	5770	
20-Jun-15		JH, EH	5600	
21-Jun-15		JH, EH	5130	
22-Jun-15		JH, EH	6300	
23-Jun-15		JH, EH	5040	
24-Jun-15		JH, EH		base stn probs
25-Jun-15		JH, EH	(7080) 3300	repeat
26-Jun-15		JH, EH	6940	
27-Jun-15		JH, EH	7600	
28-Jun-15		JH, EH	5840	
29-Jun-15		JH, EH	9300	
30-Jun-15		JH, EH	8390	
01-Jul-15		JH, EH	7480	
02-Jul-15		JH, EH		rain delay
03-Jul-15		JH, EH		rain delay
04-Jul-15		JH, EH	5990	
05-Jul-15		JH, EH	5850	
06-Jul-15		JM, NK	5660	
07-Jul-15		JM, NK		rain out
09-Jul-15		JH, EH	7075	
	C infill, B	JH, EH	1800, 2300	
11-Jul-15		JH, EH	2370	rain delay
12-Jul-15		JH, EH	3420	
13-Jul-15		JH, EH	6800	
	D, C south	JH, EH	3850	
15-Jul-15			No production	
16-Jul-15		JH, EH	4050	
PHASE 1	SUBTOTAL		187,625 m	
Nov. 1, 2015	G	JH, EH	3230	
Nov. 2, 2015	G	JH, EH	4850	
Nov. 3, 2015	G	JH, EH	5480	
Nov. 4, 2015	G	JH, EH	4200	
Nov. 5, 2015	Н	JH, EH	7290	
Nov. 6, 2015	Н	JH, EH	8220	
Nov. 7, 2015	H	JH, EH	8835	
Nov. 8, 2015	1	JH, EH	1920	
Nov. 9, 2015	H	JH, EH	8150	
Nov. 10, 2015		JH, EH	1880	
PHASE 2	SUBTOTAL		54,055 m	
2015 MAG	TOTAL		241,680 m	

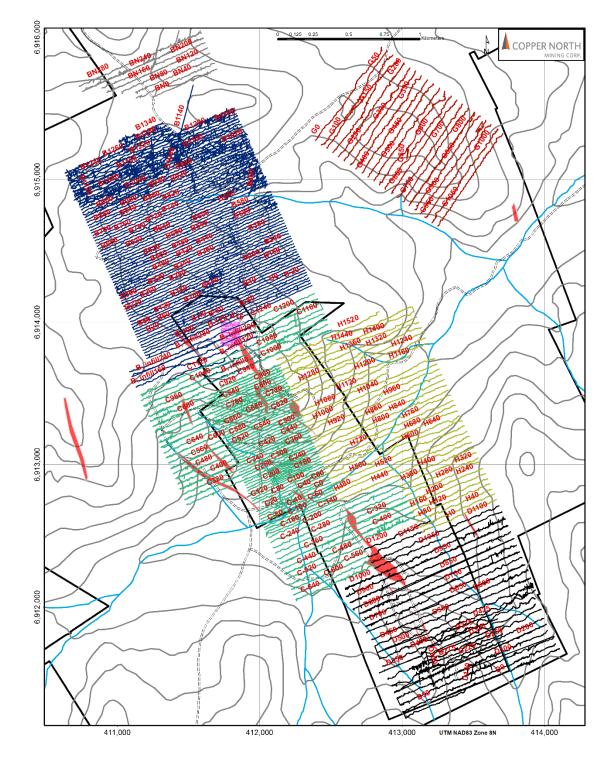


Figure 5 2015 Ground mag lines, derived from the GPS of the mag console, labelled with grid and line number.

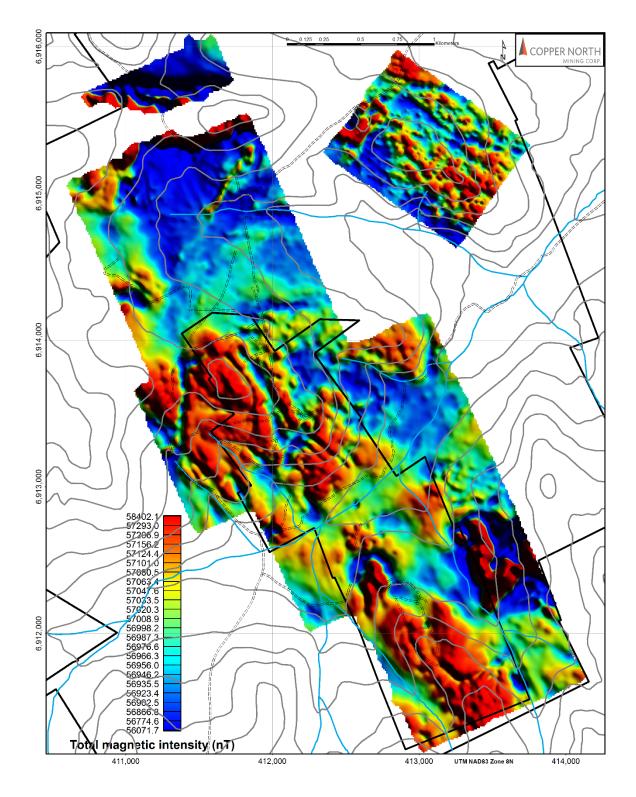


Figure 6 Total magnetic intensity from the 2015 ground magnetic survey.

The results of the magnetic survey (Figure 6) indicate a strong correlation between mineral zones and magnetic lows. This is likely due to the oxidation of magnetite to hematite in the highly oxidized amphibolites and foliated rocks. The oxidation is more prominent in these rocks as the fabric and its steep dip has facilitated deep circulation of oxygen-rich meteoric fluids, compared to the massive, less permeable intrusions in which the amphibolite is hosted. The surrounding intrusions also bear magnetic magnetite and mostly appear as magnetic highs. This provides a good contrast between mineral zones and background host intrusions. Some linear magnetic lows do not correlate with mineral zones – these are mostly fault structures along which deep oxidation and hematite alteration are present.

The Carmacks Group volcano-sedimentary rocks and volcanic rocks show up as highly magnetic areas surrounded by magnetic lows, likely owing to the dipole effect of the strongly magnetic bodies. Abrupt linear changes in the magnetic intensity are inferred to be caused by the offset of lithologies with different magnetic susceptibility along fault structures. These faults are shown on Figure 7. In areas where deep till cover is present, the magnetic method becomes less effective at distinguishing features in the underlying bedrock.

The magnetic survey provided a number of targets that were trenched in the 2015 Phase 1 program. The anomalies generated during the Phase 2 magnetic survey could not be trenched as the ground was frozen by November. Therefore, the Phase 2 anomalies remain untested. Some anomalies were over areas with thick overburden, they could not be trenched, were not drilled in 2015 and therefore remain untested. The untested anomalies include:

The NNW trending linear magnetic low at the north-east corner of Grid H. This anomaly may be the northern continuation of Zone 14, and if so, may explain the patchy magnetic disturbances just north of the Carmacks Group volcanic rocks that cover Zone 14. The lack of an anomaly in the area between the patchy magnetics and the linear anomaly may be explained by the thick cover of till around Williams Creek;

The WNW trending linear magnetic anomalies in the north-eastern half of Grid G. These anomalies are on strike with the trend of mineralization and foliation in Zone 2. Weak copper in soil anomalies from the 1970s surveys can be found downslope from this area and this may reflect downhill dispersion;

A very weak magnetic low approximately 640 metres NNW of the north end of Zone 1. This anomaly is covered by deep till and would have to be drill-tested.

There is a magnetic low on the west side of Zone 13 at its northern end. This anomaly is covered by deep till but may represent the faulted northern extension of Zone 13, and may connect northwards with the southern end of Zone 2000S. The anomaly is subdued at Williams Creek where the till becomes thicker.

### 11. TRENCHING

A total of 72 trenches were excavated for a total of 3,936 lineal trench metres and a total estimated excavated volume of 14,941 m<sup>3</sup>. All trenching was performed with a CAT 320

mechanical excavator. Trenches were logged by a geologist and chip samples were taken for assay across mineralized intervals where appropriate. Chip samples were mostly taken on three metre intervals or were cut-short and terminated at the boundaries of the mineralized interval. Assays were then composited on a length weighted basis to give an overall grade and width for mineralized intervals. Trenching in some areas was hampered by thick overburden of till or permafrost.

Quality assurance and quality control procedures include the systematic insertion of duplicate and standard samples in to the sample stream. Chip samples were labelled, positioned along the trench by tape measure and by GPS, placed in sealed bags and were shipped straight to the preparatory laboratory of ALS Minerals in Whitehorse. All geochemical analyses were performed by ALS Minerals in North Vancouver. Total copper assays were performed by fouracid digestion with an AAS finish. Soluble copper assays were carried out by sulphuric acid digestion with an AAS finish. Gold was analysed by a 30 gram charge fire assay with an AAS finish. Silver was analyzed by four-acid digestion and ICP-AES finish. Other elements were reported by a standard four-acid digestion multi-element package. All digital data are included in Appendix 2.

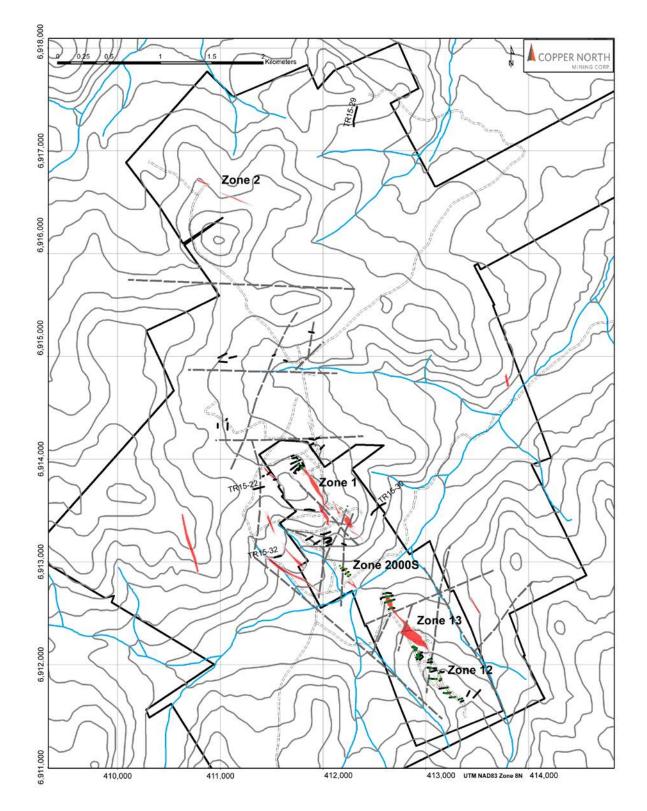


Figure 7 Trench location overview map for the claim and lease area of the Carmacks Copper project. Mineral zones in red and faults inferred from magnetics as dashed grey lines.

#### Zone 1

The northern end of Zone 1 was trenched in order to try and establish the exact location and nature of the abrupt end of the mineralized zone towards the north (Figure 8). The closure of the mineralized zone was exposed although no faults with significant fault rock were found. The end of the zone may be due to offset along an array of smaller faults or possibly by the boudinage of the zone on a metre to kilometre scale.

As the tills suddenly become thick to the north of Zone 1, copper mineralized clasts can be found in the tills. The clasts comprise malachite stained granodiorite. Several test pits were dug in this area and more copper-oxide bearing clasts were found. The bedrock source of the copper mineralization was not identified. It is possible that the material was shed from Zone 1, just to the south. Exotic clasts were noted in the tills including fossiliferous, gastropod-bearing limestone.

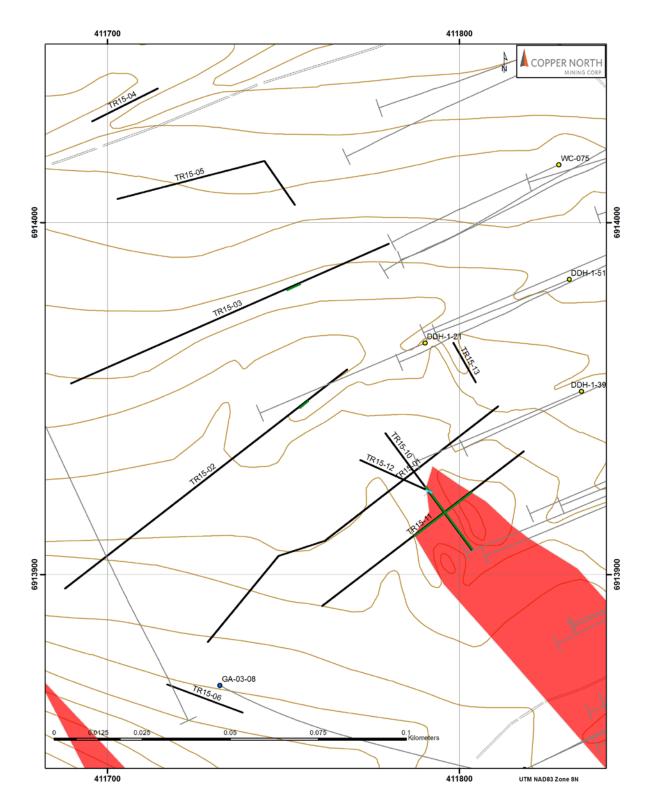


Figure 8 Trench location map at the north end of Zone 1. Mineral zone outline at surface (red) and mineralized sections (green lines) within trenches (black lines).

#### South Gap Zone

The South Gap Zone was trenched to try and connect the mineralization in the north end of Zone 2000S with that found at the south end of Zone 7. Oxide copper mineralization was discovered in these trenches. However, the overall grades were estimated as low and the area was not deemed a high priority for drilling.

#### *Zone* 2000S

The northern end of Zone 2000S was successfully trenched and chip sampled (Figure 9). The southern half of the zone could not be trenched owing to thick overburden.

ZONE	Trench	Total Cu (%)	Au (g/t)	Ag (g/t)	Interval (m)
2000S	TR15-62	0.865	0.459	4.6	3.0
2000S	TR15-63	0.553	0.26	2.7	3.5
2000S	TR15-63	0.988	0.468	4.8	5.2
2000S	TR15-64	0.507	0.187	2.2	6.0
2000S	TR15-65	0.597	0.481	3.6	3.0

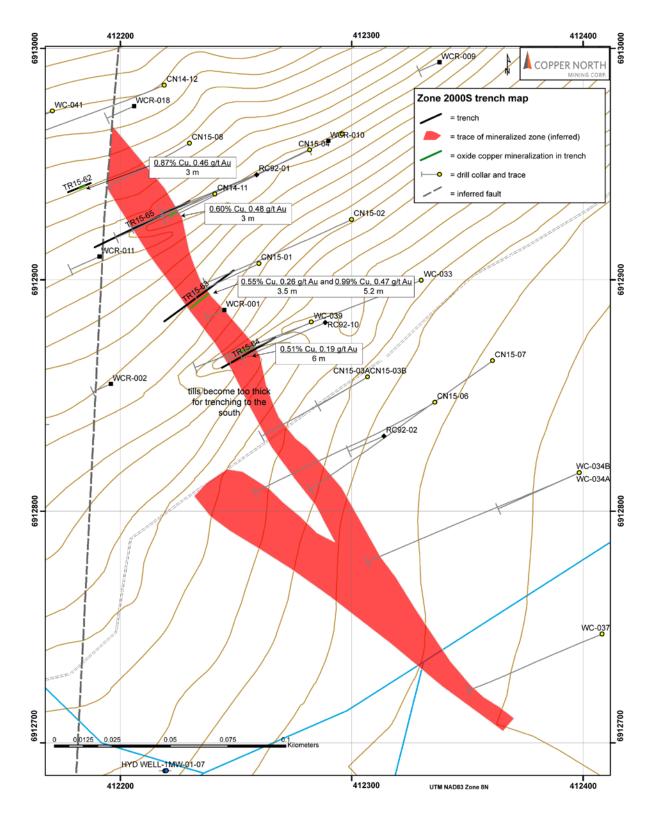


Figure 9 Zone 2000S trench map.

#### Zone 13

The majority of Zone 13 is under cover of thick till and Carmacks Group volcanic rocks and conglomerates. The northern tip of Zone 13 was trenched and chip sampled in four trenches (Figure 10). Strong potassic alteration was associated with copper mineralization in this area. The potential northern continuation of the zone could not be tested owing to deep overburden in this area, approaching Williams Creek.

ZONE	Trench	Total Cu (%)	Au (g/t)	Ag (g/t)	Interval (m)
13	TR15-50	0.375	0.157	2.3	27.0
13	TR15-51	0.289	0.176	1.6	39.0
13	TR15-51	0.188	0.074	1.0	12.0
13	TR15-52	0.795	0.190	3.6	15.0
13	TR15-52	0.221	0.057	0.7	9.0
13	TR15-61	0.175	0.065	0.9	6.0

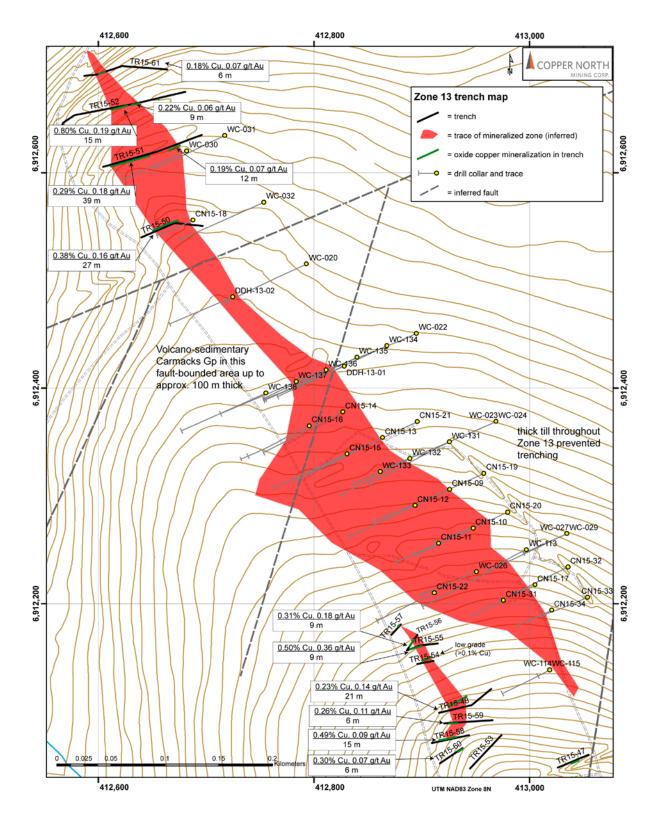


Figure 10 Zone 13 trench map with composite chip sample assays.

#### Zone 12

Trenching was conducted throughout Zone 12 in order to better understand the complex geology of the zone prior to drilling (Figure 11). In this area, the zone appears to bifurcate into at least three discrete zones and the mineral zones have also been displaced by brittle faulting. The historic trenches were opened up and new trenches were excavated, revealing mineralization. Chip sampling provided validation of grades from historic drilling in Zone 12 that are generally higher than grades found in Zone 13.

A new zone was discovered on the northwest side of Zone 12, or southwest side of Zone 13. Oxide copper mineralization is continuous for at least 120 metres of strike, but the mineralization occurs over thin widths and was not considered a high priority for drilling. It is yet unclear whether Zone 12 and Zone 13 connect as a continuous mineralized zone. Thick cover in the gap between the zones prevented testing by trenching.

ZONE	Trench	Total Cu (%)	Au (g/t)	Ag (g/t)	Interval (m)
12	TR15-42	0.588	0.118	2.8	21.0
12	TR15-43	0.628	0.108	3.8	9.0
12	TR15-44	0.667	0.712	0.1	12.0
12	TR15-44	0.631	0.124	3.0	6.0
12	TR15-46	0.472	0.045	1.8	9.0
12	TR15-46	0.641	0.127	2.4	6.0
12	TR15-47	0.625	0.183	2.1	6.0
12	TR15-48	0.227	0.141	0.8	21.0
12	TR15-49	0.538	0.070	2.6	30.0
12	TR15-49	0.466	0.061	1.3	3.0
12	TR15-55	0.498	0.357	2.7	9.0
12	TR15-56	0.307	0.175	1.2	9.0
12	TR15-58	0.485	0.086	1.6	15.0
12	TR15-59	0.261	0.110	1.3	6.0
12	TR15-60	0.298	0.069	0.5	6.0

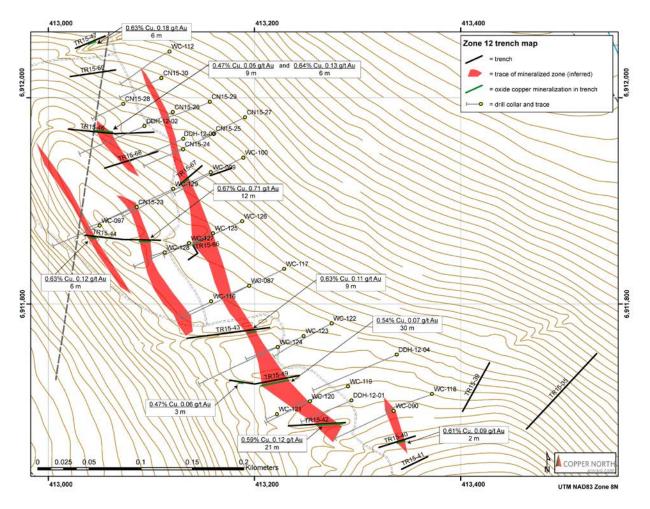


Figure 11 Zone 12 trench map with composite chip sample assays.

#### Zone 5

Historic trenches were refreshed in Zone 5 and several small new trenches were dug. These did show a small amount of mineralization, over some narrow widths. The zone was tested for condemnation as some mine facilities are planned to be constructed over this zone. The thin intervals of mineralization combined with narrow intercepts in historic drilling in Zone 5 led to the condemnation of the area for further exploration.

### Trenches TR15-25 to TR15-27

Trenching was thwarted by deep tills in the southern parts of these trenches. The trenches targeted a circular magnetic low anomaly and a linear NW-SE anomaly. The trenches returned leucogabbro comprising coarse plagioclase-pyroxene that is unlike any other lithology encountered on the property. The leucogabbro exhibits a chilled margin against the dark greenish black hornblendite host rock. The NW-SE trending magnetic low cut by trench TR15-27 was a linear zone of hornblendite lacking any copper mineralization.

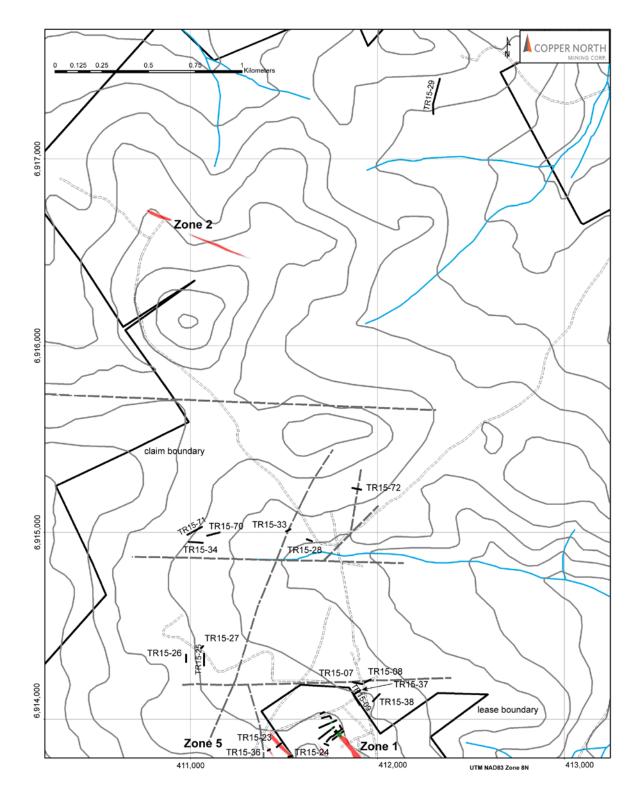


Figure 12 Trench locations for trenches located on the Carmacks Copper quartz claims.

#### Trenches TR15-34 TR15-70 and TR15-71

These trenches targeted linear NNW-SSE magnetic lows, immediately south (~130 m) of the broad magnetic high that correlates with the Carmacks Group basaltic-andesite flows. Trench TR15-34 returned some well foliated amphibolite and microdiorite. The amphibolite contained much limonite staining, including limonite stained veinlets and limonite that appears to have replaced a mineral running parallel to foliation. The limonite stain may be the result of weathering sulphides in situ and the association with amphibolite-microdiorite is encouraging as these rocks host the bulk of the copper mineralization across the rest of the property. Only a very small amount of malachite was observed, restricted to a narrow interval within the trench. The position of the trenches just below the Carmacks Group volcanic rocks may imply that if copper mineralization is present, a full-thickness of oxide and transition layers are preserved beneath a leached cap on surface as they have not been lost to erosion at the late-Cretaceous palaeosurface. This would be true if the oxidation event occurred prior to the deposition of the late-Cretaceous Carmacks Group, as inferred by the apparent erosion of oxide-transitionsulphide zone layering at the base of the Carmacks Group in Zone 13. These factors make the limonite stained amphibolites in these trenches a good exploration target for thick, underlying oxide copper mineralization.

#### Trench TR15-28

This trench targeted a prominent NE-SW linear magnetic high. The source of the high was quickly resolved as a magnetic andesite dyke, likely a feeder for the nearby Carmacks Group volcanic rocks. The host rock was granodiorite.

#### Trench TR15-72

This trench targeted a linear NNE-SSW magnetic low. The trench returned volcanic and volcaniclastic material from the Carmacks Group with no copper mineralization encountered.

#### Trench TR15-29

This trench targeted an historic copper in soil anomaly of 467 ppm Cu. The trench returned a large amount of dark green to black chlorite-altered hornblendite. Some sections were strongly hematite stained and others were strongly magnetic owing to patches of coarse magnetite. No copper mineralization was found. Two samples were assayed. No gold was detected in the samples. The copper anomaly was suspected to be derived from high background levels of copper in the hornblendite, however copper concentrations were found to be 10 and 14 ppm. The copper anomaly remains unexplained. The hornblendite appears similar to the rocks exposed in historic trenches approximately 800 m to the WNW. Here, the rocks are pyroxene-hornblende-plagioclase cumulate-textured rocks that are cut by thin felsic dykes.

#### Other trenches

Trench TR15-30 was located east of Zone 4 and spanned two magnetic lows but only returned granodiorite but by pegmatite and aplite. TR15-22 was focussed on a linear magnetic low that was coincident with a topographic low and revealed hematite stained and faulted granodiorite. TR15-32 returned some chlorite altered amphibolite cut by foliated granodiorite and pegmatite but did not contain any copper mineralization. Trenches TR15-07, TR15-08, TR15-37 and TR15-38 revealed granodiorite and did not contain copper mineralization.

### 12. CONCLUSIONS AND RECOMMENDATIONS

A two phase exploration program is recommended to evaluate the potential for additional mineralization in known zones and to evaluate the potential for discovering new zones on the remainder of the property. Phase 1 would involve a comprehensive ground magnetic survey at a 50 metre line spacing across the remainder of the property. This could be infilled at 25 metres for areas that warranted higher resolution of prospective magnetic features. The magnetic data should be inverted in 3D, constrained by all available geological information and magnetic susceptibility measurements taken from drill core. The magnetic model may generate targets that can be followed up by trenching. The total budget proposed for Phase 1 is \$60,000.

Phase 2 would comprise the drilling of targets trenched in Phase 1 and additional drilling in known zones. The area between Zones 12 and 13 would be targeted as 25 m step-out fence drilling starting at the south end of Zone 13. The magnetic low approximately 280 m NE of the northern end of Zone 12 should be drilled to test the possibility of the offset of the southern end of Zone 13 along a NE-SW trending (strike-slip?) fault. The northern end of Zone 13 should be drill tested for the possibility of northwards continuation, possibly to connect with 2000S. In particular, the linear magnetic low that appears to be the continuation of zone 2000S should be drill tested near Zone 13 as a test of offset along a NE-SW trending fault. The limonite-stained amphibolites in trench TR15-34 should be drilled to test for mineralization at depth. The very weak linear magnetic low 640 metres NNW of the north end of Zone 1 should be drill tested. Phase 2 would comprise up to 2,000 metres of drilling with a proposed budget of \$460,000.

## 13. STATEMENT OF COSTS

TOTAL COSTS									
			Portion	Assessment on					
			claimed for	Carmacks					
Costs accrued on claims	Summer	Fall	assessment	Copper claims					
Trenching (mechanical) <sup>1</sup>	\$ 50,795.00	-	26%	\$ 13,206.70					
Magnetometer rental <sup>2</sup>	\$ 6,331.50	\$ 4,799.55	66%	\$ 7,335.36					
Magnetometer labour <sup>2</sup>	\$ 48,000.00	\$ 12,000.00	66%	\$ 39,540.00					
Camp rental <sup>3</sup>	\$ 4,800.00	\$ 1,700.00	50%	\$ 3,250.00					
Generator rental <sup>3</sup>	\$ 2,400.00	\$ 850.00	50%	\$ 1,625.00					
Truck rental <sup>3</sup>	\$ 4,200.00	\$ 350.00	50%	\$ 2,275.00					
Kubota rental <sup>3</sup>	\$ 1,500.00	\$ 250.00	50%	\$ 875.00					
Food <sup>3</sup>	\$ 20,626.05	\$ 4,288.41	50%	\$ 12,457.23					
Expediting <sup>3</sup>	\$ 23,530.05	\$ 1,540.00	50%	\$ 12,535.03					
Fuel <sup>3</sup>	\$ 20,166.74	\$ 2,259.00	50%	\$ 11,212.87					
Geologist (trenching) <sup>1</sup>	\$ 34,650.00	-	26%	\$ 9,009.00					
Magentic data processing <sup>2</sup>	\$ 1,800.00	\$ 900.00	66%	\$ 1,779.30					
mobilization <sup>3</sup>	\$ 10,533.05	\$ 4,290.13	50%	\$ 7,411.59					
communications <sup>3</sup>	-	\$ 19,170.08	50%	\$ 9,585.04					
supplies <sup>3</sup>	\$ 6,251.03	\$ 699.82	50%	\$ 3,475.43					
report writing	\$ 4,500.00		100%	\$ 4,500.00					

Total spent on all Carmacks Copper claims in 2015	\$ 140,072.54
subtract costs already accounted for in HIP-REM program	\$ 4,195.00
Total eligible for assessment credit under OIP 2015/20	\$ 135,877.54
Total assement credit to be applied after doubling	\$ 271,755.08

All claims are active

Total costs for the field program included work on leases and the non-contiguous HIP-REM claims; costs have been attributed to each part of the program appropriately.

No costs incurred on Quartz Mining Leases were applied to the adjacent, contiguous Quart Mining Claims.

<sup>1</sup>Trenching costs were split 26% on claims and 74% on leases based on the locations of the trenches on claims vs. leases

<sup>2</sup>Magnetic survey costs were split 66% on claims and 34% on leases based on the percentage of magnetic ground survey conducted in each area

<sup>3</sup>Other field costs were split 50-50 between the claims and leases

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### 15. STATEMENT OF QUALIFICATIONS

I, Jack Edward Milton, do hereby state that:

I reside at 589 East 27<sup>th</sup> Avenue, Vancouver, BC, V5V 2K7.

I am not a Professional Geologist.

I graduated from the Camborne School of Mines, University of Exeter, UK, in 2008 with a first class honours Bachelor of Science degree in Applied Geology.

I graduated from the Camborne School of Mines, University of Exeter, UK, in 2009 with a Master of Science degree in Mining Geology.

I graduated from the University of British Columbia in 2015 with a Ph.D. in Geological Sciences.

I have been employed by Copper North Mining Corp. since graduating from my Ph.D. and I own shares in Copper North Mining Corp.

I managed and supervised the exploration program at the Carmacks Copper project in the field season of 2015.

This statement refers to the 2015 Technical Assessment Report for the Geology and the Geophysics of the Carmacks Copper project, Yukon that describes work carried out in the 2015 field season.

Jack Milton [signed], 30<sup>th</sup> May 2016 Project Geologist,

Copper North Mining Corp.

### 16. APPENDIX 1: Table of Quartz Claim/Lease information

							Renewal		
Grant						Ops	Period		
Number	Name		Recording	Staking	Expiry	Number	(years)		New Expiry
Y 51118	BOY	20	1970-03-09			500057556		4	2024-03-09
Y 51149	BOY	51	1970-03-09			500057559		4	2024-03-09
Y 51150	BOY	52	1970-03-09	1970-02-22		500057560		4	2024-03-09
Y 51151	BOY	53	1970-03-09	1970-02-22		500057561		4	2024-03-09
Y 51152 Y 51181	BOY BOY	54	1970-03-09 1970-03-09	1970-02-22 1970-02-23		500057562 500057567		4	2024-03-09 2024-03-09
Y 59382	DUN	83 1	1970-03-09			500057507		4 4	2024-03-09
YC65320	GAP	1	2007-07-10					4	2024-03-09
YC65321	GAP	2	2007-07-10		2020-03-09			4	2024-03-09
YC65322	GAP	3	2007-07-10		2020-03-09			4	2024-03-09
YC65323	GAP	4	2007-07-10		2020-03-09	500149701	4	4	2024-03-09
YC65324	GAP	5	2007-07-10	2007-07-06	2020-03-09	500149702	4	4	2024-03-09
YC65554	HIP	1	2007-08-14	2007-08-07	2020-03-09	500150543	4	4	2024-03-09
YC65555	HIP	2	2007-08-14	2007-08-07	2020-03-09	500150544	4	4	2024-03-09
YC65556	HIP	3	2007-08-14	2007-08-07	2020-03-09	500150545	4	4	2024-03-09
YC65557	HIP	4	2007-08-14	2007-08-07	2020-03-09	500150546	4	4	2024-03-09
YC65558	HIP	5	2007-08-14	2007-08-07	2020-03-09	500150547	4	4	2024-03-09
YC65559	HIP	6	2007-08-14	2007-08-07	2020-03-09	500150548	4	4	2024-03-09
YC65566	HIP	13	2007-08-14	2007-08-07	2020-03-09	500150555	4	4	2024-03-09
YC65567	HIP	14	2007-08-14	2007-08-07	2020-03-09	500150556	4	4	2024-03-09
YC65568	HIP	15	2007-08-14		2020-03-09		4	4	2024-03-09
YC65571	HIP	18	2007-08-14		2020-03-09			4	2024-03-09
YC65572	HIP	19	2007-08-14					4	2024-03-09
YC65573	HIP	20	2007-08-14					4	2024-03-09
YC65574	HIP	21	2007-08-14					4	2024-03-09
YC65575 YC65576	HIP HIP	22 23	2007-08-14 2007-08-14		2020-03-09 2020-03-09	500150564		4 4	2024-03-09 2024-03-09
YC65576	HIP	23 24	2007-08-14			500150565 500150566		4 4	2024-03-09
YC65578	HIP	25	2007-08-14	2007-08-07				4	2024-03-09
YC65579	HIP	26	2007-08-14	2007-08-07				4	2024-03-09
YC65580	HIP	27	2007-08-14		2020-03-09			4	2024-03-09
YC66844	JIM	1	2008-03-10		2020-03-09		4	4	2024-03-09
YC66845	JIM	2	2008-03-10	2008-03-04	2020-03-09	500154686	4	4	2024-03-09
YC66846	JIM	3	2008-03-10	2008-03-05	2020-03-09	500154687	4	4	2024-03-09
YC66847	JIM	4	2008-03-10	2008-03-05	2020-03-09	500154688	4	4	2024-03-09
YC66848	JIM	5	2008-03-10	2008-03-05	2020-03-09	500154689	4	4	2024-03-09
YC66849	JIM	6	2008-03-10	2008-03-05	2020-03-09	500154690	4	4	2024-03-09
YC66850	JIM	7	2008-03-10	2008-03-05	2020-03-09	500154691	4	4	2024-03-09
YC66851	JIM	8		2008-03-05			4	4	2024-03-09
YC66852	JIM	9		2008-03-05			4	4	2024-03-09
YC66853	JIM	10		2008-03-05			4	4	2024-03-09
YC66854	JIM			2008-03-06				4	2024-03-09
YC66855	JIM			2008-03-06				4	2024-03-09
YC66856	JIM	13	2008-03-10	2008-03-06	2020-03-09	500154697	4	4	2024-03-09

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Grant						Ops	Period	
Number	Name	Nbr	Recording	Staking	Expiry	Number	(years)	New Expiry
YC66857	JIM	14	2008-03-10	2008-03-06	2020-03-09	500154698	4	2024-03-09
YC66858	JIM	15	2008-03-10	2008-03-06	2020-03-09		4	2024-03-09
YC66859	JIM	16	2008-03-10	2008-03-06	2020-03-09		4	2024-03-09
YC66860	JIM	17	2008-03-10	2008-03-06			4	
YC66861	JIM	18	2008-03-10	2008-03-06			4	
YC66862	JIM	19	2008-03-10		2020-03-09		4	
YC66863	JIM	20	2008-03-10		2020-03-09		4	
YC66864	JIM	21	2008-03-10		2020-03-09		4	
YC66865	JIM	22	2008-03-10		2020-03-09		4	
YC66866 YC66867	JIM JIM	23 24	2008-03-10 2008-03-10		2020-03-09 2020-03-09		4	
YC66868	JIM	24	2008-03-10		2020-03-09		4	
YC66871	JIM	23	2008-03-10	2008-03-03			4	
YC66872	JIM	29	2008-03-10	2008-03-07			4	
YC66873	JIM	30	2008-03-10	2008-03-07				
YC66869	JIM F	26	2008-03-10		2020-03-09		4	
YC66870	JIM F	27	2008-03-10	2008-03-05		500154711	4	
YC39239	REM	19	2005-04-11			500128224	4	
YC39240	REM	20	2005-04-11	2005-04-07	2020-03-09	500128225	4	2024-03-09
YC39241	REM	21	2005-04-11	2005-04-07	2020-03-09	500128226	4	2024-03-09
YC39242	REM	22	2005-04-11	2005-04-07	2020-03-09	500128227	4	2024-03-09
YC39243	REM	23	2005-04-11	2005-04-07	2020-03-09	500128228	4	2024-03-09
YC39244	REM	24	2005-04-11	2005-04-07	2020-03-09	500128229	4	2024-03-09
YC39245	REM	25	2005-04-11	2005-04-07	2020-03-09	500128230	4	2024-03-09
YC39246	REM	26	2005-04-11	2005-04-07	2020-03-09	500128231	4	2024-03-09
YC39247	REM	27	2005-04-11	2005-04-07	2020-03-09	500128232	4	2024-03-09
YC39248	REM	28	2005-04-11	2005-04-07	2020-03-09		4	
YC39249	REM	29	2005-04-11	2005-04-07			4	
YC39250	REM	30	2005-04-11				4	
YB97068	TT	1	1996-12-27	1996-12-20		500089580	4	
YB97251	TT	2	1997-01-15			500089763	4	
YB96620	VW	11		1996-10-06			4	
YB96622	VW	13	1996-10-09		2020-03-09		4	2024-03-09
YB96626 YB96627	VW VW	17 18		1996-10-06 1996-10-06			4	
YB96628	VW	10		1996-10-06			4	
YB96629	VW	20		1996-10-06			4	
YB96630	VW	20	1996-10-09		2020-03-09		4	
YB96632	VW	23		1996-10-06			4	
YB96634	vw	25	1996-10-09		2020-03-09		4	
YB96636	VW	27		1996-10-06			4	
YB96637	VW	28		1996-10-06			4	
YB96638	VW	29		1996-10-06			4	
YB96639	VW			1996-10-06				2024-03-09

							Renewal		
Grant			Describer	Challing .	-	Ops	Period		N
Number	Name VW	NDr 31	<b>Recording</b> 1996-10-09	Staking 1996-10-06	Expiry 2020-03-09	Number 500089152	(years)		New Expiry 2024-03-09
YB96640 YB96641	VW	32	1996-10-09	1996-10-06		500089152		4 4	2024-03-09
YB96642	VW	33	1996-10-09	1996-10-06				4	2024-03-09
YB96643	VW	34	1996-10-09	1996-10-06				4	2024-03-09
YB96644	VW	35	1996-10-09	1996-10-06	2020-03-09			4	2024-03-09
YB96645	VW	36	1996-10-09	1996-10-06	2020-03-09	500089157		4	2024-03-09
YB96646	VW	37	1996-10-09	1996-10-06	2020-03-09	500089158		4	2024-03-09
YB96647	VW	38	1996-10-09	1996-10-06	2020-03-09	500089159		4	2024-03-09
YB96986	VW	40	1996-12-06	1996-12-04	2020-03-09	500089498		4	2024-03-09
YB96987	VW	41	1996-12-06		2020-03-09			4	2024-03-09
YB96988	VW	42	1996-12-06		2020-03-09			4	2024-03-09
YB96989	VW	43	1996-12-06		2020-03-09			4	2024-03-09
YB96990	VW	44	1996-12-06		2020-03-09			4	2024-03-09 2024-03-09
YB96991 YB96992	VW VW	45 46	1996-12-06 1996-12-06		2020-03-09 2020-03-09			4 4	2024-03-09
YB96993	VW	40	1996-12-06		2020-03-09			4	2024-03-09
YB96994	VW	48	1996-12-06	1996-12-04				4	2024-03-09
YB96995	VW	49	1996-12-06	1996-12-04				4	2024-03-09
YB96996	VW	50	1996-12-06	1996-12-04	2020-03-09	500089508		4	2024-03-09
YB96997	VW	60	1996-12-06	1996-12-04	2020-03-09	500089509		4	2024-03-09
YB96998	VW	61	1996-12-06	1996-12-04	2020-03-09	500089510		4	2024-03-09
YB26708	W	1	1989-08-31	1989-08-21	2020-03-09	500079923		4	2024-03-09
YB26709	W	2	1989-08-31	1989-08-21	2020-03-09	500079924		4	2024-03-09
YB26710	W	3	1989-08-31					4	2024-03-09
YB26711	W	4	1989-08-31					4	2024-03-09
YB26712	W	5	1989-08-31	1989-08-21				4	2024-03-09
YB26713	W	6	1989-08-31	1989-08-24				4	2024-03-09
YB26714 YB26715	W W	7	1989-08-31 1989-08-31		2020-03-09 2020-03-09			4 4	2024-03-09 2024-03-09
YB26716	w	9	1989-08-31		2020-03-09			4	2024-03-09
YB26717	Ŵ	10	1989-08-31		2020-03-09			4	2024-03-09
YB26718	W	11			2020-03-09			4	2024-03-09
YB26719	W	12	1989-08-31	1989-08-24	2020-03-09	500079934		4	2024-03-09
YB26720	W	13	1989-08-31	1989-08-24	2020-03-09	500079935		4	2024-03-09
YB26721	W	14	1989-08-31	1989-08-24	2020-03-09	500079936		4	2024-03-09
YB26722	W	15	1989-08-31	1989-08-24	2020-03-09	500079937		4	2024-03-09
YB26723	W			1989-08-24				4	2024-03-09
YB26724	W	17		1989-08-24					2024-03-09
YB26725	W	18		1989-08-24					2024-03-09
YB26726	W	19		1989-08-24					2024-03-09
YB26727	W			1989-08-24					2024-03-09
YB26728 YB26729	W W			1989-08-24 1989-08-24					2024-03-09 2024-03-09
YB26729 YB26730	W			1989-08-24					2024-03-09
1020/30	vv	23	1909-00-31	1909-00-24	2020-05-09	500079945		+	2024-03-09

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Grant						Ops	Period		
Number	Name		Recording	Staking	Expiry	Number	(years)		New Expiry
YB26731	W		1989-08-31					_	2024-03-09
YB26732	W	25	1989-08-31					4	2024-03-09
YB26733	W	26	1989-08-31					4	2024-03-09
YB26734 YB26735	W W	27 28	1989-08-31 1989-08-31					4 4	2024-03-09 2024-03-09
YB26736	Ŵ	20	1989-08-31					4	2024-03-09
YB26737	Ŵ	30	1989-08-31					4	2024-03-09
YB26738	w	31	1989-08-31					4	2024-03-09
YB26739	W	32	1989-08-31					4	2024-03-09
YB26740	W	33	1989-08-31	1989-08-25	2020-03-09			4	2024-03-09
YB26741	W	34	1989-08-31	1989-08-25	2020-03-09	500079956		4	2024-03-09
YB26742	W	35	1989-08-31	1989-08-25	2020-03-09	500079957		4	2024-03-09
YB26743	W	36	1989-08-31	1989-08-25	2020-03-09	500079958		4	2024-03-09
YB26744	W	37	1989-08-31	1989-08-25	2020-03-09	500079959		4	2024-03-09
YB26748	W	41	1989-08-31	1989-08-25	2020-03-09	500079963		4	2024-03-09
YB26749	W	42	1989-08-31	1989-08-25	2020-03-09			4	2024-03-09
YB26750	W	43	1989-08-31					4	2024-03-09
YB36249	W	50	1991-08-02					4	2024-03-09
YB36250	W	51		1991-07-28				4	2024-03-09
YB36251	W	52			2020-03-09			4	2024-03-09
YB36252	W W	53 55			2020-03-09 2020-03-09			4	2024-03-09
YB36254 YB36256	W	55 57			2020-03-09			4 4	2024-03-09 2024-03-09
YB36929	Ŵ	91			2020-03-09			4	2024-03-09
YB36930	w	92	1992-07-06		2020-03-09			4	2024-03-09
YB36931	w	93			2020-03-09			4	2024-03-09
YB36933	W	95	1992-07-06		2020-03-09			4	2024-03-09
Y 59373	WAR	22	1970-10-19	1970-10-16	2020-03-09	500057600		4	2024-03-09
YB36240	WAR	23	1991-08-02	1991-07-28	2020-03-09	500082053		4	2024-03-09
YB36241	WAR	24	1991-08-02	1991-07-28	2020-03-09	500082054		4	2024-03-09
YB36242	WAR	25	1991-08-02	1991-07-28	2020-03-09	500082055		4	2024-03-09
YB36243	WAR	26			2020-03-09			4	2024-03-09
YB36244	WAR				2020-03-09			4	2024-03-09
YB36245	WAR				2020-03-09				2024-03-09
YB36246	WAR				2020-03-09				2024-03-09
YB36247	WAR				2020-03-09			4	2024-03-09
YB36248	WAR				2020-03-09 2020-03-09				2024-03-09
YB36446 YB36447	WAR WAR				2020-03-09			4 4	2024-03-09 2024-03-09
YB36448	WAR				2020-03-09				2024-03-09
YB36448	WAR				2020-03-09			4	2024-03-09
YB36450	WAR				2020-03-09			4	2024-03-09
YB36451	WAR				2020-03-09			4	2024-03-09
YB36765	WAR				2020-03-09			4	2024-03-09

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Grant						Ops	Period	
Number	Name	Nbr	Recording	Staking	Expiry	Number	(years)	New Expiry
YB36766	WAR	39	1992-02-25	1992-02-23		500082579		1 2024-03-09
YB36767	WAR	40	1992-02-25		2020-03-09		4	
YB36768	WAR	41	1992-02-25	1992-02-22			4	
YB36769	WAR	42	1992-02-25		2020-03-09		2	
YB36770	WAR	43	1992-02-25		2020-03-09 2020-03-09		2	
YB36771 YB36772	WAR WAR	44 45	1992-02-25 1992-02-25		2020-03-09		2	
YB36773	WAR	45	1992-02-23		2020-03-09		2	
YB36774	WAR	40	1992-02-25		2020-03-09		2	
YB36775	WAR	48	1992-02-25		2020-03-09	500082588	4	
YB36776	WAR	49	1992-02-25		2020-03-09		4	
YB36777	WAR	50	1992-02-25		2020-03-09		4	
YC60390	WCC	10	2007-05-10	2007-04-29	2020-03-09	500146411	4	4 2024-03-09
YC60391	WCC	11	2007-05-10	2007-04-29	2020-03-09	500146412	4	1 2024-03-09
YC60392	WCC	12	2007-05-10	2007-04-29	2020-03-09	500146413	4	1 2024-03-09
YC60393	WCC	13	2007-05-10	2007-04-29	2020-03-09	500146414	4	4 2024-03-09
YC60394	WCC	14	2007-05-10	2007-04-29	2020-03-09	500146415	4	1 2024-03-09
YC60395	WCC	15	2007-05-10	2007-04-29	2020-03-09		4	1 2024-03-09
YC60396	WCC	16	2007-05-10				4	
YC60397	WCC	17	2007-05-10				2	
YC60398	WCC	18	2007-05-10		2020-03-09		4	
YC60399	WCC	19	2007-05-10		2020-03-09		4	
YC60401	WCC	21	2007-05-10		2020-03-09		2	
YC60403	WCC WCC	23 24	2007-05-10 2007-05-10		2020-03-09 2020-03-09		2	1 2024-03-09 1 2024-03-09
YC60404 YC60407	WCC	24	2007-05-10		2020-03-09		2	
YC60407	WCC	28	2007-05-10		2020-03-09		-	
YC60409	WCC	29	2007-05-10				2	
YC60410	WCC	30	2007-05-10				4	
YC60411	WCC	31	2007-05-10	2007-05-08			4	
YC60412	WCC	32	2007-05-10	2007-05-08	2020-03-09	500146433	4	1 2024-03-09
YC60413	WCC	33	2007-05-10	2007-05-08	2020-03-09	500146434	4	1 2024-03-09
YC60414	WCC	34	2007-05-10	2007-05-08	2020-03-09	500146435	4	4 2024-03-09
YC60415	WCC	35	2007-05-10	2007-05-08	2020-03-09	500146436	4	4 2024-03-09
YC60416	WCC	36	2007-05-10	2007-05-08	2020-03-09	500146437	4	1 2024-03-09
YC60417	WCC				2020-03-09		4	1 2024-03-09
YC60381	WCC FR.				2020-03-09		2	4 2024-03-09
YC60382	WCC FR.				2020-03-09			1 2024-03-09
YC60383	WCC FR.	3			2020-03-09			4 2024-03-09
YC60384	WCC FR.	4			2020-03-09		4	
YC60385	WCC FR.	5			2020-03-09			4 2024-03-09
YC60386	WCC FR.	6			2020-03-09			1 2024-03-09
YC60387	WCC FR. WCC FR.	7			2020-03-09 2020-03-09			1 2024-03-09 1 2024-03-09
YC60388	WCC FR.	8	2007-05-10	2007-04-28	2020-03-09	500146409	4	+ 2024-03-09

Grant	Nama	Nihar	Decending	Carling	Funding	Ops	Renewal Period		New Fuein
Number	Name		Recording	Staking	Expiry	Number	(years)		New Expiry
YC60389	WCC FR.	9	2007-05-10	2007-04-28	2020-03-09	500146410		4	2024-03-09
YC60400	WCC FR.	20	2007-05-10	2007-04-30	2020-03-09	500146421		4	2024-03-09
YC60402	WCC FR.	22	2007-05-10	2007-04-30	2020-03-09	500146423		4	2024-03-09
YC60405	WCC FR.	25	2007-05-10	2007-05-01	2020-03-09	500146426		4	2024-03-09
YC60406	WCC FR.	26	2007-05-10	2007-05-01	2020-03-09	500146427		4	2024-03-09
YC60418	WCC FR.	38	2007-05-10	2007-05-07	2020-03-09	500146439		4	2024-03-09
YC60419	WCC FR.	39	2007-05-10	2007-05-07	2020-03-09	500146440		4	2024-03-09
YC60420	WCC FR.	40	2007-05-10	2007-05-07	2020-03-09	500146441		4	2024-03-09
YB36898	Х	3	1992-06-19	1992-06-12	2020-03-09	500082711		4	2024-03-09
YB36899	Х	4	1992-06-19	1992-06-12	2020-03-09	500082712		4	2024-03-09
YB36962	Х	5	1992-08-13	1992-08-01	2020-03-09	500082775		4	2024-03-09
YB36963	Х	6	1992-08-13	1992-08-01	2020-03-09	500082776		4	2024-03-09
YB36964	Х	7	1992-08-13	1992-08-01	2020-03-09	500082777		4	2024-03-09

### 17. APPENDIX 2: Supplementary digital materials

Included on the enclosed DVD are the following digital files:

Assay certificates (WH15113459 and WH15117103) for trench chip samples in PDF and CSV formats.

Trench database with sample intervals, sample GPS coordinates and sample descriptions in Excel spreadsheet format and PDF format.

Total magnetic field data with GPS coordinates for the main contiguous grid (GridMasterCorrMagXYZCSV.csv) and grid G (ALLGridGcorrCSV.csv), in both PDF and CSV formats.