PROPERTY DESCRIPTION

New data on the geology and mineralization of the Skukum Creek gold-silver deposit, southern Yukon (NTS 105D/3)

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ABSTRACT

Detailed exploration conducted during 2006 in the western part of the Skukum Creek deposit has revealed new structural, mineralogical and geochemical features.

The deposit incorporates a number of (at least six or seven) sub-parallel narrow mineralized zones, coincident with andesite-dacite-rhyolite dyke swarms extending for at least 1 km along strike and for hundreds of metres down-dip. Various mineralized zones differ in size, structural setting, intensity and composition of mineralization, and, in total, form a large mineralized package more than 200 m wide, corresponding to a property- to district-scale fault zone extending for over 10 km and traced by a dyke belt. Significant potential exists for the exploration of these structures along strike and down-dip.

The diamond drilling intersected numerous high-grade intercepts of gold and silver mineralization corresponding to the low-sulphidation sub-type of epithermal gold-silver deposits. However, strong enrichment in base metals (up to 25% of combined Zn+Pb+Cu) and arsenic suggests essential differences from typical epithermal mineralized systems.

RÉSUMÉ

Les travaux d'exploration en détail de la campagne 2006 sur la portion occidentale du gîte de Skukum Creek ont permis de révéler de nouveaux aspects structuraux, minéralogiques et géochimiques.

Le gîte comprend plusieurs zones minéralisées sous-parallèles étroites (au moins six ou sept) qui coïncident avec une série de dykes de composition andésitique-dacitique-rhyolitique. Ces dykes s'étendent sur une longueur d'au moins 1 km et sur plusieurs centaines de mètres de profondeur. Les zones minéralisées sont différentes entre-elles par leurs dimensions, conditions structurales, intensités, et type de minéralisation. Au total, ces zones forment un ensemble minéralisé de plus de 200 m de large, correspondant à une zone de faille d'échelle régionale s'étendant sur plus de 10 km et marquée par une série de dykes. Ces structures possèdent un important potentiel pour l'exploration autant en longueur et qu'en profondeur.

Plusieurs intersections à haute teneur en or et en argent ont été obtenues pendant la campagne. Cette minéralisation correspond à un sous-type de gisement épithermal or-argent pauvre en soufre. Toutefois, un enrichissement important en métaux de base (jusqu'à 25% d'un ensemble en Zn+Pb+Cu) et arsenic suggère des différences primordiales avec les systèmes épithermaux typiques.

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INTRODUCTION

The Skukum Creek gold-silver deposit is located in the Wheaton River area, within the Skukum property, 60 km southwest of Whitehorse. The property is 100% owned by Tagish Lake Gold Corp.

The deposit is the focus of the current exploration and mining development program, with the goal of increasing the resource base of the deposit. Conducted as a part of this program, the 2006 detailed exploration of the deposit included extension of 1300-m level adit for some 400 m further west, followed by almost 6500 m of core drilling (72 drill holes in total) from underground locations.

This paper deals with preliminary field results obtained during the May-November, 2006 drilling program and accompanying mapping (with compilation of older results) of the underground 1300-m level of the Skukum Creek deposit. Special attention was given to possible exploration and genetic consequences foreseeable on the basis of the fieldwork results.

SOME ASPECTS OF REGIONAL AND DISTRICT GEOLOGY AND METALLOGENY

The 171-km^2 Skukum property encompasses several significant mineral occurrences, including the past-producing Mount Skukum gold mine, Skukum Creek gold-silver deposit, Goddell Gully gold-antimony prospect, Becker-Cochran antimony prospect, as well as numerous gold, gold-silver, lead-zinc, copper and other related showings within the Wheaton River mining district (Yukon MINFILE, Deklerk and Traynor, 2005; Fig. 1). Small copper-porphyry mineral occurrences are known near the Skukum Creek deposit. In total, these deposits and

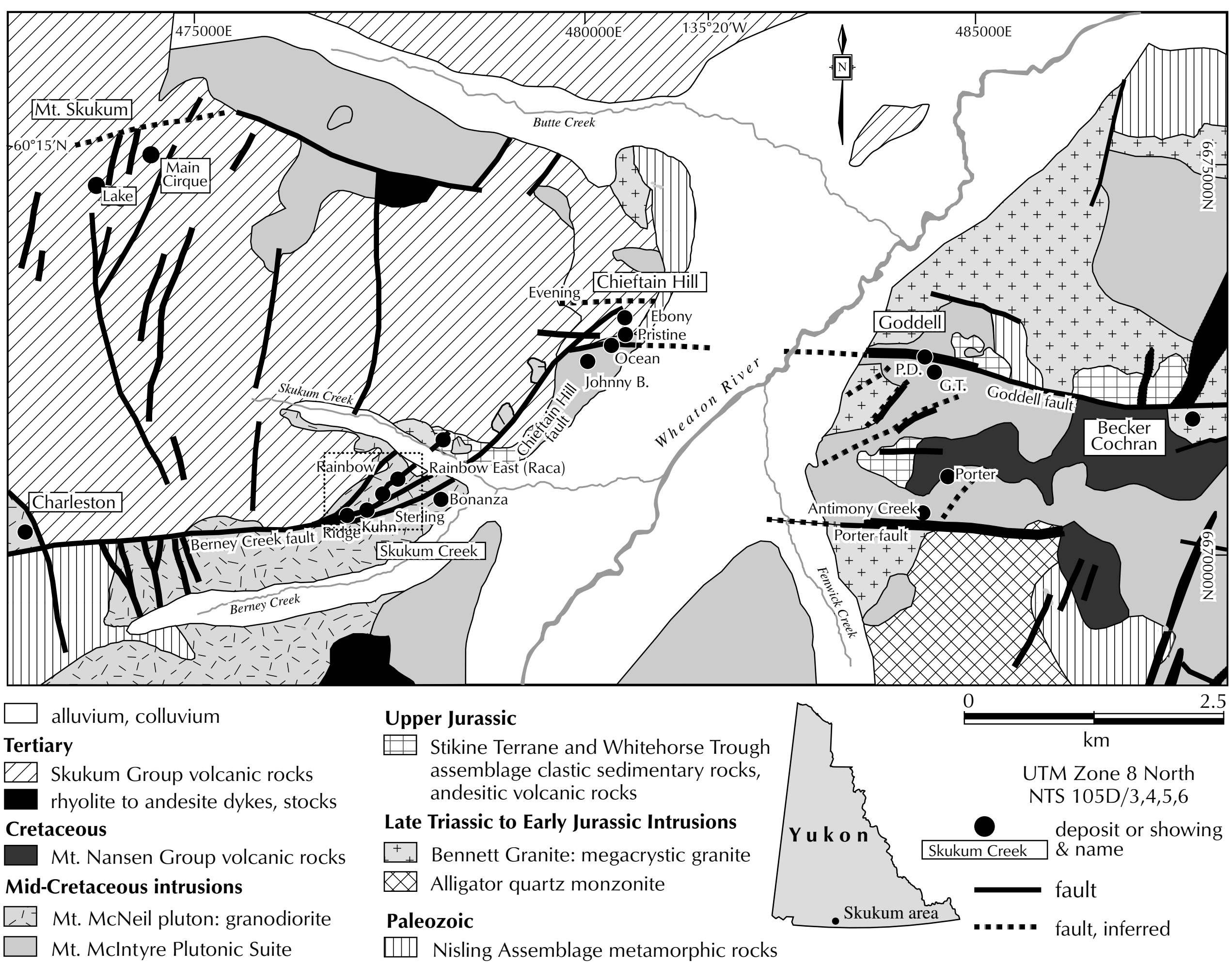

Figure 1. *Geology of the Skukum project area (after Lang et al., 2003). Data compiled from Hart and Radloff (1990) and unpublished company maps. Dotted rectangle shows area of Figure 2.*

occurrences form an important mineralized district exhibiting a long-lasting, multi-episode history of mineral formation.

The regional geology was described in a number of papers (Wheeler, 1961; Doherty and Hart, 1988; Hart and Radloff, 1990) and summarized by Lang *et al.* (2003). The Wheaton River area covers the boundary between the Stikine and Nisling terranes of the Intermontane Superterrane (or Intermontane Belt) of the Canadian Cordillera. The rocks consist of Paleozoic(?) gneiss assigned to the Nisling Terrane, Jurassic andesite and siliciclastic rocks of the Stikine Terrane, and Whitehorse Trough overlap assemblage.

The older rocks were intruded by late Triassic or early Jurassic K-feldspar megacrystic Bennett Granite (175 Ma), and then by metaluminous Cretaceous intrusions of the Coast Plutonic Complex, including the most abundant Whitehorse Plutonic Suite (116-119 Ma), locally represented by the Mt. McNeil granodiorite pluton and associated rocks, and the Mt. McIntyre plutonic suite (96-119 Ma); the latter includes the Mt. Ward granite and Carbon Hill quartz monzonite. Intermediate Cretaceous volcanic rocks of the Mt. Nansen Group, thought to be approximately coeval with the Coast Plutonic Complex, are present regionally, and in the property area occur east of the Wheaton River (Lang *et al.,* 2003).

As noted by Lang *et al.* (2003), the early Eocene Mount Skukum volcanic complex, part of the widespread late Paleocene to early Eocene felsic to intermediate volcanism of the Skukum Group (Smith, 1982 and 1983; Pride, 1986), is a caldera sequence that underlies the western portion of the district. The Mount Skukum complex consists of up to 800 m of mainly porphyritic andesitic flows and tuff, exposed over an area of approximately 200 km^2. These volcanic rocks are locally separated from pre-Tertiary rocks by curved, east- to northeast-trending structures such as Berney Creek fault and Wheaton lineament (coincident with the Wheaton River valley on Fig. 1) that have been inferred to be syn-volcanic, caldera-bounding faults (Hart and Radloff, 1990). These and parallel structures host gold-silver mineralization in the district.

On a regional scale, most of these tectonic and magmatic events have or may have been accompanied by respective metallogenic assemblages (e.g., Mihalynuk *et al.,* 1997). In particular, Upper Triassic arc rocks of the Whitehorse Trough are lithologically and temporally equivalent to those hosting important copper-molybdenum-gold porphyry deposits in southern British Columbia. Early Jurassic intrusive rocks are also known to host copper-gold mineralization in the central-western Yukon (Minto and Williams Creek deposits; Tafti and Mortensen, 2004). Cretaceous plutons produce copper skarns where they cut Upper Triassic carbonate rocks in the Whitehorse copper belt (Mihalynuk *et al.,* 1997), as well as copper-gold porphyry mineralization; and the southern end of the belt may extend into the Skukum area. Epithermal gold-silver mineralization related to volcanic rocks forms a distinct belt extending from north to south across southern Yukon; this incorporates the Mount Nansen cluster of epithermal gold deposits and occurrences related to 100-Ma Mount Nansen volcanics, the Laforma epithermal gold deposit related to the Carmacks Group volcanics (75 Ma), and finally the Mt. Skukum gold prospect, further south, related to Tertiary volcanic rocks (55 Ma). Some of these volcanic rocks are responsible for both epithermal and possibly related copper-porphyry deposits (i.e., the Laforma gold veins and the Casino copper-molybdenum-gold deposit), suggesting the respective epithermal-porphyry transitions.

The Mount Skukum mine, situated north of the Skukum Creek deposit, occurs within the Mt. Skukum Volcanic Complex and is represented by typical epithermal gold-silver mineralization occurring in quartz, quartz-carbonate and quartz-fluorite veins bearing high gold values (approximately 14 g/t Au in average; McDonald, 1990). Some of the veins are controlled by generally meridianal (north-trending) faults, which locally also host andesite and rhyolite dykes. Most of this epithermal mineralization represents its low-sulphidation sub-type that is evidenced by characteristic mineral assemblages (quartz-adularia-sericite) and textures (open-space filling, hydrothermal brecciation, cryptocrystalline quartz, bladed calcite replaced by silica, etc.; *cf.* Heald *et al.,* 1987; White and Hedenquist, 1990). On deeper levels, crackle breccia-style quartz and quartz-carbonate stockwork, locally with quite abundant pyrite, occur in andesite dykes. Epithermal high-sulphidation mineralization is also present, evidenced by the presence of alunite sinters (caps) in immediate vicinity to the Mount Skukum prospect area (McDonald, 1990).

LOCAL GEOLOGICAL SETTING

The Skukum Creek deposit is related to a large (possibly district-scale) fault zone that exceeds 200 m in width and extends in an east-northeast direction for several kilometres (possibly up to 10-20 km) along strike. This fault zone hosts the major mineralized zones of the Skukum Creek deposit, including the Rainbow, Rainbow 2, Kuhn and other zones bearing gold and silver. Further east, this fault controls the Rainbow East mineralized zone, the Goddell Gully gold-antimony prospect, the Becker-Cochran antimony prospect, as well as numerous gold, gold-silver, lead-zinc, copper, and other showings previously mentioned (Fig. 1).

This fault zone is considered to be a part of a fault system bordering and terminating the Mt. Skukum Volcanic Complex, in particular, rimming a large caldera (volcanic depression) composed of volcanic rocks. A large composite pluton of the mid-Cretaceous Coast Plutonic Suite occurs in the immediate vicinity of the Skukum Creek deposit. This pluton is composed of larger masses of gabbro, monzonite/diorite, McNeil granodiorite, as well as smaller quartz monzonite, monzonite-porphyry and granite dykes (Fig. 2).

Some features of the local geology suggest that this fault zone was established before the Tertiary volcanic event. This zone, in particular, is in part traceable by a 'chain' of roof pendants composed of monzonite/diorite and, to lesser extent, by highly metamorphic possibly Precambrian metasedimentary rocks enclosed in the McNeil granodiorite. Also, there are numerous small dykes and apophyses of younger (than McNeil granodiorite) intrusive rocks, particularly quartz monzonite, monzonite-porphyry, granite, elongated in accordance to the general strike of the fault zone.

The fault zone is expressed by a very large number of subparallel and commonly subvertical andesite, dacite,

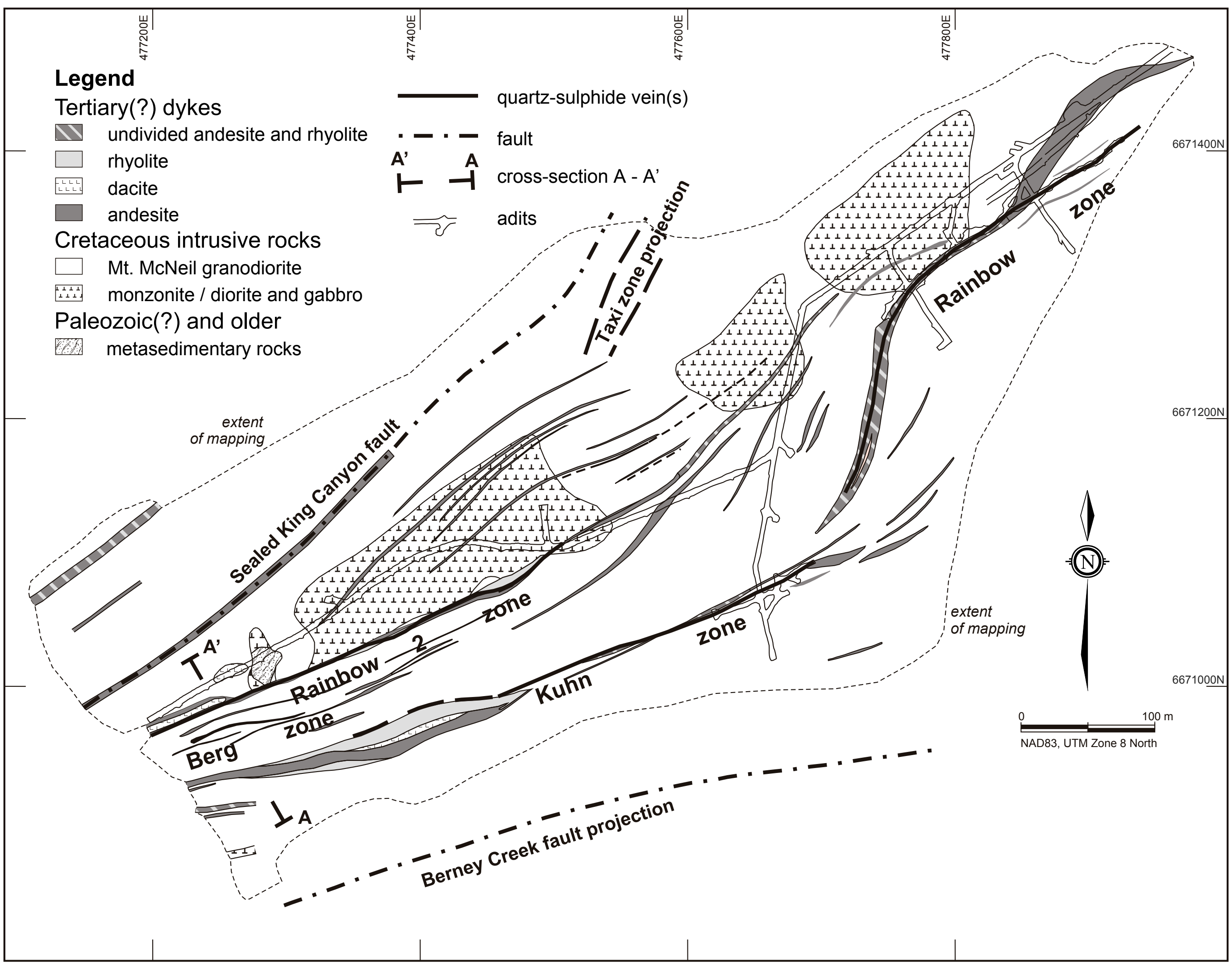

Figure 2. *Geological map of the Skukum Creek deposit, 1300-m level.*

rhyolite dykes and their swarms tracing more localized shear-like structures distinguishable within the wide fault zone. Individual dykes can attain some 15 to 20 m in thickness but commonly are 0.5 to 2 m thick; the largest dykes extend for hundreds of metres along strike and down dip. Smaller dykes commonly form 'en echelon' structures. The dykes are reliable markers of mineralized shear zones. These dykes are typically considered to represent the Tertiary volcanic event (as subvolcanic analogues of the aerial volcanic rocks); however, some of them may be in fact late mafic dykes accompanying the Cretaceous intrusive rocks (Fig. 2). Multiple episodes of dyke emplacement possibly correspond to the re-activation events of the hosting shear zone(s), with the dykes intruding into these shear zones or their re-activated intervals. Thus, individual dykes, being syn- or post-tectonic in relation to the corresponding tectonic event, occur as pre-tectonic in relation to later tectonic re-activation accompanied, in turn, by another set of related dykes.

Among the dykes found in the deposit area, the zoned dykes composed of andesite-dacite, and more complex composite andesite-dacite-rhyolite and andesite-rhyolite dykes are of special interest, as the largest of them are coincident with the most important mineralized zones. In the zoned dykes, dacite occupies the core position and exhibits gradational contacts to the 'rimming' andesites. These relationships can be considered as revealing intra-chamber magmatic differentiation rather than successive emplacement of various rock types. The differential zoning occurs where the dykes display a greater thickness, and generally grade into andesite along strike and down dip.

Composite andesite-rhyolite and andesite-dacite-rhyolite dykes are something different from the zoned andesite-dacite dykes mentioned above. These rock types are found in cross-cutting relationships rather than in gradual transitions, suggesting these complex dykes were likely formed by subsequent intrusion of portions of magma with different composition, accompanying respective re-activation of the hosting shear zone. In all cases, rhyolite appears to be younger than other rock types (dykes). It is important that the largest dykes identified on the prospect (namely, the Rainbow 2, Kuhn, and possibly Rainbow dykes) represent this type of composite dyke, and include perhaps earlier zoned andesite-dacite and/or unzoned andesite dykes intruded by rhyolite dykes.

Another important feature of the deposit structure is represented by the abundance of various hydrothermal and eruptive magmatic breccias. These include intrusive (eruptive) magmatic breccia with granodiorite fragments in monzonite-porphyry cement, as well as monolithic and polylithic phreatomagmatic breccias with andesite and rhyolite cement. Most of these breccias occur in the local shear zones.

Individual local shear zones are traceable for hundreds of metres along strike and down dip and are typically some 10 to 30 m thick. The larger shear zones hosting mineralization were studied in detail by Lang *et al.* (2003) and include the Rainbow and Kuhn mineralized zones, linked by the north-trending Sterling zone, a dilatational stepover that connects the eastern end of the Kuhn zone with the western end of the Rainbow zone. The Rainbow East zone represents a possible eastern extension of the Rainbow zone. North-northeast trending, steeply dipping quartz-sulphide extension veins in the Taxi zone, and similar veins developed throughout the underground workings, have orientations consistent with formation during sinistral displacement along the Rainbow and Kuhn faults. The Rainbow 2 zone represents a western extension of the Rainbow zone. In addition, a new mineralized zone (Berg) was discovered in 2006 between the Rainbow 2 and Kuhn mineralized zones in the western part of the deposit, an almost equal distance (some 20 to 30 m) from each of these zones.

Also, a number of either hydrothermally altered or geochemically anomalous intercepts related to andesite dyke swarms may be indicative of the presence of other (hidden on the upper levels) mineralized zones. In total, the deposit structure may be presented as a thick mineralized package incorporating at least six to seven mineralized zones related to subparallel subvertical shear zones. Total width of the mineralized package possibly exceeds 200 m. It is noteworthy that this mineralized package appears to be just a small part of a much more extensive district-scale fault zone controlling mineral occurrences on the adjacent territory.

The Rainbow mineralized zone is so far the largest mineralized zone found within the Skukum Creek deposit and hosts the majority of mineral resources. It is subvertical, coincident with a large composite andesite+rhyolite dyke, trends 50-55/78-83°S, and has been traced by drilling over a strike length of 265 m and 360 m down dip, and remains open at depth. A thick northwest-trending felsic dyke, referred to as the Portal dyke, bounds the zone to the northeast. According to Lang *et al.* (2003), the controlling fault itself pinches and swells, attaining widths of 1 to 10 m, but may reach widths to 20 m. Mineralization is represented by pinching and swelling lensoid and more uniform lenticular quartz-sulphide veins developed along the dyke contacts. The veins are younger than the dykes, and commonly contain their fragments or crosscut them, although they occur mostly close to, or along, the dyke contacts. The formation of the mineralized veins is definitely coincident with an additional (postdating the dykes) episode of tectonic shearing. Multiple generations of veins are present, including early veins incorporated as fragments into cataclasites and younger veins that overprint cataclastic breccias. The quartz-sulphide veins comprise several generations of quartz, pyrite, sphalerite, galena, arsenopyrite, stibnite, chalcopyrite, etc., with common breccia textures. The breccias exhibit textural relationships suggestive for both cataclastic and hydrothermal processes (Lang *et al.,* 2003). Coarse-grained pyrite, arsenopyrite and sphalerite are locally abundant but, generally, fine-grained sulphide minerals predominate. Total sulphide mineral contents vary from a few percent to 20-30% and higher in local massive sulphide-rich intervals.

MINERALIZED ZONES IN THE WESTERN PART OF THE DEPOSIT

The 2006 exploration program focused on the Rainbow 2, Berg and Kuhn mineralized zones from the 1300-m level, situated in the western part of the Skukum Creek deposit. Figure 2 shows the 1300-level geological plan with the position of the three mineralized zones. A typical cross-section (A-A′) through the zone is illustrated in Figures 3 and 4.

RAINBOW 2 ZONE

The Rainbow 2 zone, discovered in 2003 while completing an underground drift, is similar to the Rainbow zone. It is situated 250 m southwest of the Rainbow zone and is possibly hosted by the same shear zone striking 050°/80°SE. In 2006, the Rainbow 2 mineralized zone was traced for almost 300 m along strike; this brings the total identified and partially explored strike length of the zone to some 350 m.

The zone incorporates a composite andesite-rhyolite or zoned andesite-dacite dyke of variable thickness, with general thickening toward the west-southwest (from a few metres up to 10 m). The hosting fault zone is represented by numerous, although quite short, intervals of fracturing, tectonic brecciation, gouging, cataclasis, etc., reflecting the dilatational shear nature of the Rainbow 2 fault zone. Over significant strike extent, this shear is roughly coincident with the contact of granodiorite and monzonite/diorite, although it is not a rule, as the shear can occur far from this contact (mostly in granodiorite).

The granodiorite and monzonite/diorite commonly show increased sericite and chlorite alteration near the Rainbow 2 zone or in the hanging wall in most instances, which passes to moderate to weak alteration with distance away from the structural break. The rocks show moderate to strong chloritic alteration in the mafic minerals and moderate sericite alteration of plagioclase; a tight stockwork of epidote-carbonate with a narrow bleached envelope is also present. Within the zone, the rocks are strongly to completely silicified, bear intense quartz-sericite and quartz-carbonate-sericite alteration, and locally are strongly argillically altered. An intense stockwork of thin quartz to quartz-carbonate and quartz-pyrite stringers, and background fine-grained pyrite dissemination are also common.

Mineralized intervals occupy a relatively minor part of the fault zone (Figs. 3 and 4, see pages 260 and 261). In general, the mineralized intervals, composed of quartz-sulphide veins and intervals of intense quartz-sulphide veining, form a series of lenticular bodies up to 5-6 m thick, extending for 200-250 m along strike and 50-100 m in a vertical direction, pinching out and swelling into the next lens.

The Rainbow 2 fault zone and coincident mineralized zone are generally vertical, but dip steeply (90° to 75°) to the southwest in a few places.

The gold and silver mineralization in the Rainbow 2 zone exhibits close association with pyrite, sphalerite, arsenopyrite, chalcopyrite and galena. In most cases, a positive correlation between the amount of sulphide minerals and gold/silver grades can be established. Both coarse- and fine-grained sulphide minerals are present; the quartz-sulphide veins are characterized by brecciated, banded, locally crustiform textures (Fig. 5 and 6). Pyrite and sphalerite predominate but arsenopyrite, chalcopyrite and, less commonly, galena are locally abundant. Some veins contain magnetite and associated chalcopyrite. The quartz-sulphide veins commonly show internal zonation from sulphide-rich rims (commonly with banded and massive sulphide minerals) to sulphide-poor quartz core (with fine to coarse, disseminated, but generally minor, sulphide minerals).

Drilling during 2006 returned significant high-grade mineralization over substantial widths. Significant

Table 1. *Selected significant intersections, Rainbow 2 zone.*

Hole	Grade (g/t)		Drill length (m)
	Au	Ag	
SC06-41	18.98	137.1	0.67
including	48.5	215.0	0.25
SC06-48	13.49	218.8	3.76
including	34.24	411.9	1.40
SC06-50	77.50	487.0	1.15
SC06-60	14.90	248.0	0.55
SC06-61	17.21	103.3	2.57
including	41.80	234.0	1.05
SC06-73	18.58	244.9	2.50
including	36.80	424.0	1.00
SC06-75	51.30	437.0	0.80
SC06-78	10.95	59.1	3.61
including	33.30	145.0	1.11
SC06-85	32.53	306.9	1.59
including	68.50	600.0	0.59

intersections of gold-silver mineralization within the Rainbow 2 zone are listed in Table 1.

The Ag:Au ratio for the Rainbow 2 zone is quite low (13:1) and significantly less than that for the mineralization in the Rainbow zone (37:1).

The Rainbow 2 mineralized zone still remains open to the west-southwest as well as down dip along its entire strike length.

BERG ZONE

The discovery of a new significant mineralized zone, the Berg zone, parallel to, and located between the Rainbow 2 and Kuhn zones, is of special interest and potential importance. As with the other zones, the Berg zone is also associated with large andesite dykes and the mineralization is lenticular with limited vertical extent probably not exceeding 60-80 m.

The presence of several narrow but heavily mineralized veins within this mineralized lens is also quite common for the Berg zone.

However, in contrast to the Rainbow 2 mineralized zone, the Berg zone is characterized by a distinct plunge down from the west (west-southwest) to east (east-northeast) at a 40-50° angle. Mineralization progressively occurs at deeper levels toward the east, and on shallower levels toward the west.

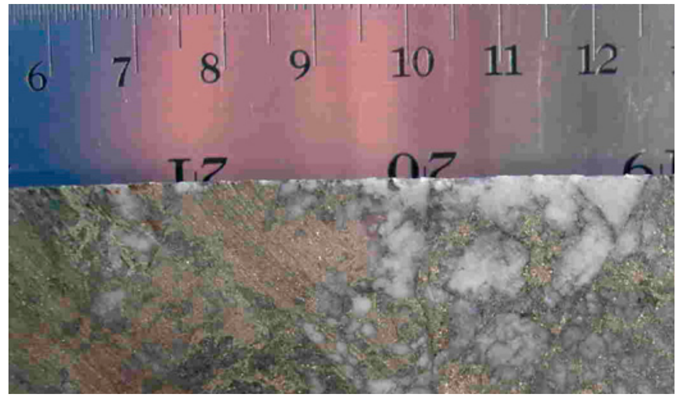

Figure 5. *Quartz-sulphide mineralization of the Rainbow 2 zone showing the brecciated nature of the zone. Sulphide minerals consist mainly of pyrite and sphalerite. SC06-61, 41.80 g/t Au, 234.0 g/t Ag.*

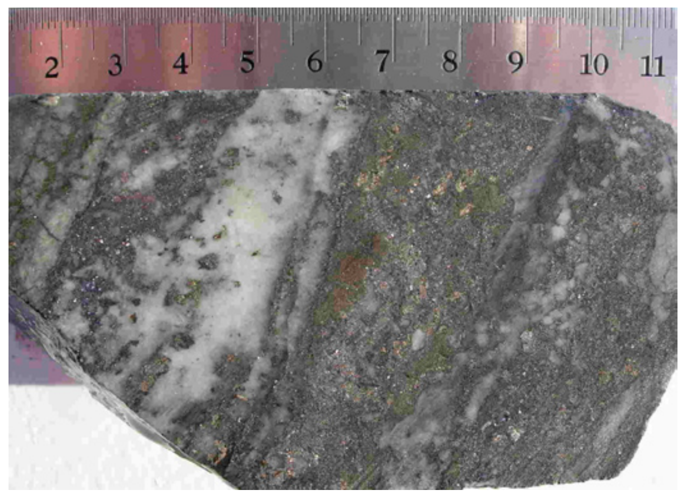

Figure 6. *Disseminated and banded textures of the quartz-sulphide mineralization of the Rainbow 2 zone. Sulphide minerals consist mainly of pyrite, arsenopyrite and sphalerite. SC06-41, 48.50 g/t Au, 215.0 g/t Ag.*

In regard to this structural feature, it has to be noted that some aspects of the distribution of higher gold and silver values within the Rainbow 2 zone (most visible on its longitudinal projection) may form a similar trend 'plunging' from the west to east.

Outside of its most mineralized portion of 60-80 m long (and 1-3 m wide), the Berg zone splits into a series of small subparallel veins, veinlets and narrow stockwork zones, locally loses its continuity, but then starts again as another set of mineralized veins tracing the general controlling structure.

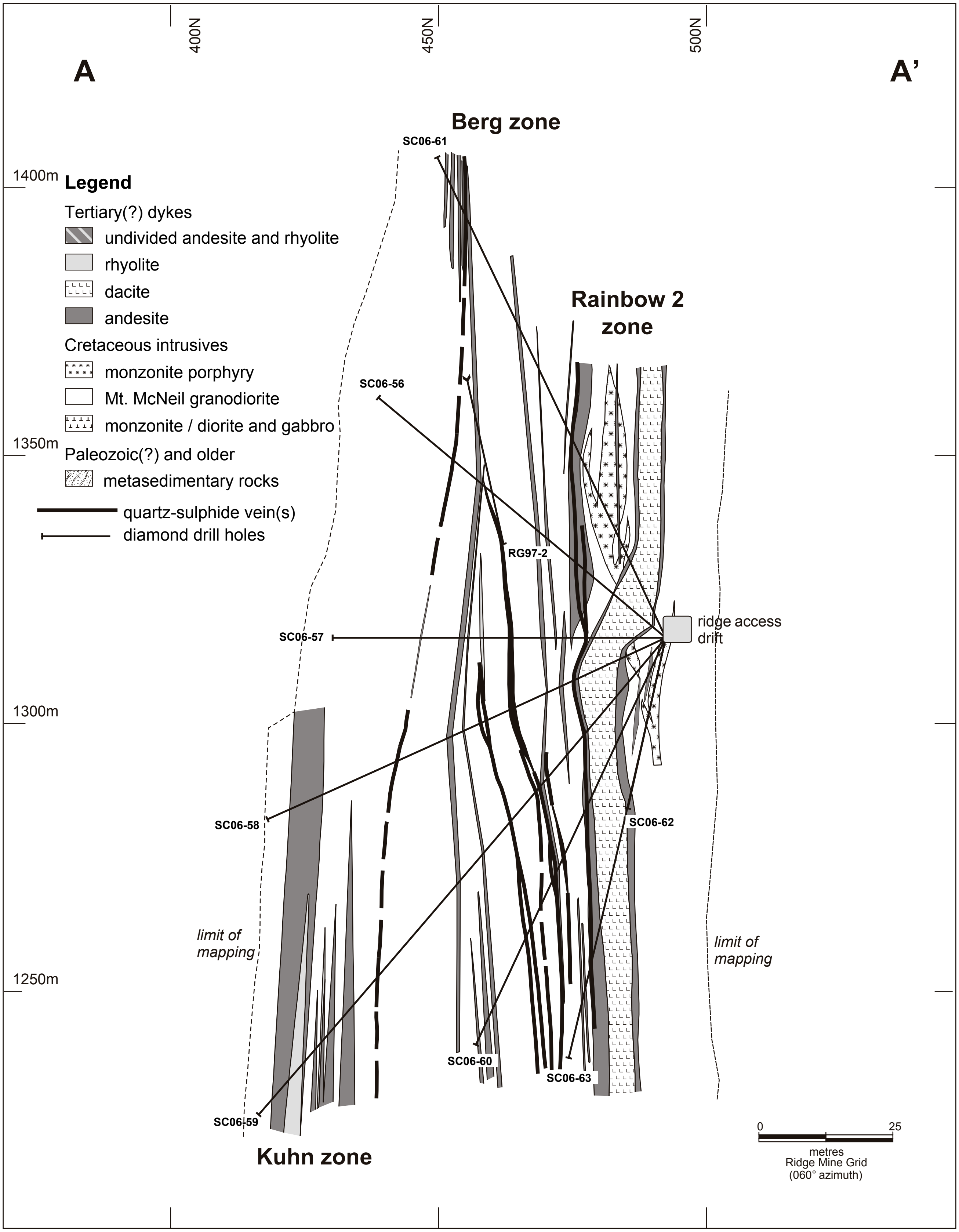

Figure 3. *DDH Cross Section A-A', geological interpretation. Location shown on Figure 2.*

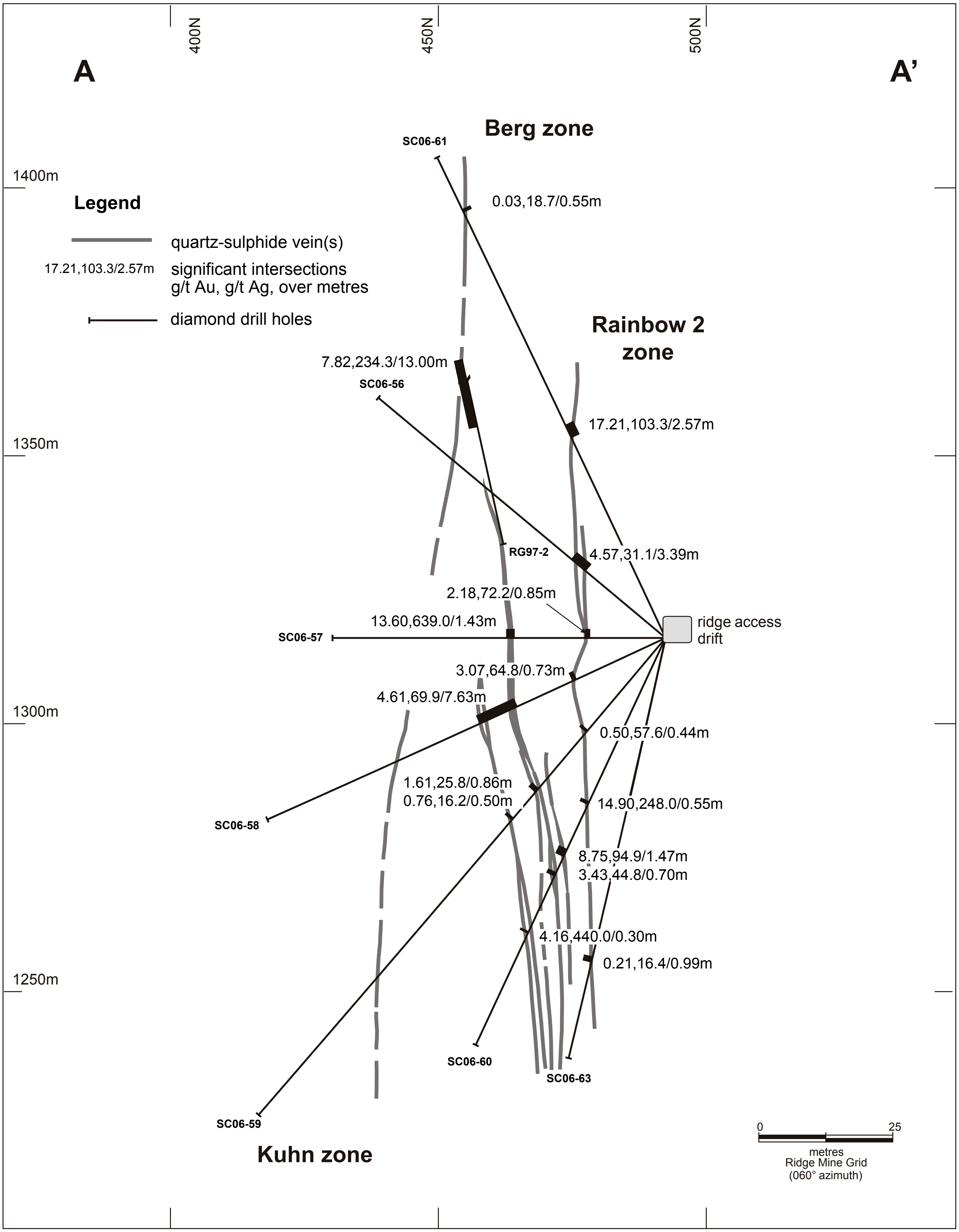

Figure 4. *DDH Cross Section A-A’, mineralization and results. Location shown on Figure 2.*

Table 2. *Selected significant intersections, Berg zone.*

Hole	Grade (g/t)		Drill length (m)
	Au	Ag	
SC06-57	13.60	639.0	1.43
SC06-58	11.57	183.3	1.86
including	23.80	329.0	0.75
SC06-70	24.57	90.0	0.95
SC06-73	18.58	244.9	2.50
SC06-78	8.15	568.0	0.30
SC06-86	23.25	397.0	1.59
including	44.23	751.7	0.83

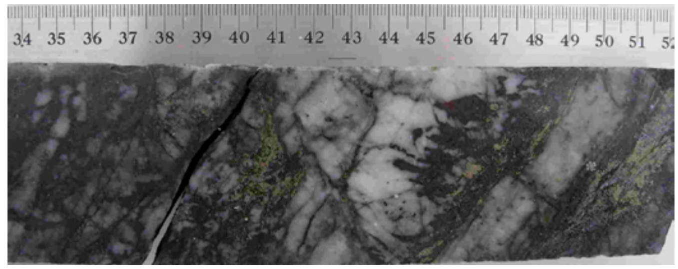

Figure 8. *Brecciated and banded textures of the quartz-sulphide mineralization of the Berg zone. Sulphide minerals consist mainly of pyrite, arsenopyrite and sphalerite. SC06-86, 23.30 g/t Au, 665.0 g/t Ag.*

The gold and silver mineralization found in the Berg zone is quite similar to that located in the Rainbow 2 zone. This is well manifested by the presence of the same set of sulphide minerals (including abundant arsenopyrite, sphalerite, galena and pyrite), high sulphide content in mineralized quartz-sulphide veins, their similar textural appearance (banded, brecciated, locally crustiform textures), etc. (Figs. 7 and 8). Perhaps, the difference is a relatively higher content of arsenopyrite in the Berg zone (with lower chalcopyrite and pyrite?), as compared to that in the Rainbow 2 zone. Another difference is observed in higher average Ag:Au ratio of the mineralization in the Berg zone (22:1), indicating greater abundance of silver, as compared to that in the Rainbow 2 zone (13:1). Finally, the mineralization found in the Berg zone more commonly bears significant antimony contents than that in the Rainbow 2 zone.

As a result of similar mineral composition, the drill intercepts of the Berg zone are also quite comparable to those of the Rainbow 2 zone in terms of the presence of high-grade gold and silver values (Table 2).

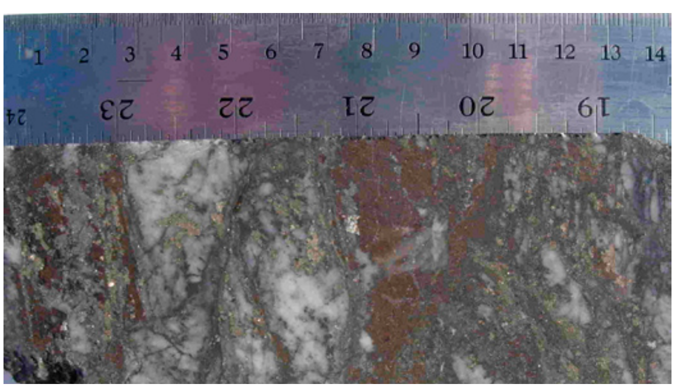

Figure 7. *Quartz-sulphide mineralization of the Berg zone showing the sheared nature of the zone. Sulphide minerals consist mainly of pyrite, arsenopyrite and sphalerite. SC06-58, 10.50 g/t Au, 519.0 g/t Ag.*

In general, the Berg mineralized zone (especially, its general controlling structure) represents an attractive exploration target for the follow-up drilling, as other large 'mineralized lenses' can be expected within this structure.

KUHN ZONE

The Kuhn mineralized zone trends 070°/ 80-85°S, and, prior to 2006, was traced by drilling over a strike length of 200 m and 350 m down dip, remaining open along strike and at depth.

The Kuhn zone geology is similar to that of the other mineralized zones. It includes a shear zone marked by intense fracturing, tectonic brecciation, faulting, commonly with tension clay, andesite, rhyolite, and composite and zoned andesite-dacite-rhyolite dykes, lenticular quartz-sulphide veins, and intense sulphide-bearing quartz, quartz-carbonate and quartz-carbonate-sericite stockwork.

The Kuhn zone carries 11.11 g/t Au and 93.5 g/t Ag over an average width of 2.89 m along a 41.0-m strike extent from the 1308-m level drift; and 29.31 g/t Au and 197.8 g/t Ag across an average width of 2.0 m and a 30.0-m strike length from the 1350-m level drift from channel samples collected in 1988. In 2003, an oblique diamond drillhole testing the northeastern depth extent of the Kuhn zone returned an incomplete intercept (due to caving) of 8.3 g/t Au, 69 g/t Ag over 2.9 m in hole SC02-16 (C.O. Naas, pers. comm., 2003).

In 2005, the Kuhn zone was intersected across 17.8 m in drillhole SC05-37, with three significant quartz-sulphide breccia/veins. The drilling returned a number of significant intercepts, including 2.83 g/t Au over 3.75 m;

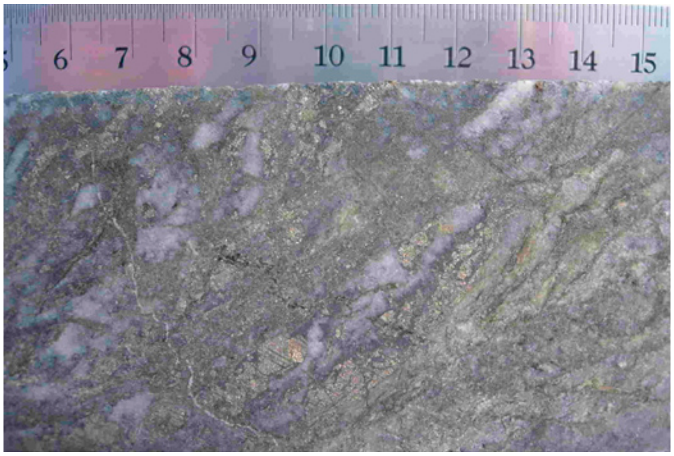

Figure 9. *Quartz-sulphide mineralization of the Kuhn Zone. Sulphide minerals consist mainly of pyrite. SC06-78, 4.58 g/t Au, 82.9 g/t Ag.*

5.04 g/t Au and 172 g/t Ag over 0.95 m in DDH SC05-37; 1.23 g/t Au and 16.0 g/t Ag over 1.2 m in DDH SC05-38; and other similar generally quite low-grade intercepts (C.O. Naas, pers. comm., 2005).

In 2006, the Kuhn zone was extended for some 310 m along strike; this brings its total identified and partially explored strike length of the zone to some 550 m. It was demonstrated that the large portion of the zone outlined in 2006 is essentially coincident with a large composite andesite-dacite-rhyolite dyke evolving into a much narrower unzoned andesite dyke toward its west-southwestern end. Similarly, the distance between the Kuhn dyke and the Berg and Rainbow 2 zones gradually becomes narrower with their possible merger expected some 200-300 m west of the end of the drift. The portion of the Kuhn zone explored in 2006 differs from previously explored sections by the presence of this large zoned andesite-dacite-rhyolite dyke.

This dyke is situated within a broad zone of intense fracturing, brecciation, quartz-sericite alteration and background disseminated pyrite, with local small zones of quartz and quartz-carbonate stringers bearing disseminated pyrite, galena, chalcopyrite, arsenopyrite, etc. (Fig. 9). Total width of the Kuhn mineralized zone may attain some 20-25 m, but decreases toward the west-southwest; it has a subvertical or very steep (80-85°) southwestern dip.

Table 3. *Selected significant intersections, 2006, Kuhn zone.*

Hole	Grade (g/t)		Drill length
	Au	Ag	(m)
SC06-73	2.48	72.9	2.82
including	3.54	120.0	1.45
SC06-78	4.58	82.9	0.27
and	5.04	53.1	0.26

Significant intercepts of the Kuhn zone obtained in 2006 are presented in Table 3.

Remarkably, average Ag:Au ratio of the mineralization in the Kuhn zone (30:1) is lower than that in the Rainbow zone (37:1) but higher than that in the Berg zone (22:1), and much higher than that in the Rainbow 2 zone (13:1).

Most of the higher gold intercepts in drilling were obtained from the highest levels of the Kuhn zone intersected by up-holes drilled at high angles at the western (west-southwestern) flank of the zone, with less gold from drill holes intersecting the Kuhn zone on the drift level in the western part of the deposit. This may suggest that the better mineralized part of the Kuhn zone plunges from the west toward the east, in similar manner to that of the Berg zone. If so, this structural pattern occurring on the Skukum Creek deposit may be one of the leading structural features controlling the mineralization.

STYLES (TYPES) OF MINERALIZATION

As noted previously, the mineralization of the Skukum Creek deposit is represented by numerous narrow lensoid and lenticular quartz (-carbonate-sericite) veins, mineralized stockwork, zones of pervasive silicification, quartz-carbonate-sericite alteration, etc. Among them, the quartz-sulphide veins are most significant and constitute the 'pivotal' element of the larger mineralized zones (Rainbow, Rainbow 2, Berg, Kuhn). Individual quartz-sulphide veins vary from several centimetres to a few metres in thickness, extending from several metres to several tens of metres along strike and down dip. Commonly, the veins merge or split into several smaller ones, locally distinguished as veining zones, pinch and swell, and experience flexure-like and sigmoid curving both along strike and down dip. The veins have essentially quartz-sulphide composition, with typically light-grey milky quartz brecciated and then cemented by dark-grey quartz, fine-grained sulphidic material, and coarser grained sulphide minerals, including pyrite, arsenopyrite, sphalerite, galena, chalcopyrite, etc.

The quartz-sulphide veins are surrounded by wide halos of mineralized stockwork, pervasive silicification and quartz-

Table 4. *Selected wider significant intersections, Skukum Creek deposit.*

Hole	Grade (g/t)		Drill length (m)
	Au	Ag	
SC06-41	2.16	22.7	6.40
SC06-58	4.61	69.9	7.63
SC06-60	2.67	43.4	6.35
SC06-65	1.92	10.1	11.66
SC06-66	0.38	60.1	12.43
SC06-68	2.43	24.4	8.02
SC06-84	4.54	48.6	8.91

carbonate-sericite alteration, containing background disseminated pyrite. Some (typically much smaller) zones contain abundant pyrrhotite, commonly associated with a propylitic-style gangue assemblage of amphibole, chlorite, epidote and quartz.

Currently, the larger quartz-sulphide veins represent the major value of the deposit; they commonly contain very high gold and/or silver values over limited widths, typically together with high sulphide contents (as well as high concentrations of Cu, Pb, Zn). Selected lower grade but much wider (than single quartz-sulphide veins) intercepts are presented in Table 4.

Most of these intervals are found in the westernmost part of the deposit, where the Rainbow 2, Berg and Kuhn mineralized zones exhibit a tendency to merge due to possible merging of the respective controlling structures. Alternatively, many of these intervals occur due to local splitting of major mineralized structures.

The productive mineralization found on the Skukum Creek deposit is characterized by significant variability in terms of mineral composition and geochemical features. The new, significantly expanded set of geochemical data makes it possible to distinguish various geochemical (and respectively mineral) types of mineralization, and to trace geochemical and mineralogical differences of mineralization occurring in different mineralized zones (Table 5).

The data presented in Table 5 illustrate several important geochemical features of gold and silver mineralization found at the Skukum Creek deposit.

In particular, at least seven different gold- and/or silver-bearing geochemical (and mineral) assemblages can be distinguished on the Skukum Creek deposit, including (1) gold-silver-bearing assemblage, with low sulphide content; (2) gold-silver-bearing assemblage, with low content of all sulphide minerals but arsenopyrite; the latter is constantly present in significant amounts providing strong enrichment in arsenic (typically more than 1% As), as a most stable geochemical signature; (3) silver-gold-bearing assemblage, also with low content of all sulphide minerals but arsenopyrite; (4) silver-gold-antimony polysulphidic assemblage, with consistant presence and great abundance of chalcopyrite, sphalerite, galena and arsenopyrite; (5) similar silver-gold polysulphidic assemblage, also with consistant presence and great abundance of chalcopyrite, sphalerite, galena and arsenopyrite, but with no essential antimony values; (6) essentially silver-bearing polysulphidic assemblage, with consistant presence and great abundance of chalcopyrite, sphalerite and galena; and (7) essentially silver-bearing assemblage, with or without bismuth mineralization and with generally low sulphide content.

The presence and abundance of various gold- and/or silver-bearing assemblages varies for different mineralized zones. In particular, the silver-gold-antimony polysulphidic assemblage (4), with consistant presence and great abundance of chalcopyrite, sphalerite, galena and arsenopyrite, appears to occur only in the Berg zone indicating the abundance of antimony as one of the most remarkable features of the Berg zone, whereas similar silver-gold polysulphidic assemblage (5), also with consistant presence and great abundance of chalcopyrite, sphalerite, galena and arsenopyrite, but with no essential antimony values predominates in the Rainbow 2 zone. The silver-gold-arsenic assemblage (4) and essentially silver polysulphidic assemblage (6) also occur in the Rainbow 2 zone only and are apparently absent in the Berg zone. In contrast, the gold-silver assemblage (1), with low sulphide content, and the gold-silver-arsenic assemblage (2) appear to be present in both the Rainbow 2 and Berg mineralized zones. Finally, the essentially silver and silver-bismuth assemblages occur both within and outside the large mineralized zones, forming typically small stockwork and veining zones.

Among these mineral assemblages, those with high sulphide content (4-6) sharply predominate the deposit and form the majority of significant intercepts obtained for the Rainbow 2, Berg and Kuhn mineralized zones during the 2006 exploration program. In addition, there appears to be some correlation between the amount of sulphide minerals and gold+silver grades, with the highest values more or less corresponding to the higher sulphide contents. Overall sulphide contents of some 10-20% are most common for gold-silver-bearing mineralized intervals,

***Table 5.** Representative assay results for various mineral assemblages on the Skukum Creek deposit.*

Drill hole	Interval, m	Au, g/t	Ag, g/t	Ag:Au	Cu, %	Pb, %	Zn, %	As, %	Sb, g/t	Bi, g/t	Zone
1. Gold-silver assemblage, with low sulphide mineral content											
SC06-58	37.20-38.14	10.80	5.1	0.5:1	0.013	0.050	0.193	0.0055	15	<5	Berg
SC06-65	23.53-24.79	16.90	43.2	2.6:1	0.034	0.596	1.230	0.0080	10	<5	Berg
SC06-74	22.19-22.63	31.60	52.4	1.7:1	0.088	0.134	1.280	0.0065	<5	<5	Rainbow 2
2. Gold-silver-arsenic assemblage											
SC06-44	62.07-62.47	14.40	72.4	5.0:1	0.108	1.040	0.641	>1	10	<5	Rainbow 2
SC06-70	36.25-37.20	24.57	90.0	3.7:1	0.128	0.590	2.388	>1	145	<5	Berg
SC06-82	39.84-40.30	30.40	94.7	3.1:1	0.104	0.664	0.637	>1	75	<5	Rainbow 2
3. Silver-gold-arsenic assemblage											
SC06-51	30.49-30.94	19.70	296.0	15.0:1	1.620	0.412	1.350	>1	<5	<5	Rainbow 2
SC06-78	44.64-45.75	33.30	145.0	4.4:1	0.215	0.410	1.740	>1	15	<5	Rainbow 2
SC06-81	37.10-37.28	70.70	710.0	10.0:1	2.140	0.298	0.517	>1	30	<5	Rainbow 2
SC06-87	21.06-22.31	16.80	133.0	7.9:1	0.227	0.800	1.450	>1	55	35	Rainbow 2
4. Silver-gold-antimony polysulphidic assemblage											
SC06-57	28.24-29.67	13.60	639.0	47.0:1	1.34	1.68	3.43	>1	1450	<5	Berg
SC06-58	30.51-31.26	23.80	329.0	13.8:1	0.49	3.17	2.96	>1	6185	<5	Berg
SC06-58	36.61-36.85	10.50	518.0	49.3:1	0.875	2.240	11.600	>1	5380	<5	Berg
SC06-86	44.76-45.59	44.23	751.7	17.0:1	1.277	8.754	14.360	>1	488	103	Berg
5. Silver-gold polysulphidic assemblage											
SC06-40	42.00-42.22	59.60	476.0	8.0:1	0.917	2.930	7.540	>1	40	135	Rainbow 2
SC06-71	19.00-19.43	16.60	805.0	48.5:1	1.800	0.579	8.940	0.9615	50	<5	Rainbow 2
SC06-75	24.30-25.10	51.30	437.0	8.5:1	0.686	2.570	5.840	0.1395	<5	<5	Rainbow 2
SC06-84	39.76-40.14	58.50	640.0	10.9:1	1.900	0.355	4.940	>1	20	<5	Rainbow 2
SC06-89	25.65-26.14	17.40	710.0	40.8:1	0.765	1.760	3.560	0.5400	<5	90	Rainbow 2
6. Essentially silver polysulphidic assemblage											
SC06-44	64.61-64.91	1.35	329.0	243.7:1	1.190	0.440	3.760	0.0050	<5	<5	Rainbow 2
SC06-76	33.75-34.75	1.44	424.0	294.4:1	1.590	2.450	6.070	0.0025	<5	<5	Rainbow 2
SC06-77	28.75-29.26	1.71	910.0	532.2:1	2.380	1.230	7.470	0.0680	<5	<5	Rainbow 2
7. Essentially silver and silver-bismuth assemblages, with low sulphide mineral content											
SC06-40	0.99-1.15	0.02	690.0	34500:1	0.012	1.050	0.370	0.0005	<5	640	-
SC06-45	3.30-3.37	0.32	1550.0	4843.8:1	0.045	0.827	0.013	0.0020	<5	3715	-
SC06-74	39.31-39.69	0.24	489.0	2037.5:1	1.180	0.193	0.374	<0.0005	25	<5	-

with locally much higher contents (up to 80-100% sulphide minerals in local parts of the mineralized intervals).

Distinct geochemical signatures of various mineral assemblages make it possible to suggest some mineralogical features, especially as to the mineral form of gold and silver; there seems to be no doubt that gold and silver are represented by various minerals (such as native gold, electrum, etc.) occurring in various proportions. In particular, comparable amounts of gold and silver in the gold-silver assemblages (1 and 2) support electrum as the major gold-silver-bearing mineral, although native gold with a high-fineness may also be present in rare cases. In contrast, the silver-gold assemblages (3-5) require the presence of one or more additional silver-bearing phases to provide very high silver grades. Finally, only silver-bearing mineral(s) occur in essentially silver-bearing assemblages (6-7). These suggestions on gold-silver mineralogy of the Rainbow 2, Berg and Kuhn mineralized zones are consistent with the data of Lang *et al.* (2003). They concluded, on the example of the Rainbow and Kuhn mineralized zones, that gold occurs mostly as electrum and minor to trace native gold, whereas silver is hosted predominantly in freibergite, with trace to minor native silver and argentite; trace amounts occur also within galena, chalcopyrite, stibnite and sphalerite.

No distinct vertical or lateral deposit-scale geochemical zonation can be established at the present stage of exploration, although, as noted above, various mineralized zones differ in their geochemical signatures. Within the mineralized zones, a larger number of productive mineral assemblages occur in structurally more complex intervals (such as their swellings). On the other hand, the lack of geochemical trends and stable geochemical variability within some 100-m vertical extent of the mineralized zones explored during the 2006 program may be attributed to significant vertical extent of mineralization.

DISCUSSION

The 2006 exploration program has resulted in additional resource expansion and delineation on the Skukum Creek deposit, with the extension of the Rainbow 2 mineralized zone for an additional 270 m further west-southwest, and discovery of the Berg mineralized zone. The program provided additional geological, structural, geochemical and mineralogical information to highlight some important features of the Skukum Creek deposit.

In particular, the exploration program has highlighted the structural position of the deposit as situated within an extended fault zone marked by numerous subparallel dyke swarms, with the respective position of the mineralization in relation to these swarms and controlling local shear structures. In total, three subparallel shears controlling larger lensoid to lenticular mineralized zones (Rainbow-Rainbow 2, Berg, Kuhn) are known; the mineralized zones are generally subvertical, with some of them possibly merging at depth, perhaps in total forming a tree-like structure. Additional structures are also marked by dyke swarms, linear hydrothermal alteration halos, and intense geochemical anomalies, with the potential to host gold mineralization.

The four presently known mineralized zones vary in the abundance of mineralized material, strike and down-dip extent, width, gold and silver grades and geochemical and mineralogical features of mineralization. In particular, the Rainbow zone is the largest and hosts the majority of the deposit resources; it is characterized by the highest average Ag:Au ratio (37:1). In contrast, the Rainbow 2 zone extends the Rainbow zone further west-southwest, and has the lowest average Ag:Au ratio (13:1), but possibly higher sulphide-mineral content. The Berg zone, also with high sulphide-mineral content, is characterized by a moderate average Ag:Au ratio (22:1), higher arsenic and especially antimony contents. The Kuhn zone also has quite high average Ag:Au ratio (30:1). Thus, several mineralized zones with different geochemical (and mineralogical) features occur together, emphasizing the complexity of the area.

In general, the Skukum Creek deposit shows structural and compositional similarities to many low-sulphidation epithermal gold-silver deposits worldwide, including Ken Snyder and Comstock Lode (Nevada, USA), Kupol and Kubaka (northeast Russia), Hishikari (Japan), El Penon (Chile), Martha Hill (New Zealand), and others. These other deposits are characterized by subvertical mineralized zones with significant depth extent (800 m and 600 m at Comstock Lode and Martha Hill, respectively; some 200 m at Hishikari and Ken Snyder; 300-400 m at Kupol; etc.) and variable Ag:Au ratio (1:1 at Kubaka, Hishikari, and Martha Hill; 10:1 at Ken Snyder; 12:1 at Kupol; 19:1 at El Penon; 23:1 at Comstock Lode). Occurrence of several mineralized veins on the upper level and their merging into a much larger single mineralized body down dip is common for some of these deposits (e.g., Kubaka, etc.). All this may suggest significant potential of the Skukum Creek deposit at depth.

However, the majority of these large epithermal deposits have much lower sulphide-mineral content (typically 1-3% sulphide minerals), that significantly distinguishes them from the Skukum Creek deposit, which typically has some 10-20%, locally greater than 80%, sulphide minerals in the mineralized zones hosting gold-silver mineralization. No such features as open-space filling textures, crypto-crystalline quartz, bladed calcite replaced by silica, typical for epithermal gold-silver deposits are observed at the Skukum Creek deposit. Interestingly, the Skukum Creek deposit differs in this regard from the Mount Skukum deposit situated nearby and related to the same volcanic-plutonic complex.

To some extent, these differences can be explained by assuming essentially deeper conditions of formation of the Skukum Creek deposit. This explanation, in particular, is favoured by the occurrence of a greater amount of sulphide minerals on deeper levels of the Mount Skukum mine. Respectively, the Skukum Creek deposit would be considered as transitional from epithermal to porphyry (rather gold-porphyry) environment.

An alternative explanation could be provided, if one considers the variability of sulphide-mineral contents within the epithermal class of gold-silver deposits. Actually, some of the epithermal gold-silver deposits are formed at shallow depths but are still characterized by the abundance of sulphide minerals. Commonly, these deposits are distinguished as epithermal gold-silver-base metal deposits. In particular, the Victoria deposit (Luzon, Philippines) is characterized by close association of gold with quartz, sphalerite, galena and chalcopyrite. In relatively high-gold zones, sphalerite and galena are abundant (Claveria *et al.,* 1999). Another example is represented by numerous epithermal gold-base metal deposits in southeast Europe (Baia Mare and others; Grancea *et al.,* 2002). Some of these deposits are clearly related to volcanic complexes with shoshonitic affinity. It is interesting that, in turn, some of these deposits are considered as links (or precursors) to gold-rich volcanic-hosted massive sulphide deposits. In general, these considerations would suggest yet stronger geological complexity of the area, with possible occurrence of different volcanic suites.

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