PETROGRAPHIC and GEOPHYSICAL ASSESSMENT REPORT on the
STU PROPERTY
in the Carmacks Copper-Gold Belt, Yukon

(STU 1-72: YC37770-95, YC40249-76, YC 40201-18)
(STU 73-132: YC65256-315)

NTS: 115I/7

Latitude 62°25'N Longitude 136°50'W

Whitehorse Mining District

Work performed April 20, 2012

For :

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SUMMARY:

The 2760 hectare STU property, NTS map sheet 115I/7, lies within the Carmacks Copper - Gold Belt and is located approximately 60 km by road northwest of Carmacks, which is 177 km by road from Whitehorse, Yukon Territory. The property is situated in the Whitehorse Mining District with a latitude and longitude of 62°25'N, 136°50'W. Mr. Bill Harris of Whitehorse, Yukon is the owner and funded the current program.

The Carmacks Copper - Gold Belt includes the Carmacks Copper deposit (Williams Creek) of Copper North Mining Corporation, containing a resource of 12.0 million tonnes of copper oxide ore grading 1.01% Cu (0.86% oxide Cu), and 0.5 g/t Au and 4.6 g/t Ag, using a cutoff grade of 0.25% Cu, and the Minto deposit of Capstone Mining Corporation, currently under production, with 19.3 million tonnes of sulphide ore grading 1.42% Cu, 0.5 g/t Au and 5.4 g/t Ag using a cutoff grade of 0.5% Cu.

The STU property is primarily underlain by Early Jurassic intrusive rocks of the Granite Mountain Batholith intruding the Paleozoic metamorphic basement rocks of the Yukon Tanana Terrane and overlain by younger volcanic rocks of the Late Cretaceous Carmacks Group. Exploration on the STU property has been hampered by lack of exposure, thick overburden cover, variable but generally poor soil profiles, and unavailability of results from previous programs.

Mineralization consists of chalcopyrite and bornite with minor pyrite and locally abundant magnetite as disseminations, irregular grains and aggregates, associated with more foliated to gneissic zones within the Granite Mountain Batholith trending 130º with magnetite-silica and biotite alteration. The highest gold and silver values are associated with bornite-rich sections. The host rocks, structures, mineralization and alteration at STU are similar to the Minto and Carmacks Copper deposits, which have been described as metamorphosed porphyry copper-gold deposits.

Previous results from the STU property include 3.51% Cu, 2.5 g/t Au and 18.4 g/t Ag across 13.5m from DDH 80-14 in the A Zone, with three of the 1980 diamond drill holes returning intersections exceeding 2.5% Cu. The rotary drill program returned maximum results of 0.71% Cu over 1.5m in hole SB-6 in the B Zone.

The 2012 program consisted of a property examination to evaluate the potential of the property and to make recommendations for the next stage of exploration. Samples were collected for petrographic analysis and magnetic susceptibility measurements. Overall, it would appear that a magnetic survey over the property should pick up the alteration zones associated with mineralization as a magnetic low, with a moderate magnetic response over mineralization. The petrographic study shows very little alteration, with only minor white mica, some clay and minor chlorite alteration of the mafic minerals. There is also no evidence of deformation.

In 2012 mineralization was found to have a direct relationship with the presence of secondary biotite, the presence of magnetite and hematite, and the development of a foliated to gneissic texture, which trends 130º (commonly with 70ºNE dips). Secondary

copper minerals such as malachite and azurite occur but are relatively uncommon and sulphide minerals predominate within the B and C Zones. Very little exposure occurs in the A Zone. Possible gold was detected in the 2008 petrographic study from the B and C Zones.

The A Zone appears to be the main zone of interest on the property with results of >0.1% Cu to 0.67% Cu and a maximum of 470 ppb Au obtained in 2005 to 2008 from samples over a 400m strike extent and up to 95m width. Malachite has been noted an additional 400m to the southeast. This probably corresponds to the zone 914m long and up to 91m wide that was delineated by United Keno Hill Mines Limited in 1977-79. The zone does not appear to have been completely delineated. The zone was explored by 24 diamond drill holes in 1980 so results from the 1980 diamond drill program are critical in the evaluation of this area.

Mineralization in the B Zone is often high grade over narrow widths suggesting a distal signature. Potential exists at depth in the area between Trench B3 to B6, which returned the best copper-gold-silver results (maximum 2.86% Cu and 2.56 g/t Au), and along strike to the northwest (northeast of the trenches to the north) and to the southeast, where little work has been completed.

Similar mineralization to the A and B Zones is exposed in the C Zone. Mineralization was traced over a 110m strike and 25-30m width in 2005 to 2008 with significant maximum results of 1.59% Cu and 3.7 g/t Au associated with 130º/NE trending mineralized fractures. Elevated copper in soils from 2010 suggests that some mineralization may extend 140m further north. Little work has been done in this area but results from DDH 80-1 would be beneficial in the evaluation of this zone.

Results from the 1980 United Keno Hill Mines Limited drill program are not in the public record but the core is stored on the property and the collar locations were located and surveyed by GPS in 2006. The first priority in a Phase 1 program is to label, unstack and systematically sample the core on the STU property so that results can be correlated and interpreted. Magnetic susceptibility measurements over the entire core can be collected at this time and, if results are located, additional unsplit mineralized intervals assayed.

Systematic MMI soil and IP geophysics surveys may be useful in tracing mineralization along strike within the three zones, particularly where the drill results from the above core sampling program are inconclusive due to poor condition of the core, and if the zone is shown to remain open or the drill hole did not adequately test the target. The surveys should be tested over several trenches with mineralization to determine their usefulness and if positive completed along strike of the zones.

A program of 2,225 metres of excavator trenching in twelve trenches is recommended over the A to C Zones to trace mineralization along strike and to complete infill trenching in known higher grade areas.

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1.0 LOCATION AND ACCESS (Figure 1)

The STU property, NTS map sheet 115I/7, lies just northwest of Hoochekoo Creek approximately 60 km by road, northwest of Carmacks, approximately 200 km northwest of Whitehorse, Yukon Territory *(Figure 1)*. The property is centered at a latitude of 62°25'N and a longitude of 136°50'W.

The property is accessible from Carmacks via the Freegold Road, a year round government maintained gravel road, which is followed for 35 km. At this point, the access road to the Carmacks Copper property (Williams Creek) of Carmacks North Mining Corporation is followed for approximately 18 km northerly past Carmacks Copper. The last 7.5 km to the STU camp, in the central property area, are by ATV along an overgrown road. Several cat trails on the claims, variably overgrown, provide access to trenches and drill sites.

The claims can also be accessed by helicopter from Carmacks with a suitable landing site at the STU camp situated in the central property area at UTM coordinates 6921240m N, 0405015m E, Nad 83, Zone 8 projection. The entire property can be accessed from the STU camp and provides the best access to Zone A. Central Zone B can be accessed from a helipad at 6919288mN, 406124mE along Trench 74+00E and Zone C from a potential landing site at DDH 80-27 at UTM coordinates 692250mN, 406091mE.

The STU camp refers to the former United Keno Hill Mines Limited drill camp, consisting of a trailer suitable for accommodation for up to 4 people.

Carmacks is the closest town, with a population of approximately 450. Facilities include a grocery store, nursing station, two service stations, and a restaurant. Complete services are available in Whitehorse, less than two hours by road from Carmacks.

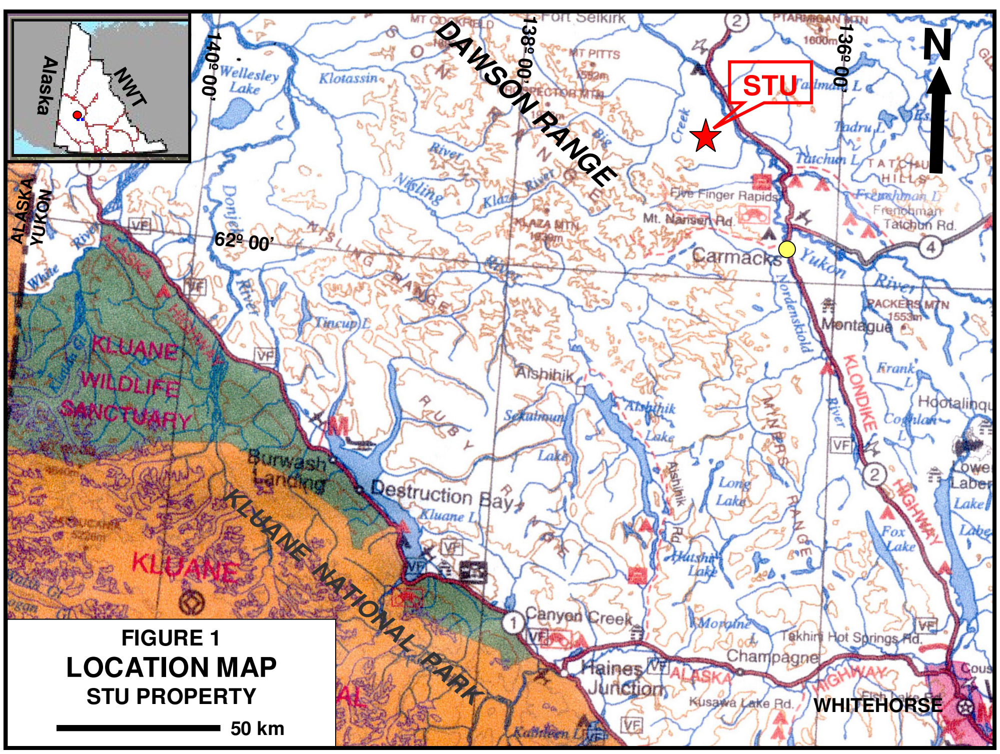


FIGURE 1
LOCATION MAP
STU PROPERTY

2.0 LEGAL DESCRIPTION (Figure 2)

The STU property consists of 132 contiguous claims covering an area of approximately 2760 hectares in the Whitehorse Mining District. The property is owned and the current program operated by Mr. Bill Harris of Whitehorse, Yukon. Work was completed on April 20, 2012. A table summarizing pertinent claim data follows and complete details are shown in Appendix II:

TABLE 1: Claim data

Claim Name	Grant No.	No. of Claims	Registered Owner	Recording Date	New Expiry Date
STU 1-10	YC37770-79	10	Bill Harris	2004-12-13	2013-12-13*
STU 11-20	YC40249-58	10	Bill Harris	2005-09-19	2013-09-19 *
STU 21-28	YC37788-95	8	Bill Harris	2004-12-21	2014-06-21*
STU 29-30	YC40259-60	2	Bill Harris	2005-09-19	2013-09-19 *
STU 31-38	YC37780-87	8	Bill Harris	2004-12-13	2013-12-13*
STU 39-54	YC40261-76	16	Bill Harris	2005-09-19	2013-09-19 *
STU 55-72	YC40201-18	18	Bill Harris	2005-08-29	2013-11-29 *
STU 73-132	YC65256-315	60	Bill Harris	2007-07-09	2013-07-09
TOTAL		**132**			

*new expiry date based on acceptance of this report

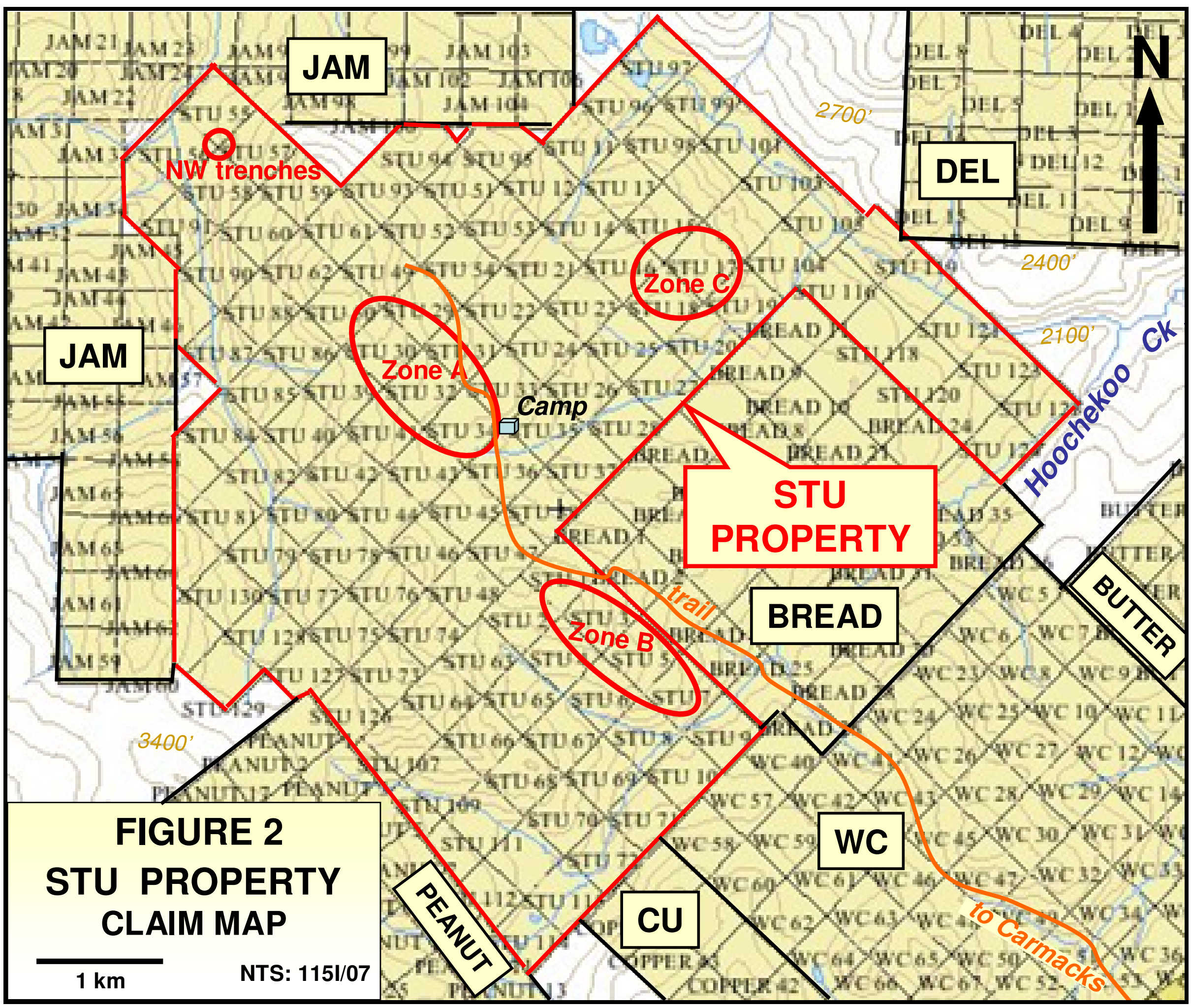


FIGURE 2
STU PROPERTY
CLAIM MAP

First Nations have settled their land claims in the area with First Nations surveyed lands occurring 3 km south of the STU property and 15 km to the north *(Figure 3).*

3.0 PHYSIOGRAPHY AND CLIMATE (Figures 1 and 2)

The property covers an area northwest of Hoochekoo Creek *(Figure 2)* within the northeastern edge of the unglaciated Dawson Range *(Figure 1)* of the Yukon Plateau.

Elevations range from a low of 640m in the eastern property area up to 1075m in the western portion of the claim block, a maximum relief of 435m. Most slopes are gentle except along the north bank of Hoochekoo Creek. North-facing slopes are heavily timbered with black spruce and generally have a thick moss cover. Some north facing slopes and low lying wet areas are covered by dense alder and willow. South facing slopes are better drained and have a cover of poplar or pine. Areas in the northwest portion of the claim block, including part of the A Zone, were burned in the 2004 and 1995 seasons.

Several small streams are present on the property that occupy broad swampy valleys between 400 and 800m wide and drain to the northeast and southeast into Hoochekoo Creek and a southeast flowing tributary of Hoochekoo Creek. Northerly flowing tributaries of Big Creek drain the northwestern property area.

Outcrop exposure on the property is <1% with float covering approximately 8%. Large areas of the property are covered by thick overburden and all of the known showings occur on hill tops or along ridge slopes where the overburden is thin or absent *(Ouellette, 1990)*.

The Carmacks area has a northern interior climate with warm summers (+20º C), long cold winters (-20º C) and moderate precipitation (25 cm), most of which is snow. The exploration season lasts from May until October.

4.0 HISTORY (Figure 3)

The STU property covers the STU Minfile occurrence, a drilled prospect, as documented by the Yukon Geological Survey *(Deklerk and Traynor, 2005)*. The STU prospect covers three mineralized zones, A, B and C *(Figure 2)*. Historical work in the A Zone includes eight bulldozer trenches excavated in 1979 and 25 diamond drill holes completed in 1980 *(Figure 5)*. Fourteen historical bulldozer trenches from 1979 and 1982 have been located in the B Zone area, nine of which directly explore the B Zone *(Figure 6)*. The C Zone has seen limited historical exploration with only four short bulldozer trenches in 1979 and three diamond drill holes in 1980 *(Figure 5)*. A summary of the work completed by various operators is tabulated below:

1971-74 Program of grid soil sampling, magnetic and electromagnetic surveys undertaken in 1971 and an induced polarization survey in 1974, outlining four northwest trending anomalies, two with a strong EM response coincident with a weak IP and geochemical expression, by Hudson's Bay Oil & Gas Company Ltd.

1976-89 Programs of prospecting (1976), mapping, deep (0.9m average) soil sampling, magnetic and VLF electromagnetic surveys (1977), an induced polarization survey (1978), 16 bulldozer trenches (1978 or 79), 4504m of diamond drilling in 28 holes and soil sampling (1980), mapping and geochemical surveys and an airborne magnetic and electromagnetic survey (1981), 13 bulldozer trenches (1982) and 1823m in 30 rotary air blast drill holes, primarily in Zone B (1989) by United Keno Hill Mines Ltd.

The programs outlined three zones (A-C) up to 914m long and 91m wide with patchy malachite staining in foliated granodiorite, from which selected grab samples assayed up to 0.58% Cu. Three of the 1980 drill holes returned intersections exceeding 2.5% Cu, including 3.51% Cu, 2.5 g/t Au and 18.4 g/t Ag across 13.5m in DDH 80-14. The rotary drill program returned a maximum of 0.71% Cu over 1.5m in hole SB-6.

2005 Prospecting, reconnaissance rock and soil sampling, examination and select rock sampling of most trenches *(Robertson, 2005)*.

2006 Program of limited magnetic susceptibility testing of drill core samples (suggesting the alteration zones associated with mineralization would be detected as a magnetic low), GPS surveying of old trenches and drill sites, an evaluation of showings and geochemical sampling *(Pautler, 2007)*.

2008 Program of mapping, geochemical sampling and a petrographic study of mineralization from the three known showings on the property *(Pautler, 2009)*.

2010 Program of mapping and geochemical sampling on outlying areas of the property including location of NW trenches *(Pautler, 2011)*.

5.0 2012 WORK PROGRAM

A total of 2 man-days were spent on the STU property on April 20, 2012. The 2012 work program consisted of a property examination to evaluate the potential of the property and to make recommendations for the next stage of exploration. Five samples were collected for petrographic analysis, three of which were utilized, the remaining two being unsuitable. Four thin sections were prepared from the three samples. Magnetic susceptibility readings were performed at Aurora Geosciences Ltd. and documented in Appendix III Control was provided by GPS. Sample locations are shown in Figures 5 to 6, and the petrographic analysis in Appendix VI.

6.0 GEOLOGY

6.1 Regional (Figure 3)

The regional geology of the area is primarily summarized from Gordey and Makepeace (2000), Mortensen and Tafti (2003) and Robertson (2005).

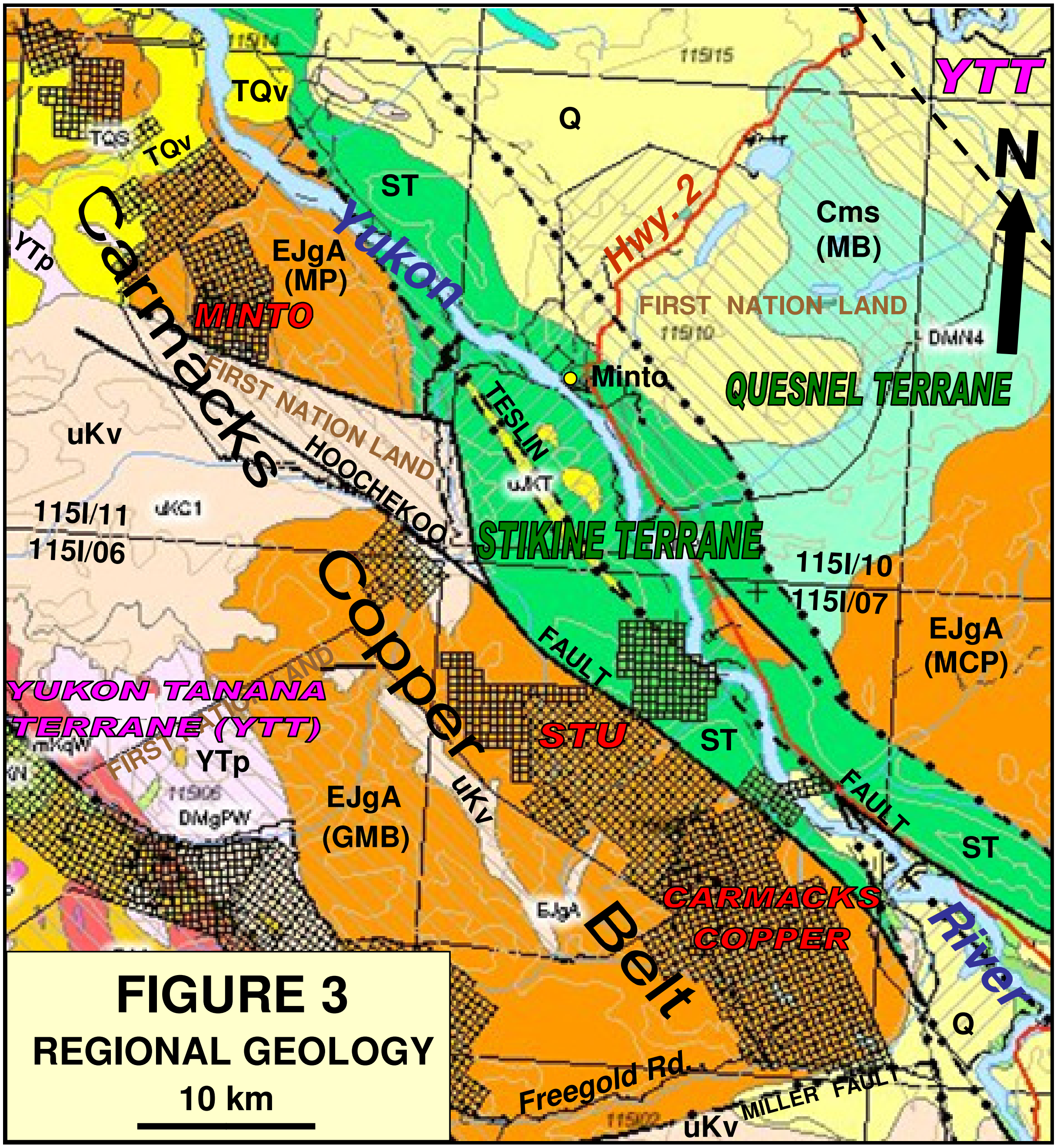


FIGURE 3
REGIONAL GEOLOGY
10 km

The STU property occurs within the Carmacks Copper Belt between the Carmacks Copper deposit (formerly Williams Creek) of Copper North Mining Corporation, containing a resource of 12.0 million tonnes of copper oxide ore grading 1.07% Cu (0.86% oxide Cu), 0.5 g/t Au and 4.6 g/t Ag, using a cutoff grade of 0.25% Cu, and the

Minto deposit of Capstone Mining Corporation (formerly Sherwood Copper Corp.), with 19.3 million tonnes of sulphide ore grading 1.42% Cu, 0.5 g/t Au and 5.4 g/t Ag using a cutoff grade of 0.5% Cu (based on drilling to end of 2006). The Minto deposit started production in October, 2007 and has greatly increased its resource. The Carmacks Copper deposit is currently in the permitting process.

The regional area of the Carmacks Copper Belt is underlain by intermediate to felsic intrusive and meta-intrusive rocks of the Early Jurassic Aishihik/Long Lake plutonic suite (**EJgA**) intruding Paleozoic metaplutonic rocks (**YTp**) and locally metavolcanic rocks (not in map area) of the Yukon Tanana Terrane, near the boundary with upper Triassic and/or older mafic volcanic rocks of the Stikine Terrane (**ST**) to the east. The above lithologies are overlain by younger basaltic volcanic rock units of the Late Cretaceous Carmacks Group (**uKv**) and the Quaternary Selkirk Group (**TQv**).

The northwest trending Hoochekoo Fault, which lies just to the northeast of the STU and Carmacks Copper properties, transects the Carmacks Copper Belt separating the Minto deposit, hosted by the Minto Pluton (**MP**), from the Carmacks Copper deposit and the STU property, both hosted by the Granite Mountain Batholith (**GMB**).

The area has been glaciated with overall northwesterly ice directions and local southeast ice directions, particularly in the west.

6.2 Property (Figure 4)

The STU property is primarily underlain by Early Jurassic intrusive rocks of the Granite Mountain Batholith (**GMB**). The intrusive rocks consist of several different phases that include potassium feldspar megacrystic granodiorite that grades to foliated biotite granodiorite, biotite gneiss and locally biotite schist, quartz-phyric granodiorite to monzogranite, and minor diorite to quartz diorite. Foliation of the granodiorite, where present, trends northwest, dipping steeply and varies from very weak to moderate to locally strong to gneissic; the latter particularly in mineralized zones.

Apart from the three main mineralized zones, gneissic granodiorite occurs on the eastern and western margins of the C Zone. Minor foliated granodiorite was also encountered approximately 1 km northwest (325°/75°E), 1 km southwest (350°/75°E) and 2 km west (320°/80°E) of the B Zone. A narrow (1m) zone of foliated biotite granodiorite, trending 300º/70ºNE, occurs in the northwest property area on STU 59 or 61.

Petrography primarily indicates a granodiorite composition for the host rock with 25-30% quartz, 35% plagioclase, 10% potassium feldspar, 15% biotite and 5% hornblende, with accessory epidote, apatite, sphene and zircon *(Fonseca, 2008)*. Metamorphism is of upper greenschist facies biotite zone as indicated by petrography and locally hornblende is partly converted to metamorphic prograde biotite *(Fonseca, 2008)*.

The intrusive rocks are cut by locally numerous aplite and pegmatite dykes of variable widths and overlain and cut by mafic flow and tuff breccia volcanic rocks and related dykes of the Camacks Group (**uKv**). Carmacks basalt flows are exposed in the northwestern C Zone and between the A and C Zones. A basalt hornblende feldspar porphyry flow is exposed as subcrop east of (above) the trenches in the northwest property area.

The northwest trending Hoochekoo Fault lies just to the northeast of the STU property and 130º trending, steeply dipping fractures and structural zones are evident across the property that appear to have a relationship to mineralization.

Three trenches occur at the northwest end of the property on the STU 55-58 claims, but only minor bedrock, consisting of clay altered granodiorite with limonite fractures and Mn staining, was exposed in Trench 3. The remaining trenches exposed till with ash horizons.

6.3 Mineralization and Alteration

The property covers the STU Minfile drilled prospect as documented by the Yukon Geological Survey as Minfile Number 115I 011 *(Deklerk, 2009)*.

Mineralization consists of chalcopyrite and bornite with minor pyrite and locally abundant magnetite. It occurs as disseminations, irregular grains and aggregates hosted by weak to well foliated biotite granodiorite to gneiss. Chalcocite and digenite often rim bornite grains and tenorite occurs in fractures. Minor malachite and azurite, with lesser chrysocolla and possible brochantite *(Fonseca, 2008)*, occur in fractures, veinlets and occasionally rim chalcocite. The copper minerals appear to replace the mafic minerals within the granodiorite. Hematite replaces magnetite and also occurs as minor fracture and open space fillings. Possible gold grains were observed in samples PTS-3 from Trench 1450E in the C Zone and PTS-5 from Trench 74+00E in the B Zone *(Fonseca, 2008)*.

Mineralization appears to be associated with more foliated sections trending 130º with magnetite-silica alteration (observed as silicification with fine disseminated magnetite along foliation) and the presence of biotite, interpreted as potassic alteration. Small veinlets sometimes cut the mineralization. Alteration minerals include quartz, mica, carbonate, epidote and chlorite. The highest gold and silver values are associated with bornite-rich sections. A crude vertical zonation has been previously noted, from pyrite at the bottom of the zone to bornite and chalcocite at the top *(Deklerk, 2009)*.

A petrographic analysis of the granodiorite host from the three known mineralized zones on the property *(Fonseca, 2008)* shows a penetrative foliation defined by melanocratic domains of biotite, with lesser hornblende-epidote-sphene-apatite-magnetite, and leucocratic domains of quartz and feldspars. Hydrothermal alteration minerals include fine grained clays and white mica partly replacing feldspars, and chlorite partly replacing biotite. Clay alteration was found to be most intense in the vicinity of intense supergene copper mineral deposition *(Fonseca, 2008)*.

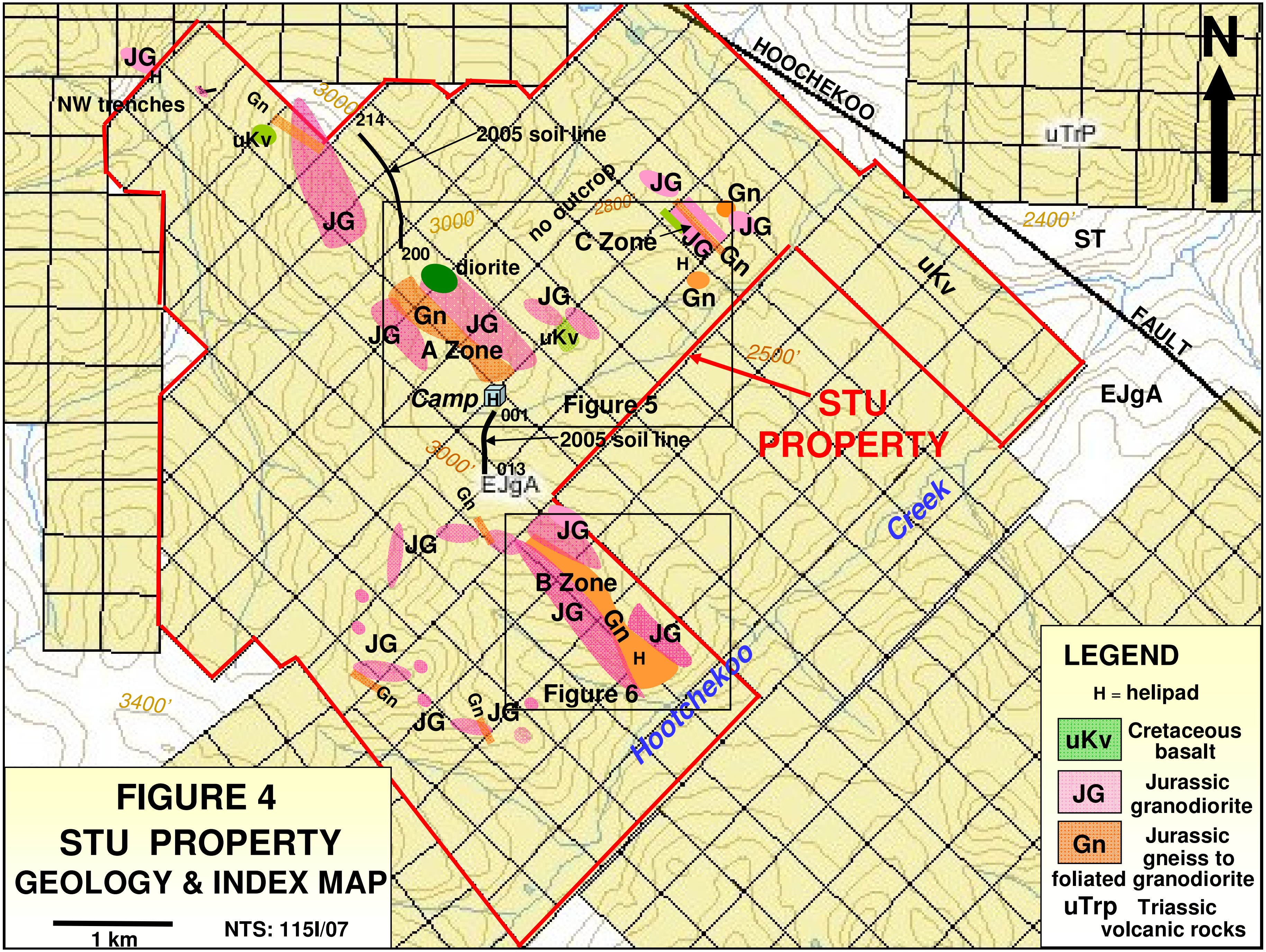


FIGURE 4
STU PROPERTY
GEOLOGY & INDEX MAP

1 km

NTS: 115I/07

7.0 DEPOSIT MODEL

Mineralization on the STU property, located between the Minto and Carmacks Copper deposits within the Carmacks Copper - Gold Belt, appears to fit the metamorphosed copper-gold porphyry deposit model proposed by Tafti and Mortensen (2004) for the two deposits.

The STU property has strong similarities to both deposits, hosted by the same rock units with similar alteration (secondary biotite, magnetite-silica) and mineralization (gold-bornite association). It has been documented that the Minto and Carmacks Copper deposits are hosted by variably deformed plutonic rocks that occur as pendants and schlieren within slightly younger less deformed intermediate intrusive rocks of the Granite Mountain Batholith *(Tafti and Mortensen, 2004)*. Petrographic and field studies of the more gneissic host rocks from Minto and Carmacks Copper show that they represent strongly deformed and metamorphosed intrusive rocks (orthogneiss), with the excess amount of biotite representing secondary (hydrothermal) biotite associated with strong hypogene potassic alteration *(Tafti and Mortensen, 2004)*.

Hornblende geochemical studies of plutonic and meta-plutonic host rocks at Minto and Carmacks Copper indicate that they formed in a continental magmatic arc setting *(Tafti and Mortensen, 2004)*. The setting, timing of mineralization and petrographic and field observations of the host rocks, mineralization and alteration led Tafti and Mortensen (2004) to conclude that the two deposits represent variations on typical copper (-gold) porphyry deposits.

It should be noted that schlieren are fragile, usually elongate concentrations of mafic material within some intrusions. Genesis may be due to shearing of heterogeneities (enclaves or xenoliths), crystal sorting during convective or magmatic flow, or crystal settling.

Recent work at the Carmacks Copper deposit has suggested that the highly foliated rocks controlling economic mineralization are rafts and lenses (xenoliths) of augite-phyric volcanic rocks of the Povoas Formation within the Granite Mountain Batholith. The Povoas Formation occurs at the base of the Triassic aged Lewes River Group, part of Stikinia, and is exposed to the northeast of the Granite Mountain Batholith *(see Figure 3)*. Similarly mineralization at the Minto deposit has been described as being hosted by zones of strongly developed penetrative foliation, interpreted as shears or as rafts of volcanic rock within the granodiorite host. The 2012 petrographic analysis shows no evidence of deformation in the STU specimens.

Calc-alkaline porphyry copper-gold mineralization at the Kemess Mine (Kemess South deposit) and the Kemess North deposit in central British Columbia is hosted by Jurassic granodiorite intrusions and adjacent Upper Triassic augite-phyric flows of the Takla Group, indicating similar chemistry, age and deposit characteristics to mineralization within the Carmacks Copper - Gold Belt. The main difference is the lack of foliated rocks associated with the mineralization.

The STU petrographic analyses confirmed similarities between the STU and the Minto and Carmacks Copper deposits and recognized similarities to the recently discovered Tropicana gold deposit of AngloGold Ashanti Australia Ltd. in Western Australia which contains 62.8 million tonnes of 2.01 g/t Au, with no mineable copper reported *(see Fonseca, 2008)*. Tropicana has been described as a metamorphosed intrusion related gold deposit. Current work is focussing on whether the deposit is in fact a metamorphosed Archean deposit or formed during metamorphism in the Proterozoic.

Tropicana is hosted within high grade metamorphic gneissic rocks and associated with late biotite and pyrite alteration *(AngloGold Ashanti website)*. STU is hosted within upper greenschist metamorphosed gneissic rocks, associated with late biotite alteration and pyrite alteration is documented at the bottom of the zone. Metamorphic prograde biotite was recognized in polished thin sections from the STU property *(Fonseca, 2008)*.

The STU 2008 petrographic analysis also indicated the presence of ubiquitous magmatic epidote, also reported at Minto, suggesting depths of formation of 18 to 20 km, which far exceeds typical depths of deposition for porphyry style deposits *(Fonseca, 2008)*.

Based on the above discussion, the author believes that mineralization within the Carmacks Copper - Gold) Belt is hosted by schlieren zones (including some volcanic xenoliths) within Jurassic granodiorite and is consistent with a calc-alkaline porphyry copper-gold model (with similarities to the Kemess Mine and Kemess North deposit) which formed at a deep crustal level.

8.0 GEOPHYSICS (Appendix III)

The cut hand specimens utilized for petrography in 2012 were tested for magnetic susceptibility by Aurora Geosciences of Whitehorse, Yukon Territory to determine a relationship between the magnetite content and mineralization and to aid in the interpretation of magnetic surveys. The measurements were undertaken by geophysicist Andre Lebel, aided by warehouse manager Stuart Murray, using an Exploranium KT-9 magnetic susceptibility Kappameter with trigger pin removed. The trigger pin is useful in specimens with geometric irregularities, but since flat surfaces were being measured, the pin was removed to increase accuracy. Samples measured were of similar size, so that readings would be comparable. Three measurements were taken of each hand specimen and/or each distinct lithological band.

The 2012 specimens were described by the author and are shown with magnetic susceptibility data in Appendix III. The results were compared to a suite of 25 samples of drill core collected from holes DDH 80-17 to DDH 80-28 from the Stu core rack in 2005 and described and tested for magnetic susceptibility in 2006. Results from this survey are included in Appendix III.

There appears to be an association of alteration and brecciation to low magnetic susceptibility readings of <0.2. The fresh granodiorite returned values commonly between 1.0 and 2.0, but variable from 0.13 to 7.86, depending on primary magnetite content. Mineralized and foliated specimens ranged from 0.04 to 23.6. However, values <3.0 were restricted to foliated granodiorite to gneiss with no mineralization evident or granodiorite with minor flecks of malachite or minor disseminations of chalcopyrite and bornite. More highly mineralized specimens returned higher magnetic susceptibilities. In 2012, a highly mineralized specimen with up to 2 cm clots of magnetite-bornite-chalcopyrite from Trench 7400E in the B Zone returned a high magnetic susceptibility of 23.6 and a specimen of strongly malachite stained granodiorite from Trench 1450E in the C Zone returned 6.89. One core specimen from 2006 with only minor malachite on fractures returned a high magnetic susceptibility reading of 10.44.

There is also a variation within one rock specimen with a lighter aplite dyke generally returning lower values (2.23) than the darker foliated bands (6.49). However, the lighter aplite with magnetite returned a maximum value of 13.5.

At Carmacks Copper mineralization is associated with magnetic lows and at Minto with a moderate magnetic response. The alteration appears to be magnetite destructive so that a magnetic low would be associated with the alteration zones within the generally magnetic granodiorite host. However, visually there is an increase in magnetite locally around mineralized fractures and an increase in biotite content and foliation. This would appear to be local in extent and can be observed on the core logging and outcrop scales but not on a larger grid scale for magnetic surveys.

Detailed magnetic susceptibility measurements over the existing core would be useful to obtain a complete and more accurate interpretation, especially if correlated with assay results. Overall, it would appear that a magnetic survey over the property should pick up the alteration zones associated with mineralization as a magnetic low, with a moderate magnetic response over mineralization.

9.0 PETROGRAPHY (Appendix VI)

Additional petrography was undertaken on the STU property in 2012 in an attempt to determine the controls on mineralization. One thin section (TS) and three polished thin sections (PTS) were prepared by Vancouver Petrographics Ltd., of Langley, British Columbia and sent to Dr. Tim Liverton of Watson Lake, Yukon Territory for petrographic analysis. Descriptions of the hand specimens are presented in Appendix III, with magnetic susceptibility readings and the petrographic report is enclosed as Appendix VI. Sample locations are plotted on Figures 5 and 6 and tabulated with the descriptions in Appendix III. Photos of the samples *(Photos 1 to 8)* follow this section, on pages 13-14.

The previous 2008 petrographic study consisted of malachite stained samples of granodiorite from each of the three known showings on the property (A to C). Higher grade (bornite bearing) specimens were collected in 2012 from the B (STU-1) and C (STU-1450E) Zones, with one sample of typical unmineralized granitic country rock from the B Zone (STU-2) *(Photo 8)* for comparison. A high grade bornite-chalcopyrite-malachite bearing sample from mid Trench 7400E in the B Zone was collected and two sections were cut, one across a 2 cm bornite-chalcopyrite-magnetite clot *(Photos 1 and 2)*, hosted by foliated hornblende-biotite granodiorite (STU-1A) and the other across a light coloured aplite dyke/vein (STU-1B) *(Photo 3)*. A strong malachite stained specimen (STU-1450E) with minor bornite on fractures was collected from the C Zone *(Photos 5 to 7)*.

Specimen STU-1 was collected from Trench 74+00E (B1) in the B Zone from the vicinity of the best hole (SB-6) from the 1989 rotary drill program, which returned 0.71% Cu over 5 feet. STU-1450E was collected from the vicinity of a sample which returned 0.23% Cu.

The petrographic study shows very little alteration, with only minor white mica, some clay and minor chlorite alteration of the mafic minerals (biotite and hornblende). There is also no evidence of deformation. This is more consistent with a deep porphyry (magmatic) environment than a deformed copper porphyry model, which has been suggested. Grain boundary reduction has been noted and related corridors, which overprint foliation, appear to control the location of supergene copper and iron minerals.

The typical K-spar megacrystic country rock (STU-2), collected from the B Zone, and the host rock of mineralization in Trench 1450E from the C Zone (STU-1450E) were found to have a monzogranite composition (based on limited data), so slightly more K-spar rich than the granodiorite host rock in Trench 7400E in the B Zone (STU-1A). A suite of 6 specimens petrographically analyzed in 2008 also returned a granodiorite composition. The aplite dyke/vein (STU-1B) cutting specimen STU-1B has a syenogranite composition (more K-spar rich) and exhibits some alteration and mineralization.

Mineralogy includes quartz, plagioclase (granophyric textures evident), orthoclase, microcline, perthite, biotite, hornblende, with epidote, sphene, apatite and zircon. Garnet, and minor fluorite and topaz were noted in STU-1A. Opaque minerals include magnetite (commonly weakly replaced by hematite along microfractures), bornite, chalcopyrite and chalcocite. Chalcocite alteration of bornite is evident, but may also occur as primary grains. Malachite is the dominant supergene mineral with lesser chrysocolla and bronchantite(?).

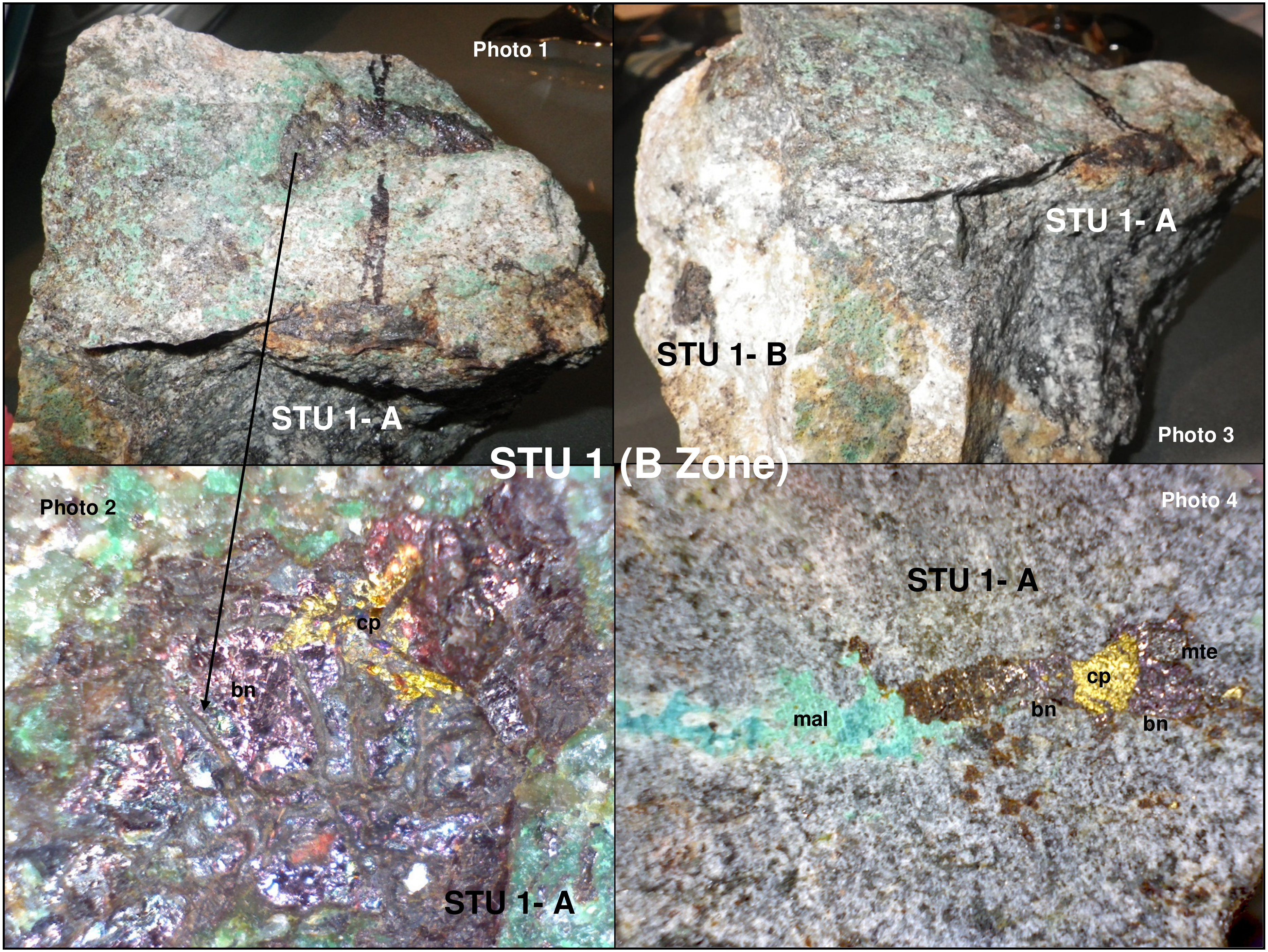


Photo 1
STU 1- A
STU 1- B
STU 1- A
Photo 3
STU 1 (B Zone)
Photo 2
cp
bn
STU 1- A
Photo 4
STU 1- A
mte
cp
bn
bn
mal

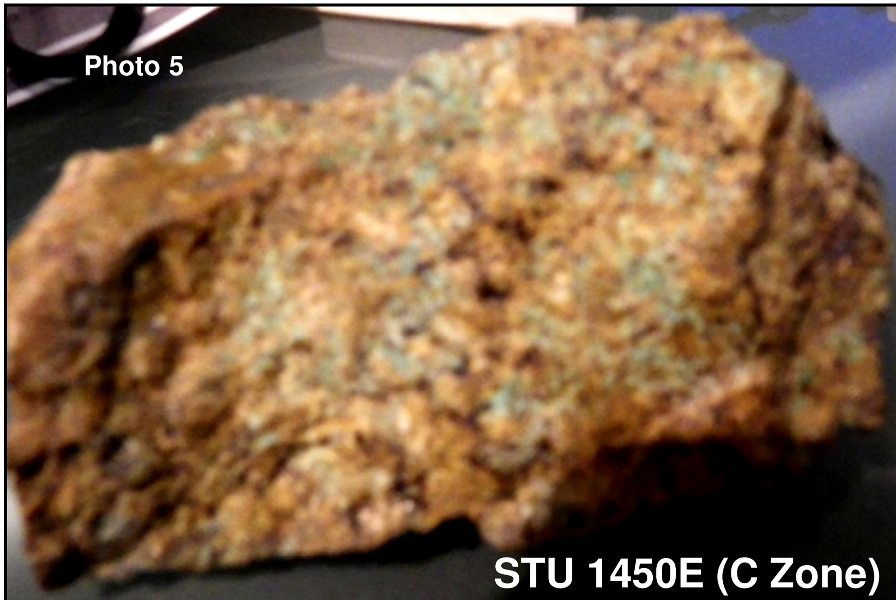
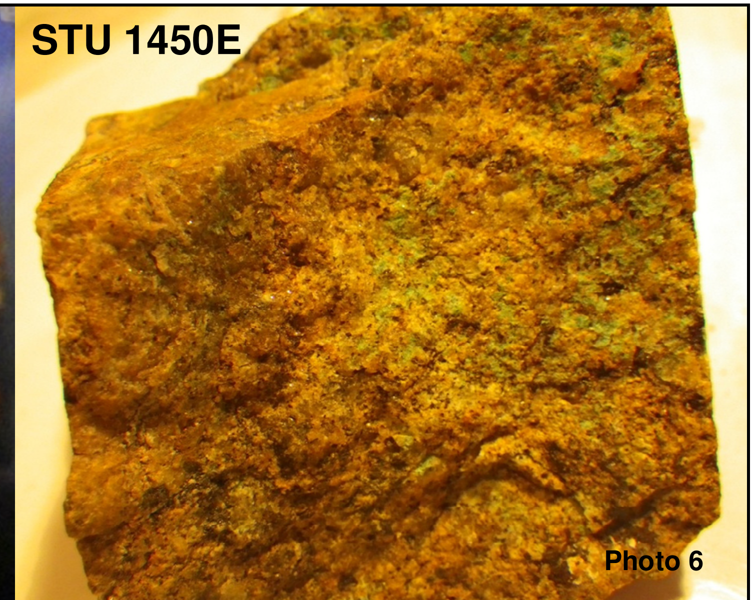
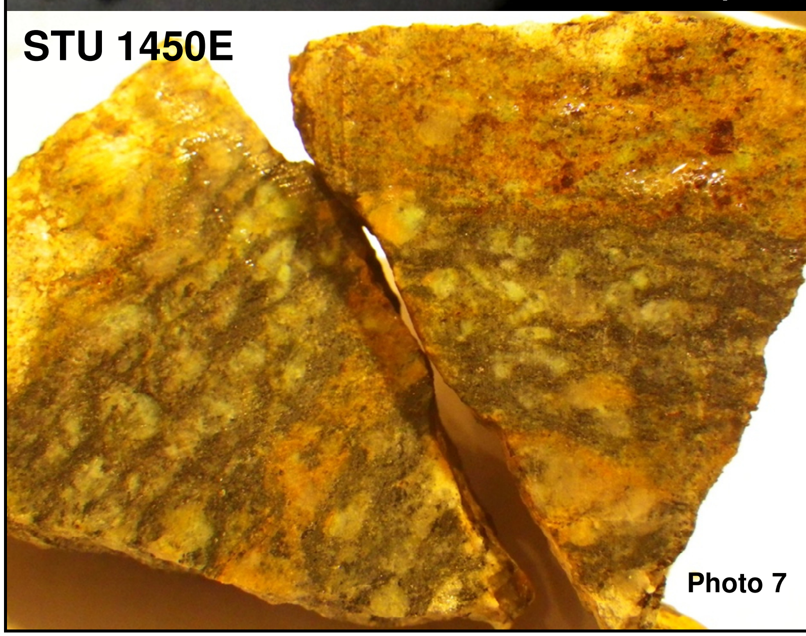


Photo 5
STU 1450E (C Zone)


STU 1450E
Photo 6


STU 1450E
Photo 7

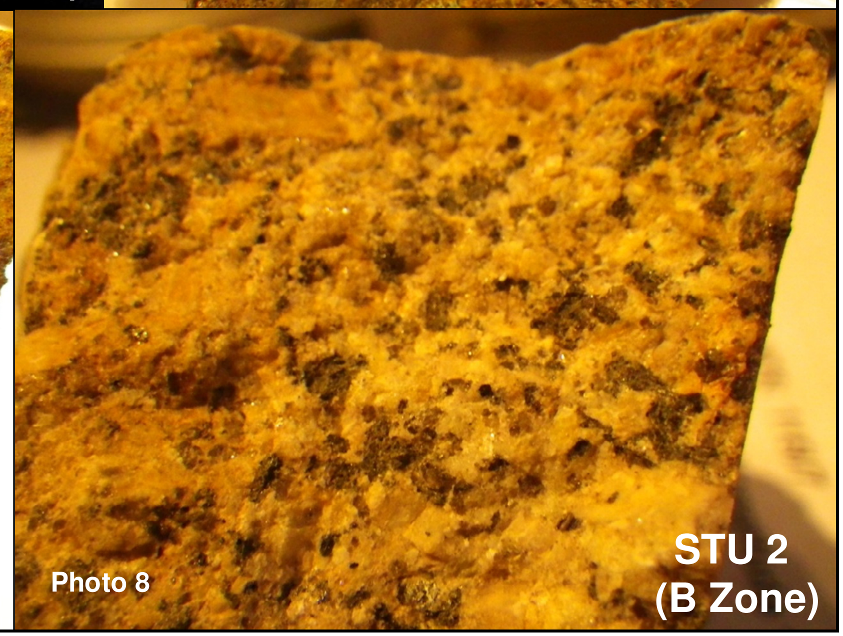
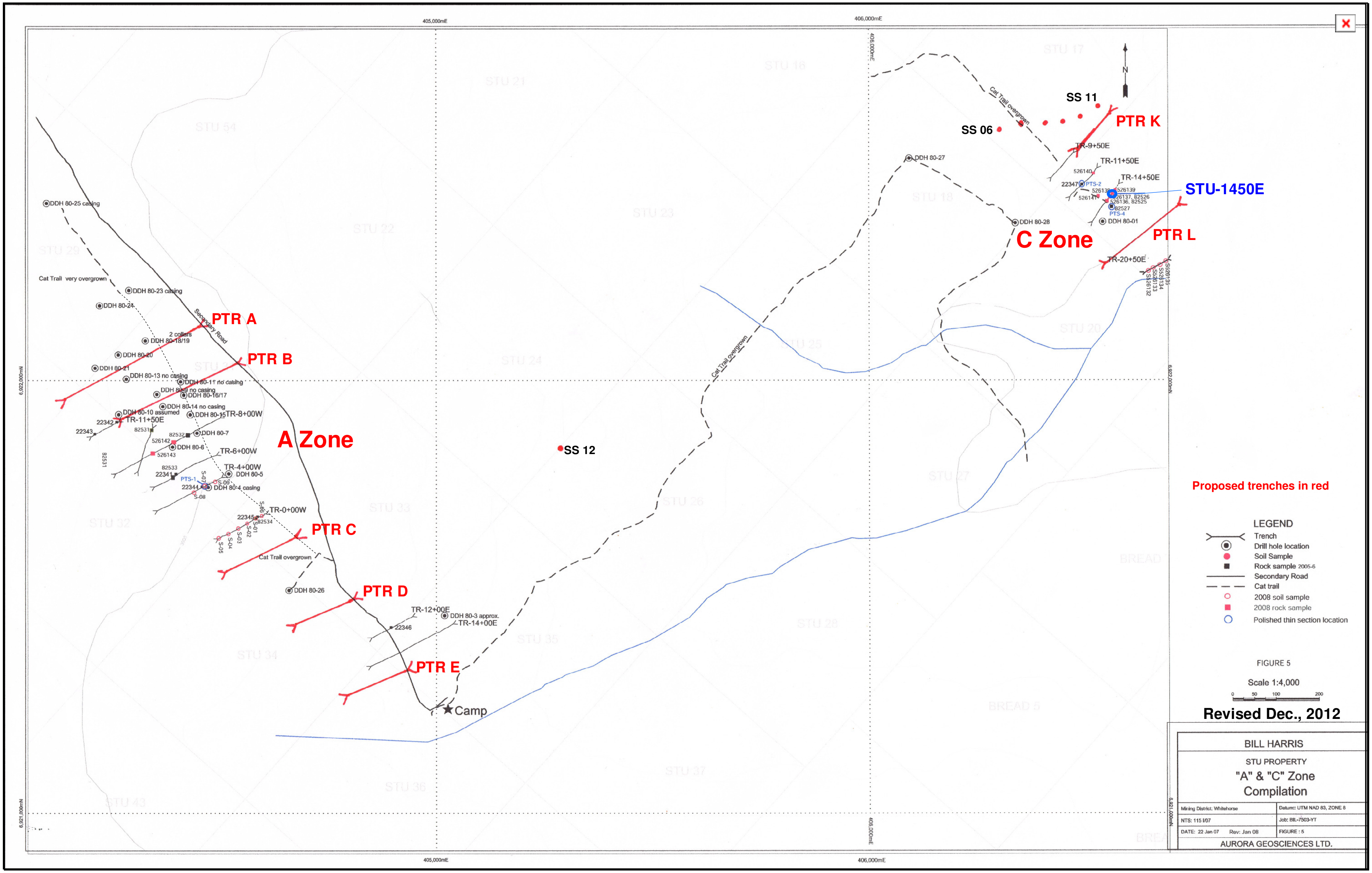
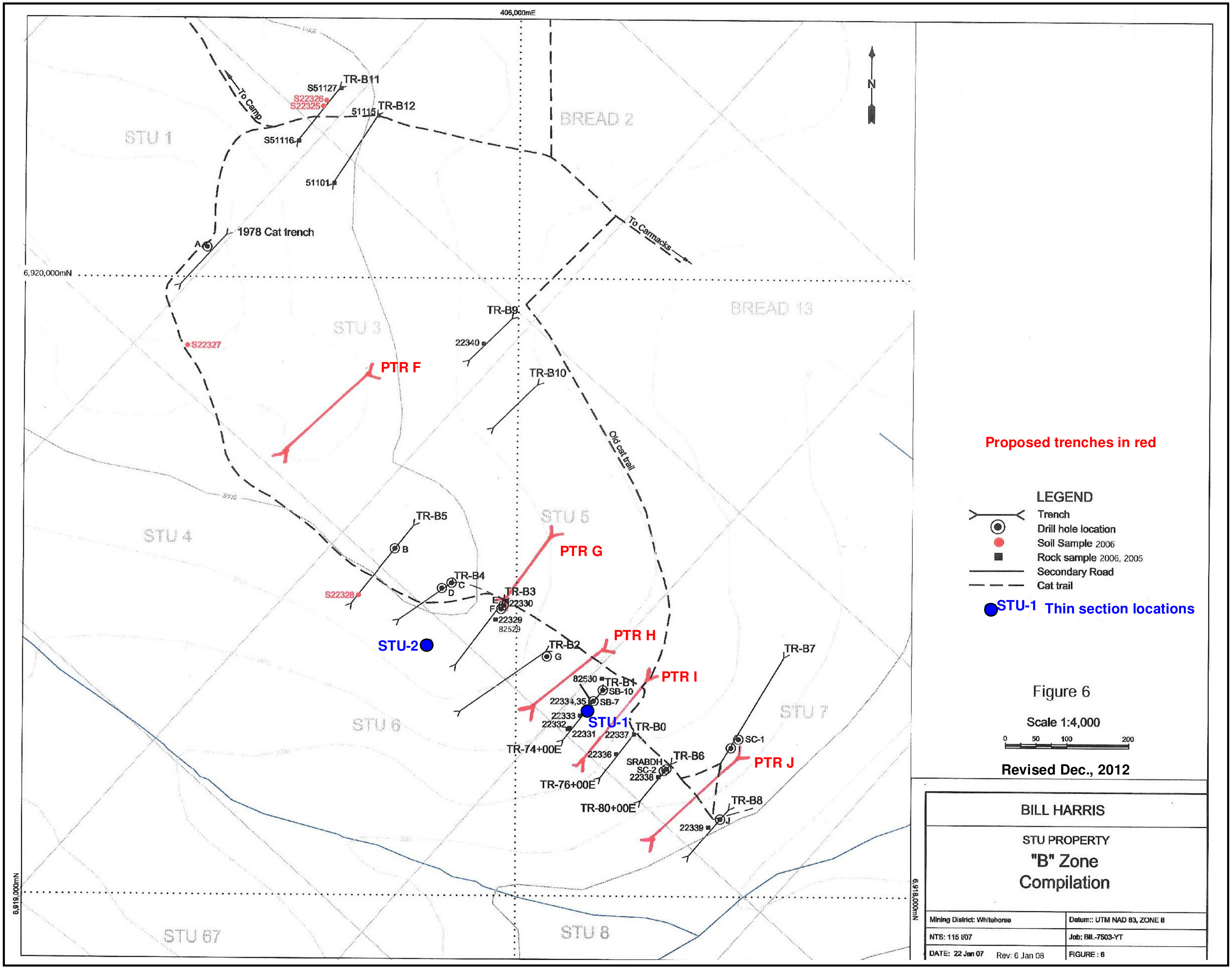


Photo 8
STU 2
(B Zone)



PTR A
PTR B
PTR C
PTR D
PTR E
PTR K
PTR L
SS 11
SS 06
SS 12
STU-1450E
A Zone
C Zone
Camp
Cat Trail overgrown
Cat Trail very overgrown
Secondary Road
TR-9+50E
TR-11+50E
TR-14+50E
TR-20+50E
TR-8+00W
TR-6+00W
TR-4+00W
TR-0+00W
TR-11+50E
TR-12+00E
TR-14+00E
DDH 80-25 casing
DDH 80-23 casing
DDH 80-24
DDH 80-26
DDH 80-27
DDH 80-28
DDH 80-01
DDH 80-3 approx.
Proposed trenches in red
LEGEND
Trench
Drill hole location
Soil Sample
Rock sample 2005-6
Secondary Road
Cat trail
2008 soil sample
2008 rock sample
Polished thin section location
FIGURE 5
Scale 1:4,000
Revised Dec., 2012
BILL HARRIS
STU PROPERTY
"A" & "C" Zone
Compilation
AURORA GEOSCIENCES LTD.


406,000mE
TR-B11
S51127
S22326
S22325
51115
TR-B12
To Camp
STU 1
S51116
51101
BREAD 2
N
1978 Cat trench
A
To Carmacks
6,920,000mN
TR-B9
BREAD 13
STU 3
22340
S22327
PTR F
TR-B10
Old cat trail
Proposed trenches in red
LEGEND
Trench
Drill hole location
Soil Sample 2006
Rock sample 2006, 2005
Secondary Road
Cat trail
STU-1 Thin section locations
STU 4
TR-B5
STU 5
PTR G
TR-B4
TR-B3
22330
22329
82529
S22328
STU-2
PTR H
TR-B2
TR-B1
SB-10
SB-7
PTR I
TR-B7
Figure 6
Scale 1:4,000
STU-1
TR-B0
STU 6
STU 7
TR-74+00E
SC-1
TR-B6
SRABDH
SC-2
PTR J
TR-76+00E
TR-80+00E
TR-B8
22339
Revised Dec., 2012
BILL HARRIS
STU PROPERTY
"B" Zone
Compilation
6,919,000mN
STU 67
STU 8
Mining District: Whitehorse
Datum:: UTM NAD 83, ZONE 8
NTS: 115 I/07
Job: BIL-7503-YT
DATE: 22 Jan 07
Rev: 6 Jan 08
FIGURE : 6

10.0 TRENCHING (Figures 4 to 6)

No trenching was conducted in the current program but a total of 29 trenches were excavated on the STU property between 1978 and 1982 by United Keno Hill Mines Ltd. All of the trenches were located and surveyed by GPS in recent years using UTM coordinates, Nad 83 datum, Zone 8 projection. Trench locations are documented below and shown in Figures 4-6.

Table 2: Trench locations

Name	Zone	Northing	Easting	Elev. (ft)
TR1150W	A	6921920	404296	3080
TR1150Wend	A	6921868	404214	3110
TR800W	A	6921906	404491	3040
TR800Wend	A	6921791	404250	3090
TR8cross	A	6921900	404347	
TR8crossend	A	6921790	404250	
TR600W	A	6921826	404501	3030
TR600Wend	A	6921748	404339	3050
TR400W	A	6921795	404545	3000
TR400Wend	A	6921692	404347	3030
TR000W	A	6921714	404642	2970
TR000Wend	A	6921640	404506	2980
TR1200E	A	6921455	404964	2865
TR1200Eend	A	6921401	404849	2870
TR1400E	A	6921450	405034	2830
TR1400Eend	A	6921340	404845	2820
TR-B5	B	6919598	405826	3050
TR-B5end	B	6919484	405742	2960
TR-B4	B	6919500	405883	3020
TR-B4end	B	6919446	405811	2980
TR-B3	B	6919450	405971	2970
TR-B3end	B	6919360	405897	2930
TR-B2	B	6919380	406035	2885
TR-B2end	B	6919300	405914	2880
TR7400E	B	6919354	406155	2780
TR7400Eend	B	6919260	406076	2780
TR7600E	B	6919260	406192	2705
TR7600Eend	B	6919191	406139	2690
TR8000E	B	6919214	406254	2660
TR8000Eend	B	6919154	406204	2615
TR-B7	B	6919387	406436	2650
TR-B7end	B	6919216	406335	2630
TR-B8	B	6919141	406348	2545
TR-B8end	B	6919067	406283	2490
TR-B9	B	6919935	405991	2830
TR-B9end	B	6919868	405922	2890

Name	Zone	Northing	Easting	Elev. (ft)
TR-B10	B	6919828	406029	2820
TR-B10end	B	6919758	405962	2880
TR-B11	B	6920306	405708	3030
TR-B11end	B	6920221	405640	3070
TR-B12	B	6920262	405770	2990
TR-B12end	B	6920153	405698	3030
1978 cat trench	B	6920047	405515	3030
cat trench end	B	6919980	405449	3050
TR950E	C	6922520	406491	2700
TR950Eend	C	6922496	406446	2685
TR1150E	C	6922481	406520	2670
TR1150Eend	C	6922452	406489	2660
TR1450E	C	6922452	406575	2630
TR1450Eend	C	6922405	406540	2615
TR2050E	C	6922274	406690	2395
TR2050Eend	C	6922251	406651	2390
NWTR-1	NW	6923394	402593	2703
NWTR-1End	NW	6923382	402562	2684
NWTR-1a	NW	6923382	402562	2684
NWTR-1aEnd	NW	6923377	402568	2687
NWTR-2	NW	6923385	402551	2676
NWTR-2End	NW	6923401	402507	2645
NWTR-3	NW	6923445	402515	2623

11.0 DRILLING (Figures 5 and 6)

No drilling was conducted in the current program but a total of approximately 4505m of diamond drilling in 28 holes and 1823m of rotary air blast drilling in 30 holes has been completed on the property by United Keno Hill Mines Ltd in 1980 and 1989, respectively. The BQ size core is stored on site in two racks in poor condition at UTM coordinates 6921220mN, 404960mE, Nad 83 datum, Zone 8 projection, just west of the United Keno Hill camp. One rack, leaning badly, holds approximately 1900m of core from holes DDH 80-17 to DDH 80-28. Only a few boxes appear to be missing, although many boxes are deteriorating. The second rack holds approximately 2600m of core from holes DDH 80-01 to DDH 80-17, but is largely collapsed with many overturned boxes and missing core.

The results of the 1980 diamond drill program are not in the public record except for four holes (DDH 80-17, -25, -27 to -28) filed for assessment. It is reported that the program returned significant results with three of the 1980 drill holes returning intersections exceeding 2.5% Cu, including 3.51% Cu, 2.5 g/t Au and 18.4 g/t Ag across 13.5m in DDH 80-14 *(Deklerk, 2009)*. Results for DDH 80-17, which appears to be a step out from DDH 80-14, are reported as 0.15% Cu, 0.18 oz/t Ag, trace Au over 25.4m *(see Fisher and Watson, 1981)*.

From observations made in 2006 and 2008, it appears that the core in both core racks can be salvaged with some care and the core contains significant mineralized intervals, particularly tenorite bearing sections, which have not been sampled.

Diamond drill hole collars, trenches and significant reference locations were surveyed by GPS in the field in 2006 using UTM coordinates, Nad 83 datum, Zone 8 projection. Nineteen of the twenty-five drill holes from the A Zone and the three drill holes from the C Zone were located. The additional sites from the A Zone are approximated from grid co-ordinates. The data is plotted in Figures 5 and 6 and drill hole collars are documented in Table 3 below.

Table 3: Diamond drill hole locations

Drill	Zone	UTM	NAD83	Elev.	Az.	Dip	Depth
Hole	**No.**	**Northing**	**Easting**	**(m)**	**(º)**	**(º)**	**(m)**
80-01	C	6922365.921	406541.015	785.144	026	-50	104.5
80-02 **	A	6921350	405500	863	220	-50	69.5
80-03 *	A	6921446	405022	863	218	-50	167.6
80-04	A	6921753.16	404474.297	909.176	240	-50	121.9
80-05 *	A	6921782	404525	911	240	-50	156.4
80-06	A	6921846.072	404392.073	912.891	240	-50	93.9
80-07	A	6921878.822	404447.686	912.34	240	-50	111.5
80-08 *	A	6921890	404381	910.502	240	-50	120.1
80-09	A	6921967.651	404356.099	915.353	240	-50	135.3
80-10	A	6921921.256	404267.452	921.995	208	-50	137.8
80-11	A	6921997.104	404410.764	910.648	240	-50	204.8
80-12 *	A	6922030	404350	912	240	-50	160.3
80-13	A	6922003.209	404285.099	918.304	240	-50	152.4
80-14	A	6921939.428	404369.969	914.801	240	-50	154.5
80-15	A	6921921.048	404432.934	910.502	240	-50	190.8
80-16	A	6921965.953	404418.051	910.27	240	-50	232.6
80-17	A	6921965.953	404418.051	910.27	242	-72	426.1
80-18	A	6922091.469	404329.235	911.475	240	-48	183.5
80-19	A	6922091.469	404329.235	911.475	240	-57	92.7
80-20	A	6922059.415	404266.536	917.87	-	-89	122.5
80-21	A	6922028.637	404212.854	924.374	-	-90	91.4
80-22 *	A	6922122	404404	912	240	-50	210?
80-23	A	6922208.599	404290.905	911.298	240?	-50	185.9
80-24	A	6922172.78	404223.412	918.483	240?	-50	153.0
80-25	A	6922409.49	404101.31	921.875	220	-50	161.8
80-26	A	6921515.716	404662.036	884.614	240	-50	195.7
80-27	C	6922513.116	406093.277	792.134	030	-50	187.8
80-28	C	6922363.293	406338.785	793.875	028	-50	183.5
TOTAL	**28 drill holes**						**4507.8**

* approximate location, site not located   **location very approximate

The rotary drill sites from 1989, primarily drilled in the B Zone with no rotary holes in the A and C Zones, were identified by the presence of a mound of drill cuttings and a metal tag on the ground. Only a few of the tags could be read. The approximate hole collars were recorded by GPS in the field in 2006 using UTM coordinates, Nad 83 datum, Zone 8 projection in 2006 and are shown below in Table 4. The best hole from the rotary drill program was hole SB-6 from Trench 74+00E in the B Zone which returned 0.71% Cu over 5 feet.

Table 4: Rotary drill hole locations

Drill	UTM	NAD83
Hole	Northing	Easting
A	6920049	405494
B	6919561	405803
C	6919505	405895
D	6919507	405871
E	6919469	405980
F	6919463	405976
G	6919395	406050
H	6919386	406051
I	6919205	406334
J	6919125	406246
SB-7	6919314	406127
SB-10	6919332	406142
SC-1	6919202	406363
SC-2	6919251	406242

12.0 CONCLUSIONS AND RECOMMENDATIONS

There is excellent exploration potential on the STU property to host copper-gold mineralization similar to that of the Minto and Carmacks Copper deposits, all located within the Carmacks Copper - Gold Belt. The host rocks, structures, mineralization and alteration at STU are similar to the Minto and Carmacks Copper deposits, which have been described as metamorphosed porphyry copper-gold deposits.

Exploration on the STU property has been hampered by lack of exposure, thick overburden cover, variable but generally poor soil profiles, local cover by magnetic Carmacks basaltic rocks and unavailability of results from previous programs.

Mineralization was found to have a direct relationship with the presence of secondary biotite, the presence of magnetite and hematite, and the development of a foliated to gneissic texture, which trends 130º (commonly with 70ºNE dips). Secondary copper minerals such as malachite and azurite are relatively uncommon and sulphide minerals predominate within the mineralized zones. Malachite is more abundant in areas of more recent disturbance. Possible gold was detected from the B and C Zones in the 2008 petrographic study.

The A Zone appears to be the main zone of interest on the property with results of >0.1% Cu to 0.67% Cu and a maximum of 470 ppb Au obtained in 2005 to 2008 from samples over a 400m strike extent and up to 95m width. Malachite has been noted an additional 400m to the southeast. This probably corresponds to the zone 914m long and up to 91m wide that was delineated by United Keno Hill Mines Limited in 1977-79. The zone does not appear to have been completely delineated. It is known that the 1980 program returned significant results with three of the 1980 diamond drill holes returning intersections exceeding 2.5% Cu, including 3.51% Cu, 2.5 g/t Au and 18.4 g/t Ag across 13.5m in DDH 80-14. Results for DDH 80-17, which appears to be a step out from DDH 80-14, are reported as 0.15% Cu, 0.18 oz/t Ag, trace Au over 25.4m. The results from the 1980 diamond drill program are critical in the evaluation of this area.

Mineralization in the B Zone is often high grade over narrow widths suggesting a distal signature. In 2006 high copper-gold grades in the B Zone were found to be due to the presence of fine grained chalcocite and chalcopyrite replacing biotite with maximum values of 2.86% Cu and 2.56 g/t Au. Limonite, malachite, chalcocite, and silicification occur along 130º/70ºNE fractures hosted by biotite rich granodiorite. The best hole from the rotary drill program in 1989 was hole SB-6 from Trench 74+00E (B1) in the B Zone which returned 0.71% Cu over 5 feet. Potential exists at depth in the area between Trenches B3 to B6, which returned the best copper-gold-silver results in 2006 to 2008 (maximum 2.86% Cu and 2.56 g/t Au), along strike to the northwest (northeast of the trenches to the north) and to the southeast, where little work has been completed.

Similar mineralization to the A and B Zones is exposed in the C Zone, despite limited exposure. Mineralization was traced over a 110m strike and 25-30m width in 2005 to 2008 with significant maximum results of 1.59% Cu and 3.7 g/t Au associated with 130º/NE trending mineralized fractures. Elevated copper in soils from 2010 suggests that some mineralization may extend 140m further north past the east end of Trench 9+50E. The only foliation measured in the C Zone was found to dip 60ºNE with all three drill holes within the zone located to the southwest of the mineralized horizon. The closest drill hole is DDH 80-1, located 45m southwest of the zone, so would not adequately test the zone unless it steepened. Results from DDH 80-1 would be beneficial in the evaluation of this zone.

Minor elevated copper values in soil were obtained from Trenches 2 and 3 in the NW Zone, and from the northern strike extension of the C Zone. Minor foliated granodiorite was encountered approximately 1 km northwest, 1 km southwest, and 2 km west of the B Zone.

Overall, it would appear that a magnetic survey over the property should pick up the alteration zones associated with mineralization as a magnetic low, with a moderate magnetic response over mineralization.

If results from the 1980 diamond drill program cannot be obtained from Alexco Resources Limited, the core racks on the STU property should be labelled, unstacked and systematically sampled. Magnetic susceptibility measurements over the entire core can be collected at this time. Even if assay results are obtained the existing core should be salvaged and magnetic susceptibility readings can be collected and additional unsplit mineralized intervals assayed. The collar locations are known and results can then be correlated and interpreted.

Systematic MMI soil and IP geophysics surveys may be useful in tracing mineralization along strike within the three zones, particularly where the drill results are inconclusive due to poor condition of the core, and if the zone is shown to remain open or the drill hole did not adequately test the target. The surveys should be tested over several trenches with mineralization to determine their usefulness and if positive completed along strike of the zones.

Trenching is recommended to trace mineralization to the north and south of existing trenches in the A Zone. The southern trenches would be situated further west of Trenches 12+00E and 14+00E. In the B Zone infill trenching is recommended between Trenches B3 to B6, which returned the best copper-gold-silver results in 2006 to 2008 (maximum 2.86% Cu and 2.56 g/t Au). Trench B3 should be extended to the northeast. Additional trenches are recommended along strike. Trenching is also recommended north of Trench 11+50E and southeast of Trench 14+50E in the C Zone. Proposed trench locations are shown in Figures 5 and 6 and tabulated below.

Table 5: Proposed trench locations

Name	Zone	Northing	Easting	Az.	Length
		mN	mE	(°)	(m)
PTR-A	A	6922122	404468	240	345
PTR-Aend	A	6922122	404160		
PTR-B	A	6922037	404533	245	255
PTR-Bend	A	6921936	404308		
PTR-C	A	6921680	404698	240	215
PTR-Cend	A	6921577	404509		
PTR-D	A	6921504	404798	240	140
PTR-Dend	A	6921439	404672		
PTR-E	A	6921333	404927	235	150
PTR-Eend	A	6921255	404801		
PTR-F	B	6919832	405556	227	175
PTR-Fend	B	6919714	405624		
PTR-G	B	6919543	406046	040	100
PTR-Gend	B	6919304	406020		
PTR-H	B	6919304	406020	045	180
PTR-Hend	B	6919425	406153		
PTR-I	B	6919353	406221	220	170
PTR-Iend	B	6919228	406107		
PTR-J	B	6919227	406360	225	180
PTR-Jend	B	6919102	406230		
PTR-K	C	6922523	406499	045	100
PTR-Kend	C	6922593	406573		
PTR-L	C	6922409	406723	230	215
PTR-Lend	C	6922274	406553		
TOTAL	**12 trenches**				**2,225**

Rotary air blast drilling may be useful in tracing mineralization along strike in previously untested areas in the A and B Zones. Diamond drilling may be necessary to trace the mineralization if it lies at depth. In the C Zone rotary air blast drilling may be useful in tracing mineralization further north of Trench 9+50E along strike under basaltic cover rocks and overburden to the northwest and overburden further to the southeast in the Trench 20+50E area.

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Appendix II: Statement of Claims

Grant Number	Claim Name	Claim No.	Claim Owner	Record Date	Expiry Date
YC37770	STU	1	Bill Harris - 100%	13/12/2004	13/12/2013
YC37771	STU	2	Bill Harris - 100%	13/12/2004	13/12/2013
YC37772	STU	3	Bill Harris - 100%	13/12/2004	13/12/2013
YC37773	STU	4	Bill Harris - 100%	13/12/2004	13/12/2013
YC37774	STU	5	Bill Harris - 100%	13/12/2004	13/12/2013
YC37775	STU	6	Bill Harris - 100%	13/12/2004	13/12/2013
YC37776	STU	7	Bill Harris - 100%	13/12/2004	13/12/2013
YC37777	STU	8	Bill Harris - 100%	13/12/2004	13/12/2013
YC37778	STU	9	Bill Harris - 100%	13/12/2004	13/12/2013
YC37779	STU	10	Bill Harris - 100%	13/12/2004	13/12/2013
YC40249	STU	11	Bill Harris - 100%	19/09/2005	19/09/2013
YC40250	STU	12	Bill Harris - 100%	19/09/2005	19/09/2013
YC40251	STU	13	Bill Harris - 100%	19/09/2005	19/09/2013
YC40252	STU	14	Bill Harris - 100%	19/09/2005	19/09/2013
YC40253	STU	15	Bill Harris - 100%	19/09/2005	19/09/2013
YC40254	STU	16	Bill Harris - 100%	19/09/2005	19/09/2013
YC40255	STU	17	Bill Harris - 100%	19/09/2005	19/09/2013
YC40256	STU	18	Bill Harris - 100%	19/09/2005	19/09/2013
YC40257	STU	19	Bill Harris - 100%	19/09/2005	19/09/2013
YC40258	STU	20	Bill Harris - 100%	19/09/2005	19/09/2013
YC37788	STU	21	Bill Harris - 100%	21/12/2004	21/06/2014
YC37789	STU	22	Bill Harris - 100%	21/12/2004	21/06/2014
YC37790	STU	23	Bill Harris - 100%	21/12/2004	21/06/2014
YC37791	STU	24	Bill Harris - 100%	21/12/2004	21/06/2014
YC37792	STU	25	Bill Harris - 100%	21/12/2004	21/06/2014
YC37793	STU	26	Bill Harris - 100%	21/12/2004	21/06/2014
YC37794	STU	27	Bill Harris - 100%	21/12/2004	21/06/2014
YC37795	STU	28	Bill Harris - 100%	21/12/2004	21/06/2014
YC40259	STU	29	Bill Harris - 100%	19/09/2005	19/09/2013
YC40260	STU	30	Bill Harris - 100%	19/09/2005	19/09/2013
YC37780	STU	31	Bill Harris - 100%	13/12/2004	13/12/2013
YC37781	STU	32	Bill Harris - 100%	13/12/2004	13/12/2013
YC37782	STU	33	Bill Harris - 100%	13/12/2004	13/12/2013
YC37783	STU	34	Bill Harris - 100%	13/12/2004	13/12/2013
YC37784	STU	35	Bill Harris - 100%	13/12/2004	13/12/2013
YC37785	STU	36	Bill Harris - 100%	13/12/2004	13/12/2013
YC37786	STU	37	Bill Harris - 100%	13/12/2004	13/12/2013
YC37787	STU	38	Bill Harris - 100%	13/12/2004	13/12/2013
YC40261	STU	39	Bill Harris - 100%	19/09/2005	19/09/2013
YC40262	STU	40	Bill Harris - 100%	19/09/2005	19/09/2013
YC40263	STU	41	Bill Harris - 100%	19/09/2005	19/09/2013
YC40264	STU	42	Bill Harris - 100%	19/09/2005	19/09/2013
YC40265	STU	43	Bill Harris - 100%	19/09/2005	19/09/2013
YC40266	STU	44	Bill Harris - 100%	19/09/2005	19/09/2013

Grant Number	Claim Name	Claim No.	Claim Owner	Record Date	Expiry Date
YC40267	STU	45	Bill Harris - 100%	19/09/2005	19/09/2013
YC40268	STU	46	Bill Harris - 100%	19/09/2005	19/09/2013
YC40269	STU	47	Bill Harris - 100%	19/09/2005	19/09/2013
YC40270	STU	48	Bill Harris - 100%	19/09/2005	19/09/2013
YC40271	STU	49	Bill Harris - 100%	19/09/2005	19/09/2013
YC40272	STU	50	Bill Harris - 100%	19/09/2005	19/09/2013
YC40273	STU	51	Bill Harris - 100%	19/09/2005	19/09/2013
YC40274	STU	52	Bill Harris - 100%	19/09/2005	19/09/2013
YC40275	STU	53	Bill Harris - 100%	19/09/2005	19/09/2013
YC40276	STU	54	Bill Harris - 100%	19/09/2005	19/09/2013
YC40201	STU	55	Bill Harris - 100%	29/08/2005	29/11/2013
YC40202	STU	56	Bill Harris - 100%	29/08/2005	29/11/2013
YC40203	STU	57	Bill Harris - 100%	29/08/2005	29/11/2013
YC40204	STU	58	Bill Harris - 100%	29/08/2005	29/11/2013
YC40205	STU	59	Bill Harris - 100%	29/08/2005	29/11/2013
YC40206	STU	60	Bill Harris - 100%	29/08/2005	29/11/2013
YC40207	STU	61	Bill Harris - 100%	29/08/2005	29/11/2013
YC40208	STU	62	Bill Harris - 100%	29/08/2005	29/11/2013
YC40209	STU	63	Bill Harris - 100%	29/08/2005	29/11/2013
YC40210	STU	64	Bill Harris - 100%	29/08/2005	29/11/2013
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YC40212	STU	66	Bill Harris - 100%	29/08/2005	29/11/2013
YC40213	STU	67	Bill Harris - 100%	29/08/2005	29/11/2013
YC40214	STU	68	Bill Harris - 100%	29/08/2005	29/11/2013
YC40215	STU	69	Bill Harris - 100%	29/08/2005	29/11/2013
YC40216	STU	70	Bill Harris - 100%	29/08/2005	29/11/2013
YC40217	STU	71	Bill Harris - 100%	29/08/2005	29/11/2013
YC40218	STU	72	Bill Harris - 100%	29/08/2005	29/11/2013
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YC65257	STU	74	Bill Harris - 100%	09/07/2007	09/07/2013
YC65258	STU	75	Bill Harris - 100%	09/07/2007	09/07/2013
YC65259	STU	76	Bill Harris - 100%	09/07/2007	09/07/2013
YC65260	STU	77	Bill Harris - 100%	09/07/2007	09/07/2013
YC65261	STU	78	Bill Harris - 100%	09/07/2007	09/07/2013
YC65262	STU	79	Bill Harris - 100%	09/07/2007	09/07/2013
YC65263	STU	80	Bill Harris - 100%	09/07/2007	09/07/2013
YC65264	STU	81	Bill Harris - 100%	09/07/2007	09/07/2013
YC65265	STU	82	Bill Harris - 100%	09/07/2007	09/07/2013
YC65266	STU	83	Bill Harris - 100%	09/07/2007	09/07/2013
YC65267	STU	84	Bill Harris - 100%	09/07/2007	09/07/2013
YC65268	STU	85	Bill Harris - 100%	09/07/2007	09/07/2013
YC65269	STU	86	Bill Harris - 100%	09/07/2007	09/07/2013
YC65270	STU	87	Bill Harris - 100%	09/07/2007	09/07/2013
YC65271	STU	88	Bill Harris - 100%	09/07/2007	09/07/2013
YC65272	STU	89	Bill Harris - 100%	09/07/2007	09/07/2013

Grant Number	Claim Name	Claim No.	Claim Owner	Record Date	Expiry Date
YC65273	STU	90	Bill Harris - 100%	09/07/2007	09/07/2013
YC65274	STU	91	Bill Harris - 100%	09/07/2007	09/07/2013
YC65275	STU	92	Bill Harris - 100%	09/07/2007	09/07/2013
YC65276	STU	93	Bill Harris - 100%	09/07/2007	09/07/2013
YC65277	STU	94	Bill Harris - 100%	09/07/2007	09/07/2013
YC65278	STU	95	Bill Harris - 100%	09/07/2007	09/07/2013
YC65279	STU	96	Bill Harris - 100%	09/07/2007	09/07/2013
YC65280	STU	97	Bill Harris - 100%	09/07/2007	09/07/2013
YC65281	STU	98	Bill Harris - 100%	09/07/2007	09/07/2013
YC65282	STU	99	Bill Harris - 100%	09/07/2007	09/07/2013
YC65283	STU	100	Bill Harris - 100%	09/07/2007	09/07/2013
YC65284	STU	101	Bill Harris - 100%	09/07/2007	09/07/2013
YC65285	STU	102	Bill Harris - 100%	09/07/2007	09/07/2013
YC65286	STU	103	Bill Harris - 100%	09/07/2007	09/07/2013
YC65287	STU	104	Bill Harris - 100%	09/07/2007	09/07/2013
YC65288	STU	105	Bill Harris - 100%	09/07/2007	09/07/2013
YC65289	STU	106	Bill Harris - 100%	09/07/2007	09/07/2013
YC65290	STU	107	Bill Harris - 100%	09/07/2007	09/07/2013
YC65291	STU	108	Bill Harris - 100%	09/07/2007	09/07/2013
YC65292	STU	109	Bill Harris - 100%	09/07/2007	09/07/2013
YC65293	STU	110	Bill Harris - 100%	09/07/2007	09/07/2013
YC65294	STU	111	Bill Harris - 100%	09/07/2007	09/07/2013
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YC65300	STU	117	Bill Harris - 100%	09/07/2007	09/07/2013
YC65301	STU	118	Bill Harris - 100%	09/07/2007	09/07/2013
YC65302	STU	119	Bill Harris - 100%	09/07/2007	09/07/2013
YC65303	STU	120	Bill Harris - 100%	09/07/2007	09/07/2013
YC65304	STU	121	Bill Harris - 100%	09/07/2007	09/07/2013
YC65305	STU	122	Bill Harris - 100%	09/07/2007	09/07/2013
YC65306	STU	123	Bill Harris - 100%	09/07/2007	09/07/2013
YC65307	STU	124	Bill Harris - 100%	09/07/2007	09/07/2013
YC65308	STU	125	Bill Harris - 100%	09/07/2007	09/07/2013
YC65309	STU	126	Bill Harris - 100%	09/07/2007	09/07/2013
YC65310	STU	127	Bill Harris - 100%	09/07/2007	09/07/2013
YC65311	STU	128	Bill Harris - 100%	09/07/2007	09/07/2013
YC65312	STU	129	Bill Harris - 100%	09/07/2007	09/07/2013
YC65313	STU	130	Bill Harris - 100%	09/07/2007	09/07/2013
YC65314	STU	131	Bill Harris - 100%	09/07/2007	09/07/2013
YC65315	STU	132	Bill Harris - 100%	09/07/2007	09/07/2013
TOTAL	**132**	**Claims**			

APPENDIX III: Sample Descriptions and Magnetic Susceptibility

STU PROJECT, Yukon Territory 2012 SAMPLE DESCRIPTIONS AND MAGNETIC SUSCEPTIBILITY									
SAMPLE		NAD 83	ZONE 8	ELEV.		Magnetic Susceptibility (x10-3 SI units)			
No.	LOCATION	EASTING	NORTHING	(ft)	DESCRIPTION	1	2	3	Avg.
STU-1 overall	B Zone TR B1 TR7400E	406118	6919305	2702	malachite stained, weakly foliated, variably weak to strongly magnetic, dark coloured, medium grained hornblende-biotite granodiorite with clots of magnetite, bornite, chalcocite and disseminated chalcopyrite, irregularly cut by unfoliated, less malachite stained, light coloured, non to weakly magnetic fine grained aplite with some remnant foliated dark phase; from centre of trench B6 (7400E)				
STU-1B light part	B Zone TR B1 TR7400E	406118	6919305	2702	unfoliated light coloured, non to weakly magnetic fine grained aplite with some remnant foliated dark phase; from centre of trench B1 (7400E); although not tested, the aplite shows one 1.2 cm red-brown crystal (probably K-feldspar) that has a biotite + malachite rim, some bornite.	1.9	2.6	2.2	**2.23**
STU-1B light part with magnetite	B Zone TR B1 TR7400E	406118	6919305	2702	reading taken over unfoliated light coloured, more magnetic fine grained aplite phase	14.5	14.0	12.0	**13.5**
STU-1A dark foliated part	B Zone TR B1 TR7400E	406118	6919305	2702	malachite stained, weakly foliated, variably weak to strongly magnetic, dark coloured, medium grained hornblende-biotite granodiorite with clots of magnetite, bornite, chalcocite and disseminated chalcopyrite up to 2 cm	7.3	6.0	6.16	**6.49**
STU-1A mineralized	B Zone TR B1 TR7400E	406118	6919305	2702	reading taken over clots of magnetite, bornite, chalcocite with disseminated chalcopyrite	25.6	26.6	18.7	**23.6**
STU-2	B Zone between TRB3 & B4	405857	6919407	2950	coarse grained unfoliated,Kspar megacrystic hornblende-biotite granodiorite with K-spar megacrsts to 1.5 cm in size, moderately magnetic to locally strong, especially around mafic phenoscrysts, minor (<5%) rusty spots; from outcrop between TRB3 & B4, fairly fresh	6.34	13.5	1.18	**7.01**
TR1450E	C Zone	406563	6922434	2591	rusty weathering, strongly malachite stained, moderately foliated, moderately magnetic, medium grained hornblende-biotite granodiorite, with minor bornite on fractures, minor clay alteration; from centre of trench 1450E, 1 cm rusty weathered rind	3.4	8.88	8.4	**6.89**

STU Project	2006				
Diamond Drill Core Samples for Magnetic Susceptibility Measurement					
Hole No.	**Foot-age**	**Sample**	**Response to Pencil Magnet**	**Description**	**Magnetic Sus.**
80-17	643	whole core	locally strong over mafic mineral clusters	Dark grey, fresh, weakly foliated, porphyritic granodiorite (gdi). Large white feldspar phenos to 2 cm, but usually 0.5 to 1 cm, 5% Qz, 10% mafics (biotite and hornblende), partial alteration to chlorite and trace epidote. Foliation @ 65˚ to CA; a few healed fractures @ 20˚ to CA	2.86
80-17	677.5	whole core	locally strong over mafic mineral clusters	Pale grey, fresh, weakly foliated, porphyritic granodiorite (gdi); very similar to 80-17-643. Occasional large white to very pale pink feldspar phenos to 5 cm with mafics clustered around margins. Abundant white feldspar grains (0.3 to 0.7 cm), 3 to 5 % Qz, approx. 10% mafics (bi and hbl), bi partially alt to chlor. Weak foliation @ 60˚ to CA. Fracture surfaces @ 50˚ and 55˚ to CA (conjugate set) and 15˚ to CA. Very minor hem stain on fracture faces.	2.13
80-17	749.1	½ core	very weak and local response	Medium grey, well-foliated, porphyritic gdi. Pale feldspar phenos to 1.5 cm stretched parallel to foliation @ 50˚ to CA. 3% Qz, 15% mafic minerals (bi and hbl); biotite largely altered to chlorite. Trace diss. py as tiny cubes. Thin (0.5 mm) hem veinlet @ 40˚ to CA; fracture surface parallel to CA.	0.5
80-17	794	½ core	no response	Bright pink and green, well-foliated, almost gneissic gdi-quartz monzonite, becoming compositionally banded. Foliation @ 25˚ to CA. 5% Qz, abundant pink feldspar, <10% mafics (bi and hbl), mostly alt to chlorite with minor epidote and trace sericite (?). Approx. 5% brown garnet.	0.07
80-17	807	whole core	generally strong response	Medium grey, fine grained, largely non- porphyritic gdi. Very weak foliation parallel to CA. Few small white feldspar phenos (to 3 mm), 5% Qz, 80% feldspar (plag and kspar?), 15% mafics (mostly biotite with weak alt to chlorite). Calcite and trace gypsum (?) on fracture surfaces @ 60˚ to CA; feldspars turn pink along selvedges of these fractures.	4.97
80-18	276	½ core	no response	No magnetic susceptibility determination: sample badly fractured and broken. Very pale, clay-altered gdi-qz mon., originally a well-foliated, weakly porphyritic qz-fsp-bi-hbl rock. Foliation near parallel to CA. Strong alteration to sericite, clays, calcite, minor chlorite.	
80-18	305	½ core	no response	Similar to 80-18-276 but more competent (feldspars less altered) . Pale, strongly altered, foliated and fractured (healed fractures) @ 30-35˚ to CA. Formerly med-grained, weakly porphyritic gdi-qz mon. with qz-fsp-bi-hbl, now altered to sericite, clays, trace hem.	0.15
80-19	100.5	whole core	no response except over a few tiny black grains	Medium brown strongly altered porphyritic intrusive rock, probably qz mon. Fractured and starting to brecciate. Abundant limonite in matrix and veinlets (@ 40˚ to CA. Remnants of strongly altered feldspar (kspar ?) phenos (to 2.5 cm) and small (0.3 to 0.5 cm) pale grey qz phenos (15-20%). Abundant small plag phenos in the limonitic matrix with a few remnants of altered biotite.	0.08
80-19	131	whole core	no response	Pale pink-brown, fractured, altered qz mon. (less altered than 80-19-100.5). Very few pale k-feldspar (?) phenos to 2 cm, 10-15% small qz phenos (to 0.5 cm) in pink feldpsathic matrix (plag + kspar?), low mafic content (3-5%), mostly altered to chlor and hem. Many fine limonitic fractures in several orientations. Thin (< 1mm) dark hem veinlet @ 40˚ to CA. Abundant fine lim and hem in matrix. Thin (1mm) white feldspar veinlet @ 60˚ to CA. Trace matrix and veinlet calcite.	0.09
80-20	378	whole core	no response except over few small mafic clusters	Medium grey, porphyritic to medium grained gdi. Folaition weak to absent. Occasional large pale pink feldspar phenos (kspar ?) to 2 cm. Abundant plag phenos (0.3 to 0.6 cm) - quite fresh. Qz < 3%, 15% mafics, mostly biotite altering to chlor and hem.	1.21
80-22	118	whole core	local response over patches of mafic minerals	Similar to 80-20-378. Pale grey-brown, medium grained weakly porphyritic gdi. Poor foliation approx. 65˚ to CA. A few pale pink (k-spar?) phenos approx. 0.8 to 1.5 cm. Abundant smaller plag phenos and 5 to 10% qz. 10-15% mafics with bi >> hbl, partially altered to chlorite and limonite .	0.13
80-22	566	½ core - irregular	no response	Dark grey, well-foliated to gneissic gdi, developing compositional banding @ 35˚ to CA. 15-20% mafics with bi > hbl, and 5-10% qz. The rest is white feldspar in patches and bands; original phenos stretched along foliation. Tiny specks of malachite, a few very small grains of cpy and one grain of bornite (?)	0.12

STU Project			2006		
Diamond Drill Core Samples for Magnetic Susceptibility Measurement					
Hole No.	**Foot-age**	**Sample**	**Response to Pencil Magnet**	**Description**	
80-23	195.5	whole core	strong response over patches of mafic minerals	Similar to 80-20-378 and 80-22-118. Grey to grey-brown, medium grained, locally porphyritic gdi with weak foliation @ 40˚ to CA. Occasional large feldspar phenos to 2.5 cm. 12-15% mafic minerals (bi >> hbl), strongly chloritised. 3-5% qz, abundant white feldspar grains as small phenos and matrix. Trace hem staining. Fractures @ 50˚ to CA.	3.83
80-23	511	½ core - irregular	very weak and local response	Dark grey very fine grained diorite (?). Weak foliation sub-parallel to CA shown largely by bands of different grain size. One small patch of medium grained, equigranular gdi (lense or band or xenolith?). Main rock is largely fine grained plag and mafics (hbl > bi?), with minor qz (<1%). Fractures at 55˚ and 60˚ to CA (conjugate set); 1-2 mm calcite veinlet @ 15˚ to CA with minor epidote.	0.45
80-23	535	½ core - irregular	locally strong over mafic mineral clusters	Similar to 80-20-378/80-22-118/80-23-195.5. Grey-brown, medium grained to weakly porphyritic, foliated gdi . White feldspar phenos (0.3 to 0.8 cm) stretched along foliation @ 30˚ to CA. 10-15% mafic minerals (bi = hbl) with some bi altering to chlorite. Qz < 5%. Thin veinlets of pink feldspar (1-2 mm). Dark red hem staining on fracture faces parallel to CA and 50˚ to CA with a few specks of malachite.	2.83
80-24	375	½ core - irregular	strong response over patches of mafic minerals	Grey, medium to coarser grained gneissic gdi. Strong foliation, starting to develop compositional banding. Originally porphyritic (white feldspar grains 0.5 to 1.5 cm, now stretched along foliation @ 45˚ to CA). Qz < 3%. 10% mafic minerals (bi = hbl); biotite partly chloritised. Occasional specks of malachite on fractures parallel to foliation and parallel to CA..	10.44
80-24	380	½ core - irregular	very weak and local response	Pale grey, strongly foliated gneissic gdi. White and pale pink feldspar phenos now stretched along foliation @ 50˚ to CA. Compositional banding becoming well-developed. 3-5% mafic minerals, mostly bi with weak chlor alteration. 3-5% qz. Minor malachite staining on fractures @ 10˚ to CA and a few tiny specks apparently along foliation planes, close to biotite grains.	0.11
80-24	382	½ core - irregular	no response	Medium grey and pink strongly foliated gneissic gdi. White and pink feldspar phenos stretched along foliation @ 75˚ to CA. Compositional banding developing. Qz 3-5%, mafics 3-5% (mostly bi, minor chlor alt.). A few tiny grains of cpy and py.	0.04
80-25	138.5	whole core	locally weak over patches of mafic minerals	Bright pink poorly foliated qz monzonite. Texture is partly brecciated. Large patches of pink feldspathic material (kspar and qz ?) separated by areas of similar finer grained material with biotite (largely alt to chlor); hem staining in matrix and along fractures . Trace epidote and calcite in fractures and areas of altered matrix.	0.34
80-26	282	whole core irregular	locally strong over areas of mafic minerals	Distinctive med grained, weakly foliated, mafic gdi. Foliation @ 45˚ to CA. One finer grained mafic band @ 25˚ to CA. Rock consists of white feldspar and 20% very dark, fresh, mafics, mostly hbl, with occasional hbl phenos to 1.5 cm. Minor bi is fresh. Qz less than 2%. Fractures @25˚ to CA.	0.16
80-27	116	whole core	moderately responsive	Dark grey-brown, fine grained, porphyritic dyke rock; unfoliated, probably Carmacks Group. Small phenos of plag, bi, hbl in very fine grained pale brown matrix. Fractures @ 50˚ to CA.	3.16
80-27	586	whole core	moderate over volc. clasts; locally weak over mafics in gdio	Medium grey, brecciated gdi with large dark angular fine grained clasts (volc ?) to 2 cm. Gdi also appears partly as clasts and partly as finer grained matrix. Most gdi clasts are pale grey, similar to many other samples in this suite; mostly pale feldspar, with 5-10% mafics (bi and hbl, partly chloritised) and 2 - 3% qz. Other areas are gdi-qz mon with abundant pink feldspar, qz and minor mafics, mostly biotite.	0.29
80-28	567	whole core irregular	generally strong response	Porphyritic gdi-qz mon with weak foliation @ 50˚ to CA. Occasional large pale pink feldspar phenos (to 2.5 cm) with smaller white feldspar grains, 10-15% mafics (bi > hbl) with weak chlorite alteration of biotite, minor epidote, 3-5% qz.	7.68
80-28	593	whole core	generally strong response	Similar to 80-28-567. Pink feldspar phenos are smaller (most are 1 cm) and paler. Abundant smaller white feldspar grains, fracture.	5.7

APPENDIX IV
Statement of Expenditures

Wages:	Jean Pautler	1 day @ 850.00/day	$850.00		
	Aquiles Gonzalez	1 day @ 500.00/day	500.00		
	April 20, 2012	**Total:**			**$1,350.00**
Petrography:	4 sections and report @ 300.00 ea.				**1,200.00**
Equipment Rental:	Truck:	2 days @ $100/day		200.00	
	Satellite Phone:	1 day @ $30/day		30.00	
		Total:			**230.00**
Mob/Demob:	Whitehorse to Carcross & return				**91.50**
Helicopter:	Trans North Helicopters April 20, 2012 50% of Whitehorse to STU & return (split with Antofagasta Mining)				**2,400.00**
Magnetic Susceptibility:	6 specimens including report				**500.00**
Field Supplies:	(flagging tape, batteries, sample bags) 2 man-days @ 15./md				**30.00**
Copying, Printing:					**50.00**
Report & Drafting:					**1,350.00**
GRAND TOTAL:					**$7,201.50**

APPENDIX V
STATEMENT OF QUALIFICATION

I, Jean Marie Pautler, do hereby certify that:

1) I, Jean Marie Pautler of 103-108 Elliott Street, Whitehorse, Yukon Territory am self-employed as a consultant geologist and authored this report.

2) I am a graduate of Laurentian University, Sudbury, Ontario with an Honours B.Sc. degree in geology (May, 1980).

3) I am a registered member of the Association of Professional Engineers and Geoscientists of British Columbia, Registration Number 19804.

4) I am a geologist with more than thirty years of experience in the Canadian Cordillera.

5) I was involved in the 2012 program on the STU property on April 20, 2012.

6) I have no direct or indirect interest in the STU property, which is the subject of this report.

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APPENDIX VI: Petrographic Report

PETROGRAPHIC SURVEY OF THE STU CU-AU PROJECT

Dr. Timothy Liverton, PhD

Watson Lake, Yukon Territory

December, 2012

Scale bars are 1 mm, unless otherwise specified.

NUMBERING USED FOR PHOTOMICROGRAPHS

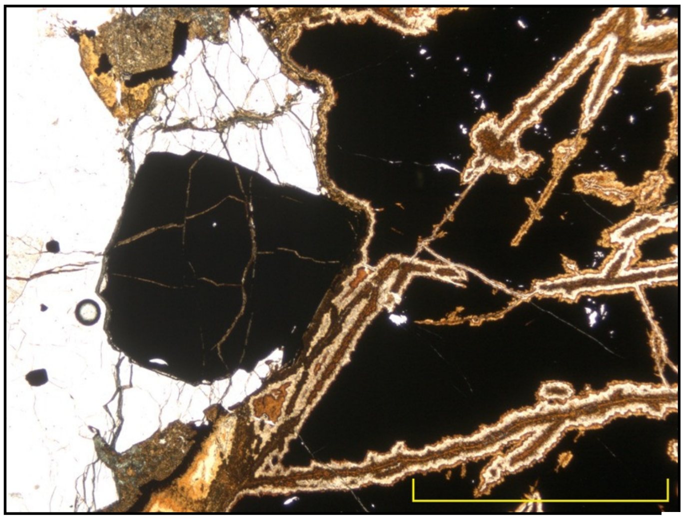
- after the sample number the figures -5, 0, -10 etc. refer to the objective lens used
- 'pp' denotes plain polarized transmitted light
- 'xp' denotes transmitted light with crossed polarizers
- 'oil' indicates that the oil immersion objective has been used (10, 20 or 100x)
- 'ppin' indicates plain polarized incident (i.e., reflected) light in air; 'oil' indicates that the oil immersion objective has been used (10, 20 or 100x)
- 'xpin' indicates crossed polarizers with incident light in air. Often the analyser is set at 85° or 80° to emphasize anisotropy
- Further numbers are used if several photographs are taken of the same specimen under the same conditions.

Granite classification:

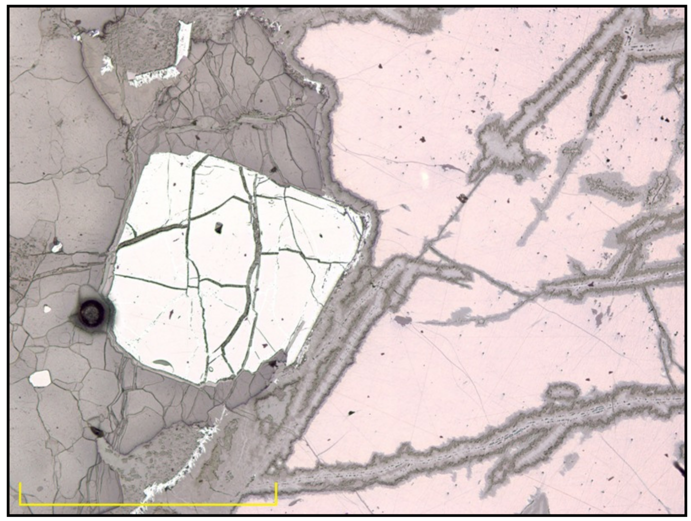
The terms 'syenogranite', 'monzogranite' or 'granodiorite' are used according to a visual estimate of feldspar proportions. With just one thin section it is futile to attempt anything more quantitative: at least six orthogonal sections would be required from each rock for point counting and even then the result would be contingent on sample collection.

STU-1A

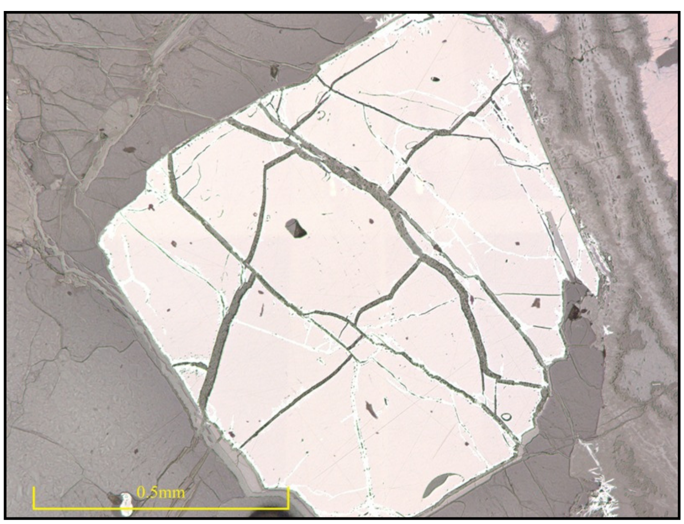
This granitoid is an even-grained hornblende-biotite granodiorite. Plagioclase content is somewhat more than K-feldspar. Subhedral plagioclase phenocrysts are ≤ 4mm long. Orthoclase is quite anhedral and up to 3mm long. Hornblende is up to 2mm in size, anhedral, and locally to 20%, but other fields show 5%. Chlorite replaces it along cleavages. Biotite is up to 2mm long in clusters and is quite chloritized. The rock is faintly foliated. Accessory minerals are garnet (occasional anhedral grains to 1mm), sphene (anhedral to 1.5mm, and lacking the usual distinct brown colour). It is, however, optically positive with low 2V and shows 5 orders of interference colours, so identification is good. A few < 0.3mm sized masses of zeolites(?) (R.I. seems too low for micas) are present.



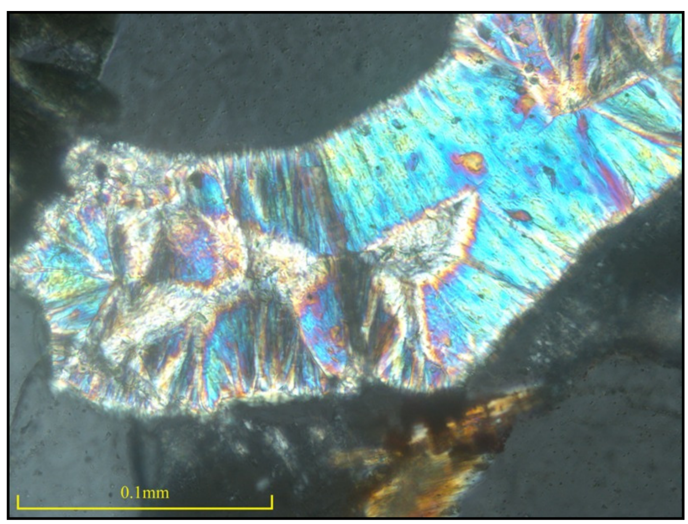
STU-1-A-5,0pp
Bornite and chalcocite, transmitted plain polarized light showing weathering



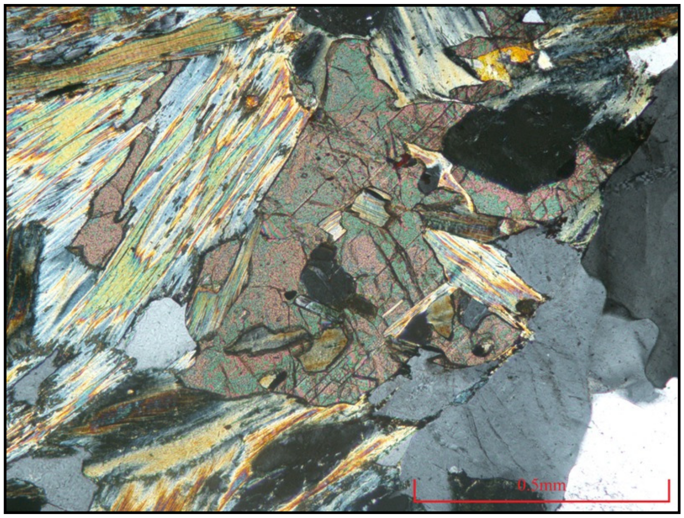
STU-1-A-5,0ppin
Bornite (both grains). Veins in bornite are chalcocite. Same field as at left, in reflected light.



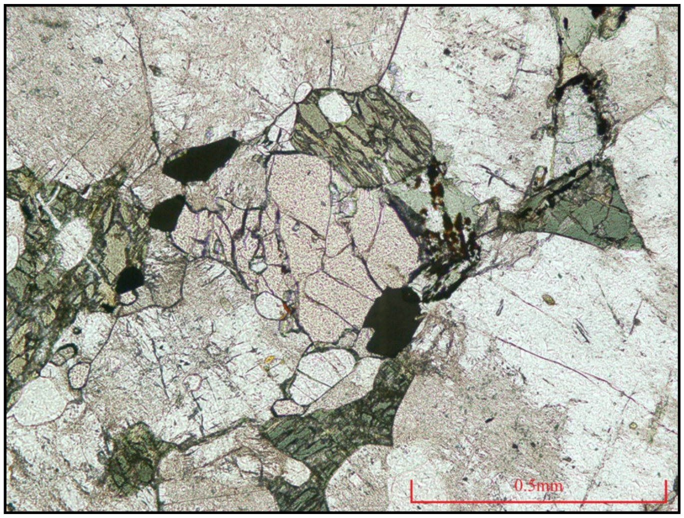
STU-1-A-10ppin
Bornite with chalcocite alteration along cracks



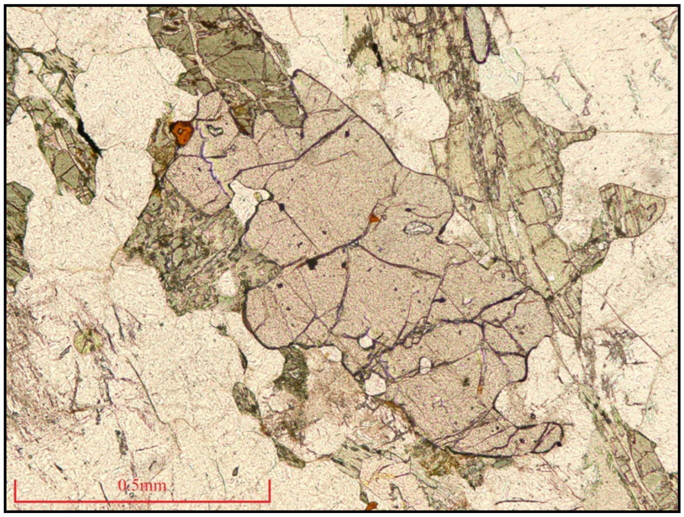
STU-1A-50xp
Vughs of zeolites(?) along grain boundary



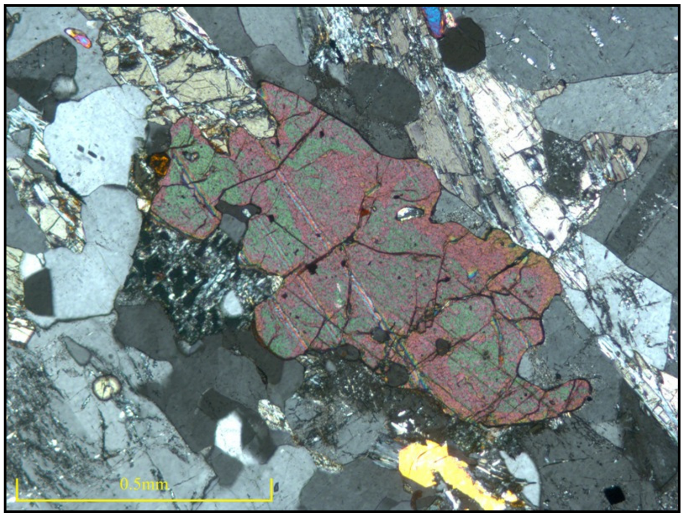
STU-1A-5,0xp
Chloritized biotite and sphene: crossed polarizers



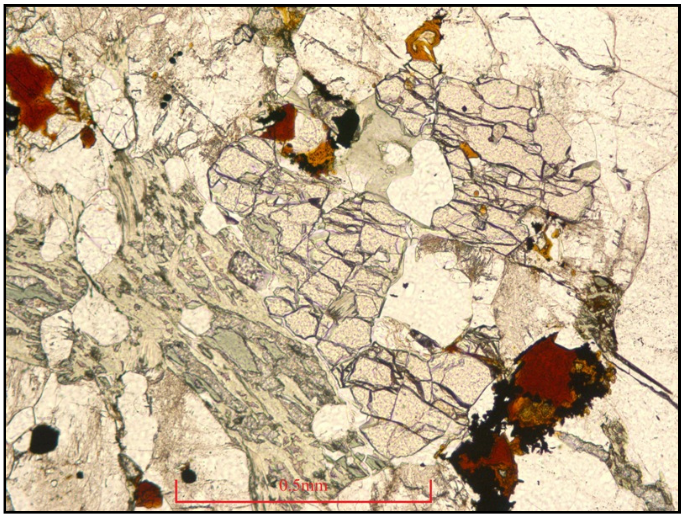
STU-1A-10pp
Fluorite (centre grain) with sulphide and chlorite



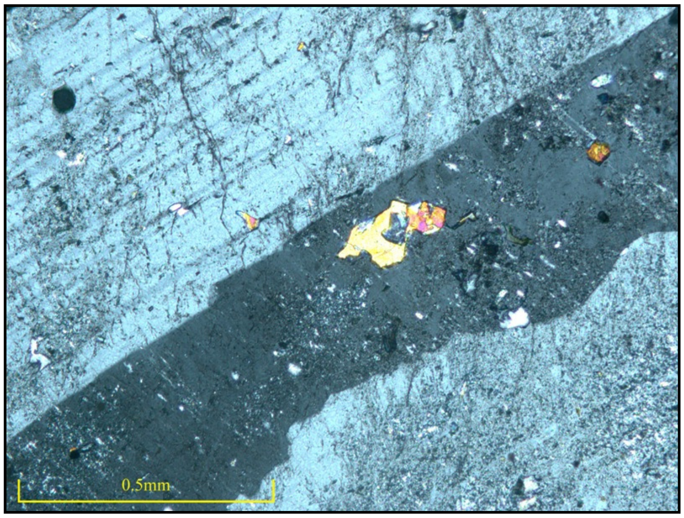
STU-1A-10pp2
Sphene and hornblende



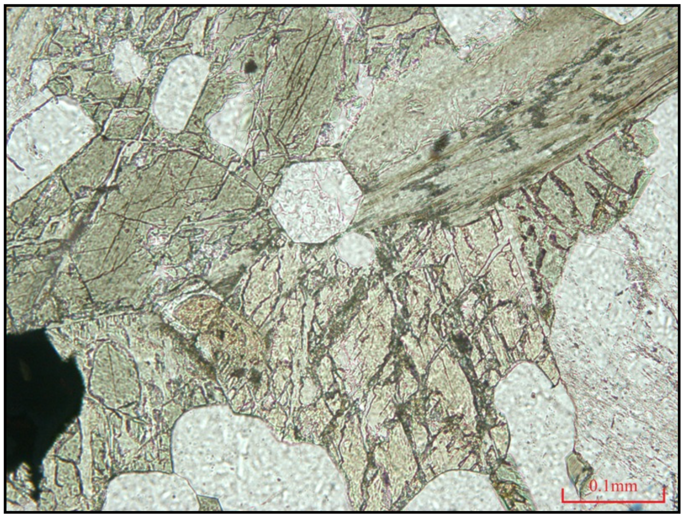
STU-1A-10xp2
Sphene showing twinning, cleavage and birefringence



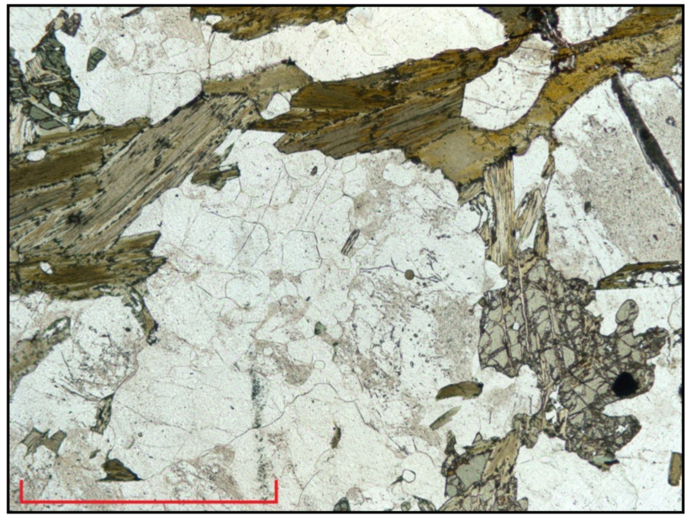
STU-1A-10pp3
Garnet with chloritized amphibole
and weathering products



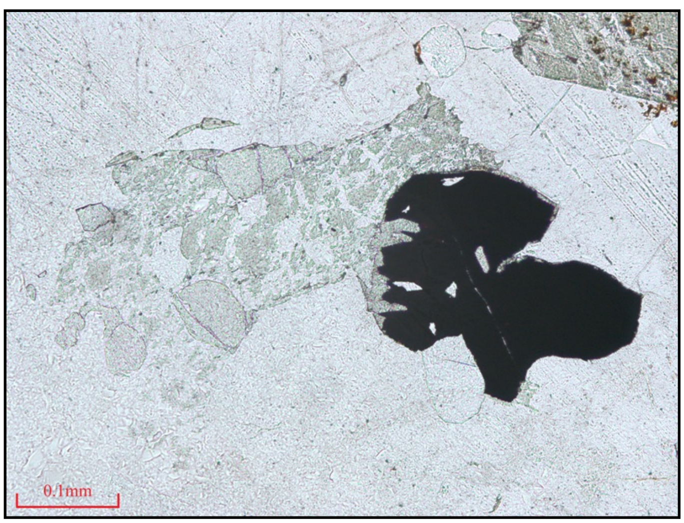
STU-1A-10xp
Topaz (red and yellow interference colours)
in plagioclase. Crossed polarizers



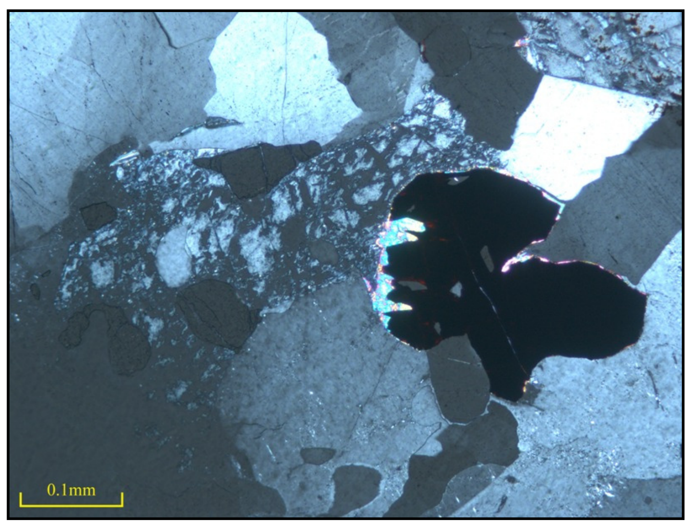
STU-1A-20pp
Basal section of apatite in amphibole
(prismatic sections alongside)



STU-1A-5,0pp2
Slightly altered biotite plus amphibole



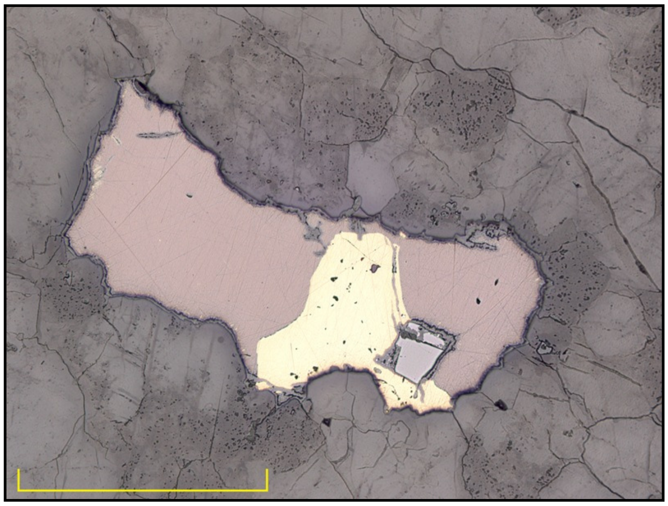
STU-1A-20pp3
Sulphide with sphene crystals
included, anhedral garnets to left



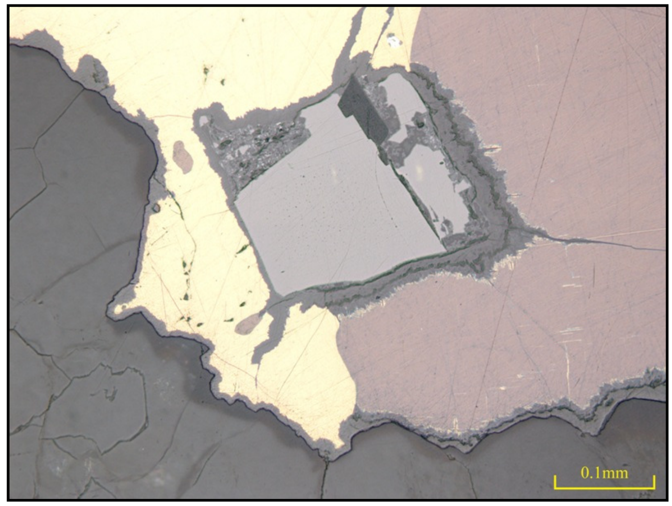
STU-1A-20xp3
Same field as at left: showing anisotropy of
sphene compared to anisotropic garnet

STU-1B

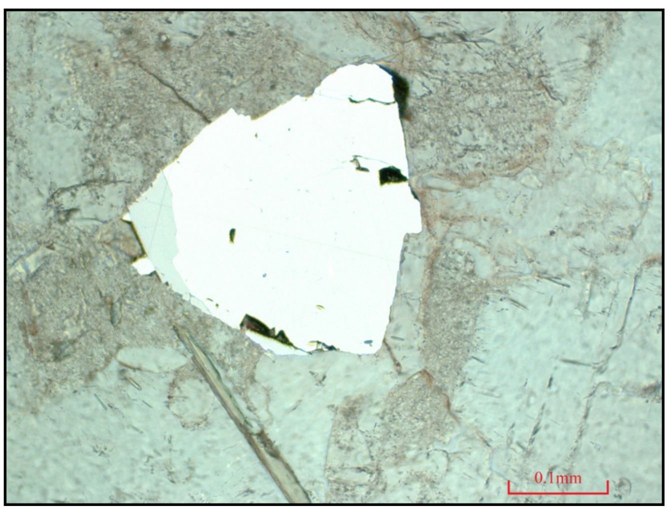
This is a very leucocratic even-grained biotite syenogranite with granophyre. Biotite (< 1%) varies from 'fresh' over much of the section but where coarser mica to ≤ 4mm long surrounds a 9mm sphene grain it is chloritized. One biotite grain is altered to white mica. Orthoclase and microcline phenocrysts are to 2mm long and completely anhedral. Plagioclase (subordinate to K-feldspar) is up to 3mm subhedral forms. Small patches of granophyre to 1.5mm across are common.



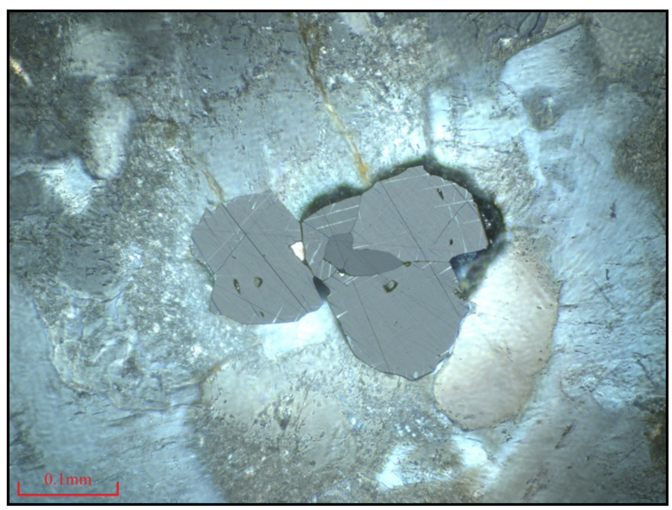
STU-1-B 20ppin
Bornite, chalcopyrite and chalcocite (in air)



STU-1-B 5,0ppin
Bornite, chalcopyrite and chalcocite



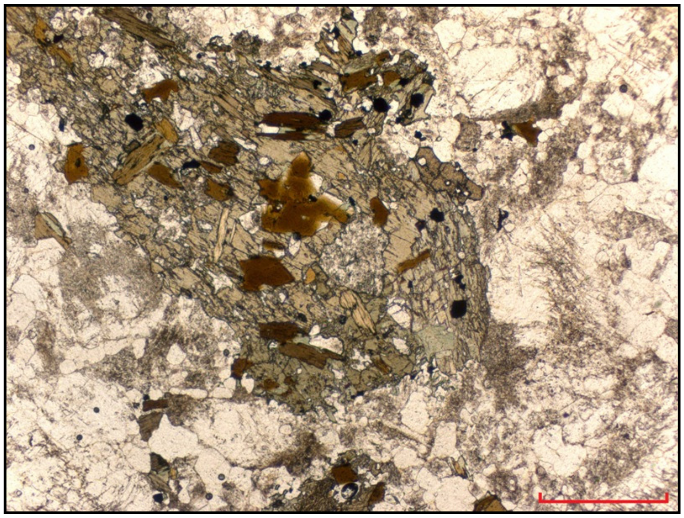
STU-1-B 20ppin oil
Chalcocite grain displaying reflection pleichroism (oil immersion)



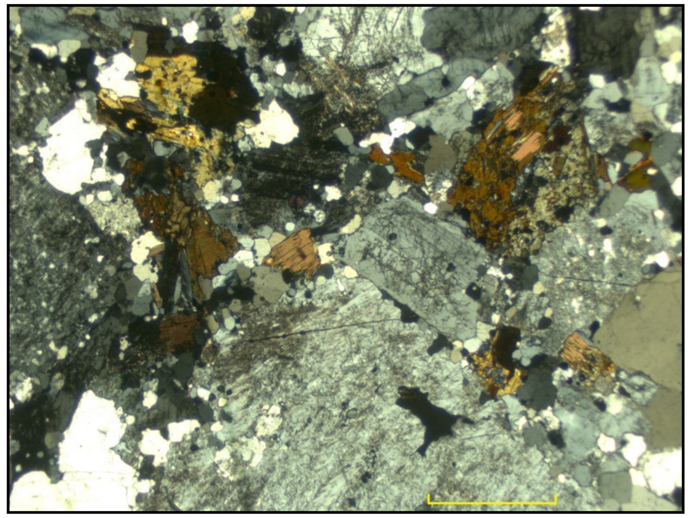
STU-1-B 20xpin oil
Shows chalcocite exhibiting anisotropy (in oil, field diaphragm stopped down)

STU-2

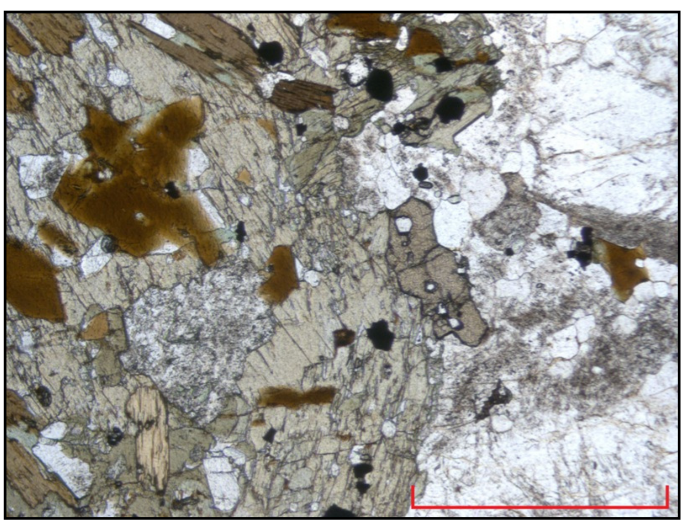
This is an orthoclase megacrystic hornblende-biotite monzogranite. Subhedral orthoclase megacrysts are up to 9mm long. Plagioclase is subhedral and up to 3mm long. Anhedral hornblende is up to 5mm long and poikilitically encloses biotite, which shows very slight chloritization. The ferromagnesians occupy about 15% of the bulk. Subhedral sphene to 1mm is clustered with the amphibole, together with the sulphides.



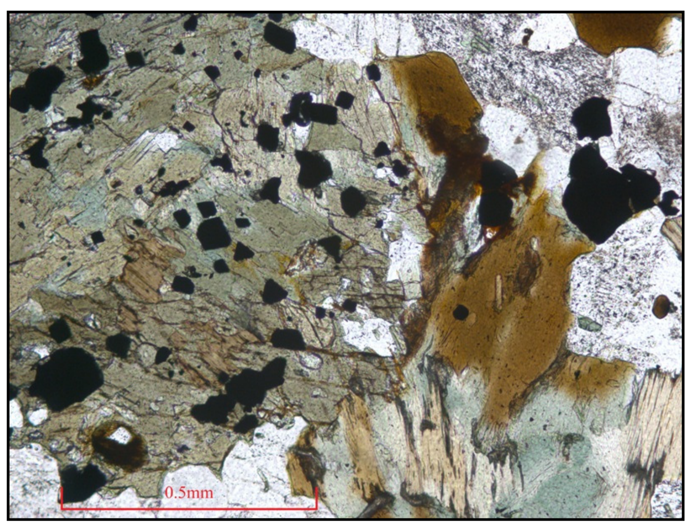
STU-2-2,5pp
Cluster of hornblende and biotite with sulphides and sphene (on RHS)



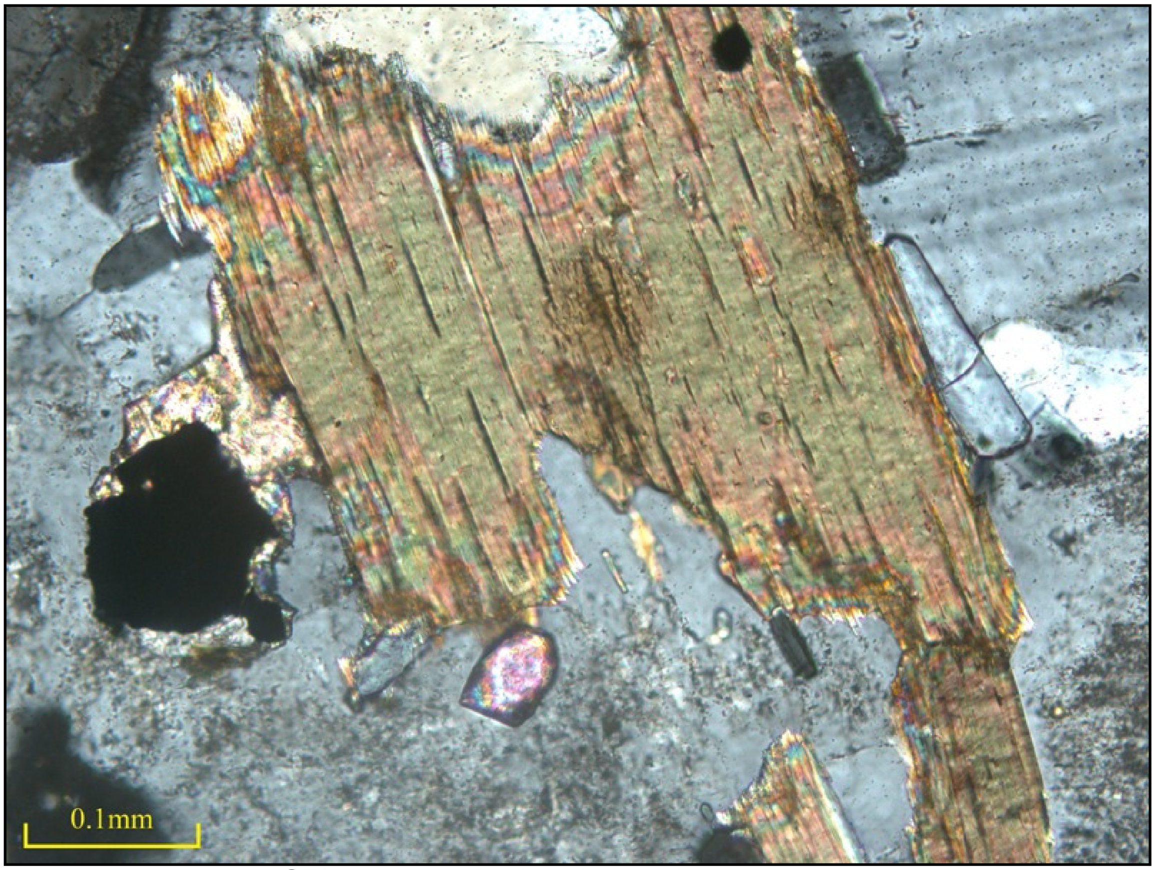
STU-2-2,5xp
Hornblende, biotite, plagioclase, orthoclase, quartz



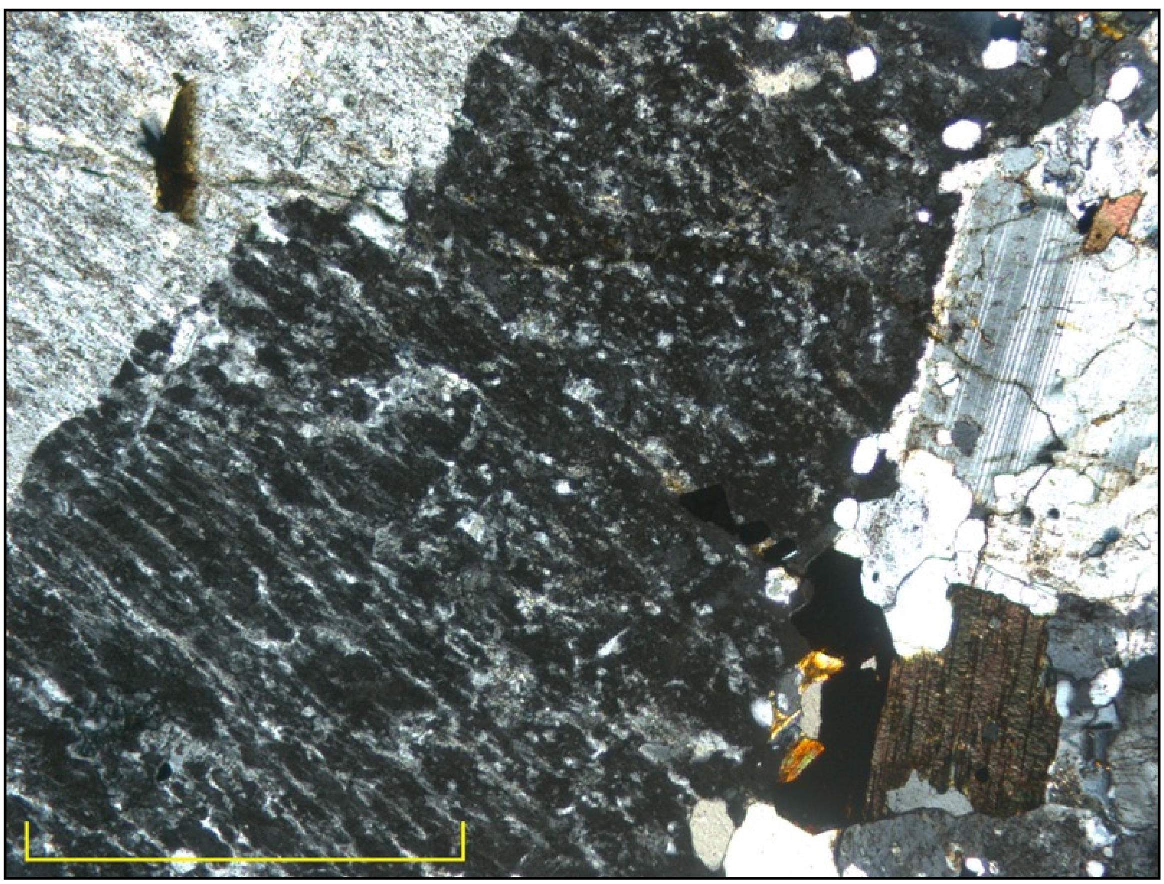
STU-2-5,0pp2
Hornblende poikilitically enclosing biotite, sphene on right hand side



STU-2-10pp3
Amphibole, biotite (with some chlorite) and sulphides



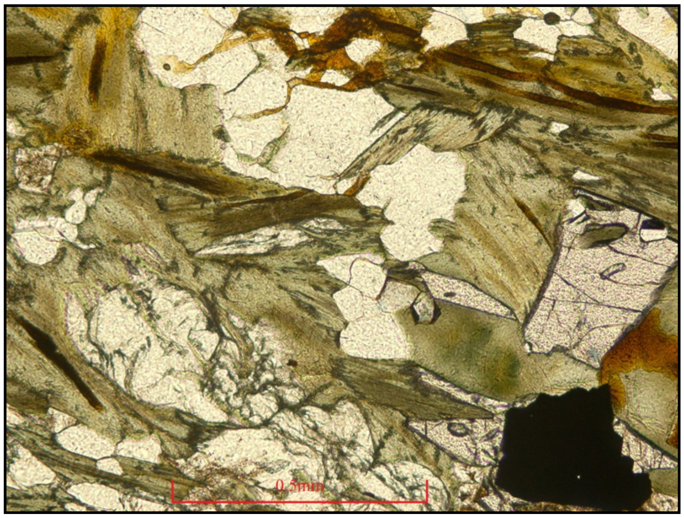
STU-2-20xp: Biotite with apatite and sulphide



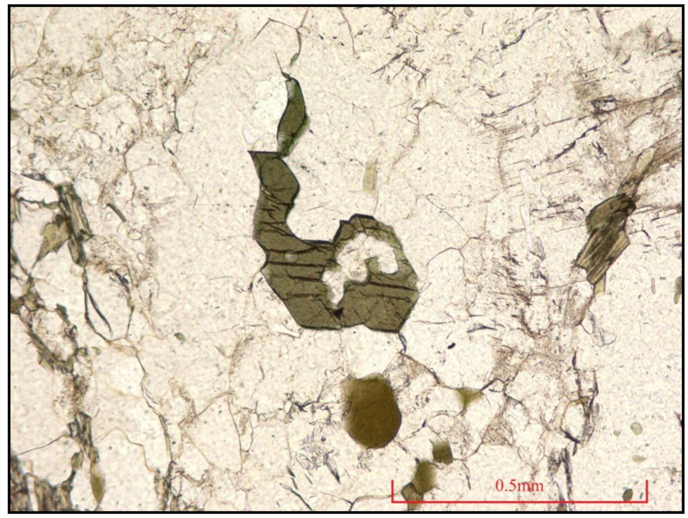
STU-2-5,0xp: Twinned orthoclase microperthite megacryst, plagioclase and biotite

STU-1450

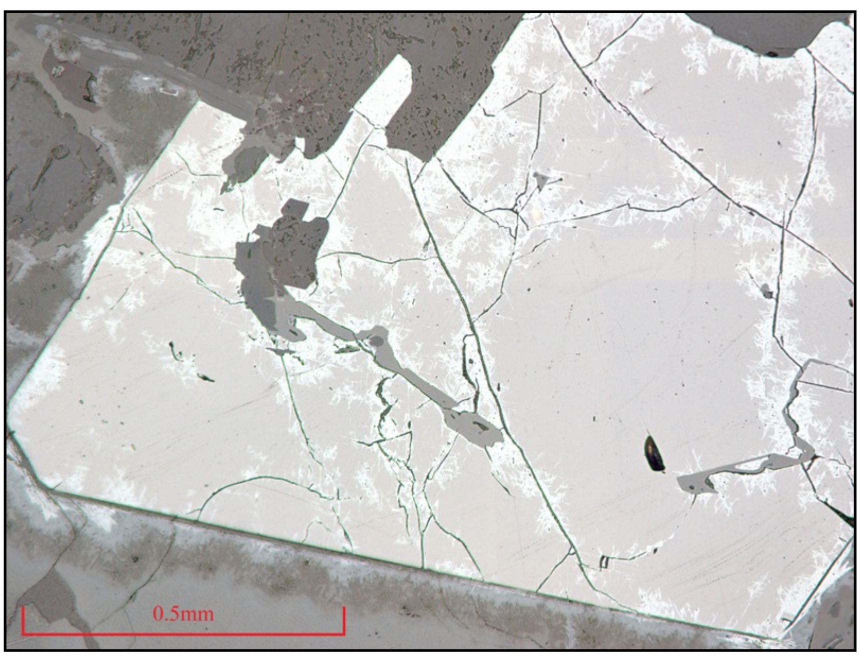
Is a megacrystic biotite (and rare hornblende) monzogranite. Both orthoclase and plagioclase form megacrysts to 6mm long (plagioclase is subhedral, orthoclase completely anhedral). Megacrysts are clustered, but occupy about 50% of the rock. Small patches of granophyre to 1mm across are clustered around orthoclase. Biotite to 1.5mm is fresh, clustered and constitutes about 15% volume average, but locally is from 2-30%. It defines a weak foliation. Hornblende is << 1%. Plagioclase phenocrysts are to 6mm long. Microcline and orthoclase are up to 4mm in subhedral to anhedral forms. Hornblende is found as rare anhedral grains.



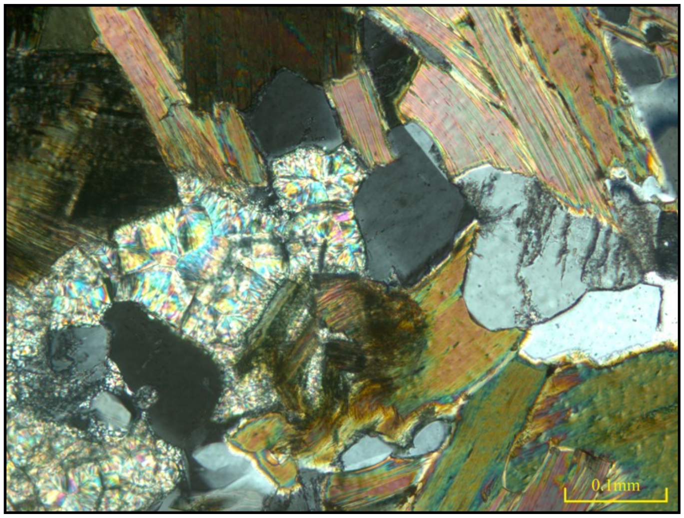
STU-1450-10pp
Biotite, quartz, opaques, sphene



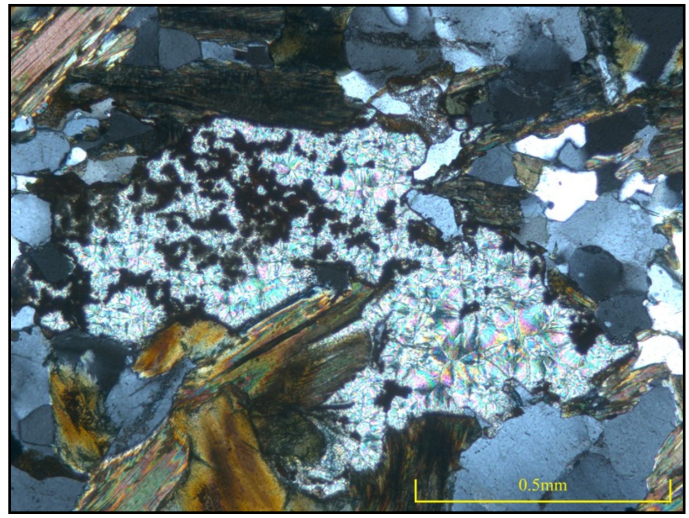
STU-1450-10pp
Hornblende (scarce in this rock)



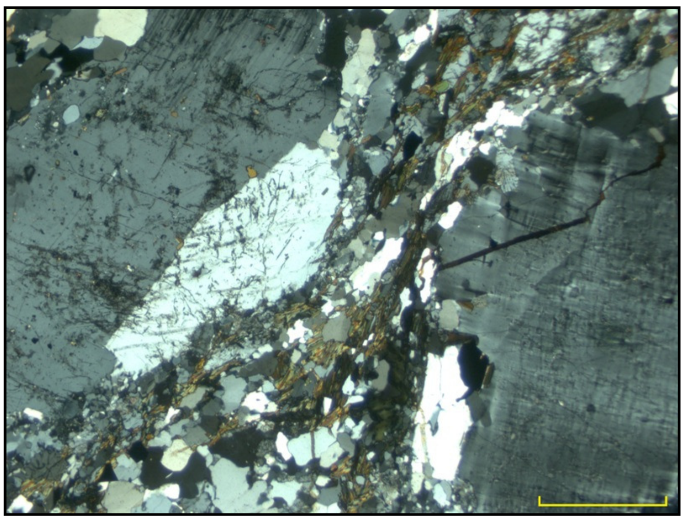
STU-1450-10ppin
bornite with chalcocite in cracks



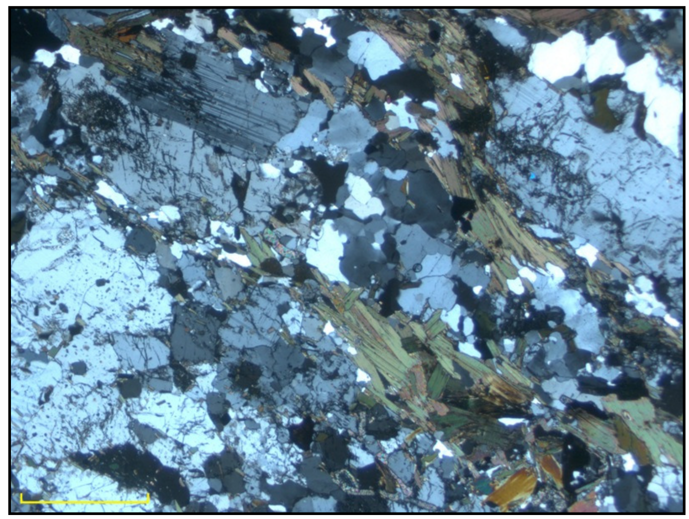
STU-1450-20xp
Fibrous mineral (? Phengite)



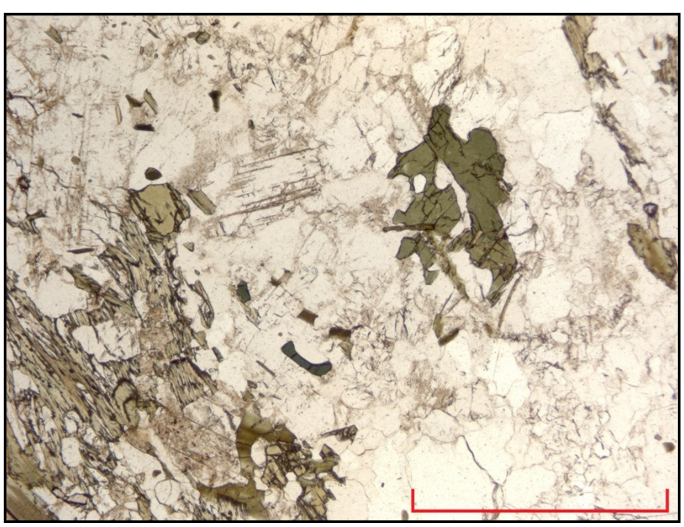
STU-1450-10xp3
Alteration: zeolite or phengite? (Plus opaques)



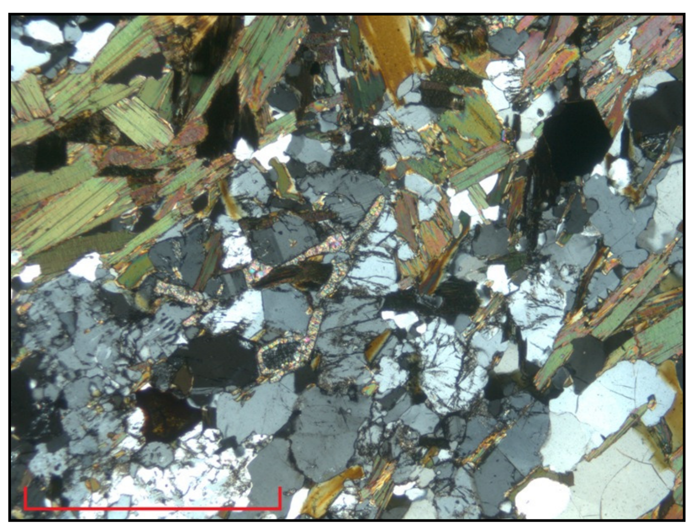
STU-1450-2,5xp2
Orthoclase, plagioclase (perthite) at one end of the megacryst



STU-1450-2,5xp
Orthoclase, plagioclase (perthite) at one end of the megacryst



STU-1450-5,0pp2
Hornblende and biotite



STU-1450-5,0xp
Biotite with some sulphide in quartz and minor feldspar. Alteration along grain boundaries