Structural settings and geochemistry of the Myschka gold prospect, Tintina Gold Belt, Mt. Selous area (105K/16, 105N/1), Yukon

Serguei G. Soloviev, Carl M. Schulze and Oleksiy E. Baklyukov
Klad Enterprises Ltd.[1]

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ABSTRACT

The Myschka property overlies a large mineralized area within and adjacent to a 1200 m by 600 m Cretaceous Tombstone Suite granodioritic intrusion. Mineralization is controlled by at least four wide east-west-trending lensoid zones of faulting, brecciation and hydrothermal alteration. Just north of the intrusion, the zones were followed for a distance of 1500 m; widths of individual zones vary from 20 to 100 m. The zones tend to coalesce into much wider (up to 200 m) brecciated packages that dip steeply (70-85°) to the south and apparently crosscut the intrusive. A network of northerly dipping fault and alteration zones crosscut these breccias.

The breccias include intensive quartz stockwork and thicker quartz-filled shear zones containing disseminated gold-bearing sulphide (pyrite, arsenopyrite) mineralization. Rock samples returned numerous strongly anomalous gold values ranging from 200 ppb to 1.05 g/t throughout the extent of the breccia zones. Larger quartz veins locally exhibit much stronger sulphide enrichment, resulting in higher Ag, Bi, Sb, Pb, Zn and Cu values influencing property-scale geochemical zonation. A distinctive gold and pathfinder element soil anomaly is coincident with the breccia packages.

During the 2002 exploration program, the prospect was advanced to drill-ready stage. Proposed drilling will test subsurface continuation of gold-bearing fault/breccia and alteration zones into the intrusive rock.

RÉSUMÉ

La propriété Myschka repose sur une vaste zone minéralisée qui se trouve à l'intérieur et près d'une intrusion granodioritique de la Suite de Tombstone du Crétacé (1200 m sur 600 m). La minéralisation est contrôlée par au moins quatre grandes zones lenticulaires à direction est qui sont faillées, bréchifiées et altérées par des fluides hydrothermaux. Juste au nord de l'instrusion, on a suivi les zones sur une distance de 1500 m; les largeurs individuelles varient de 20 à 100 m. Elles ont tendance à fusionner pour former de vastes brèches (jusqu'à 200 m de large) qui pendent fortement (70-85°) vers le sud et recoupent apparemment l'intrusion. Un réseau de zones faillées et altérées inclinées vers le nord recoupent ces brèches.

Les brèches incluent un stockwork de quartz et des zones de cisaillement plus épaisses remplies de quartz recelant des sulfures aurifères disséminés (pyrite, arsénopyrite). Les échantillons de roche prélevées sur toute l'étendue des zones bréchifiées ont donné de fortes anomalies d'or variant de 200 ppb à 1,05 g/t. Les plus gros filons de quartz affichent localement un enrichissement plus marqué en sulfures, d'où des teneurs plus élevées en Ag, Bi, Sb, Pb, Zn et Cu qui influent sur la zonation géochimique à l'échelle de la propriété. Une anomalie caractéristique d'or et des éléments indicateurs dans le sol coïncide nettement avec les ensembles de brèches.

Au cours de la campagne d'exploration de 2002, on a poursuivi les travaux de préparation jusqu'à l'étape des forages. Ceux-ci permettront de vérifier la continuation souterraine des zones faillées/bréchifiées et altérées aurifères dans la roche intrusive.

[1]*104-135 10th Ave S., Cranbrook, British Columbia, Canada V1C 2N1, tel: 250-489-5156, fax: 250-489-5185, info@chapleauresources.com*

INTRODUCTION

The Myschka property, 100% owned by Klad Enterprises Ltd., is situated 110 km north of the town of Ross River, Yukon, within the Tintina Gold Belt (Fig. 1). The property is located 60 km west of the North Canol Road, which extends northeast from Ross River to the Yukon-Northwest Territories border near the Mactung tungsten deposit. The property is centred at 62°59' north latitude, 132°07' west longitude on NTS map sheets 105K/16 and 105N/1, and consists of 106 contiguous Yukon quartz mining claims covering 2216 hectares (5475 acres). Two airstrips of unknown condition exist roughly 9 km to the southeast and 5 km to the southwest of the central property area.

The Myschka property is part of a large cluster of base metal, silver and gold occurrences found within or close to the eastern contact of the Mt. Selous Batholith belonging to the 92 Ma mid-Cretaceous Tombstone Intrusive Suite, the major magmatic and metallogenic unit of the Tintina Gold Belt (British Columbia and Yukon Chamber of Mines, 2000). The mineralized cluster in its currently known extent, occupies an area exceeding 20 by 20 km, and incorporates several small granitoid stocks apparently satellitic to the Mt. Selous Batholith. The set of mineral occurrences includes high-grade lead-zinc-silver (galena, sphalerite) veins, chalcopyrite-pyrrhotite (+ scheelite?) skarns, stockwork and disseminated sulphide-related (pyrite, arsenopyrite) gold mineralization, and bismuth-copper (chalcopyrite), arsenic (arsenopyrite) and antimony (stibnite) veins. This is very similar to the set of intrusive-related mineral deposits and occurrences known within some other large mineralized districts of the Tintina Gold Belt. The broad occurrence of lead-zinc-silver and gold shows the Mt. Selous cluster to be most similar to mineralization in the Mayo and Keno Hill areas, although some local variations (in particular, greater abundance of sphalerite in the base metal veins) are well pronounced. A base metal (+As, Sb) signature is usually considered to reflect a distal position of gold mineralization relative to a parental pluton (Mortensen et al., 1996), although some variations in metallogenic specialization of the intrusives (and related mineralized districts) can also be considered.

EXPLORATION HISTORY

In 1967, the Lad claims were staked roughly 5 km west-southwest of the present Myschka property centre by the Hess Project (Atlas EL, Quebec Cartier Mining Company and Phillips Brothers (Canada) Ltd.). Work consisted of geological and geochemical surveying, and hand trenching, followed in 1969 by road construction and bulldozer trenching. The program revealed a Pb-Zn-Ag occurrence exposed for 15 m, with values averaging 205.7 g/t Ag, 6% Pb, 3% Zn and 2% Cu across widths of

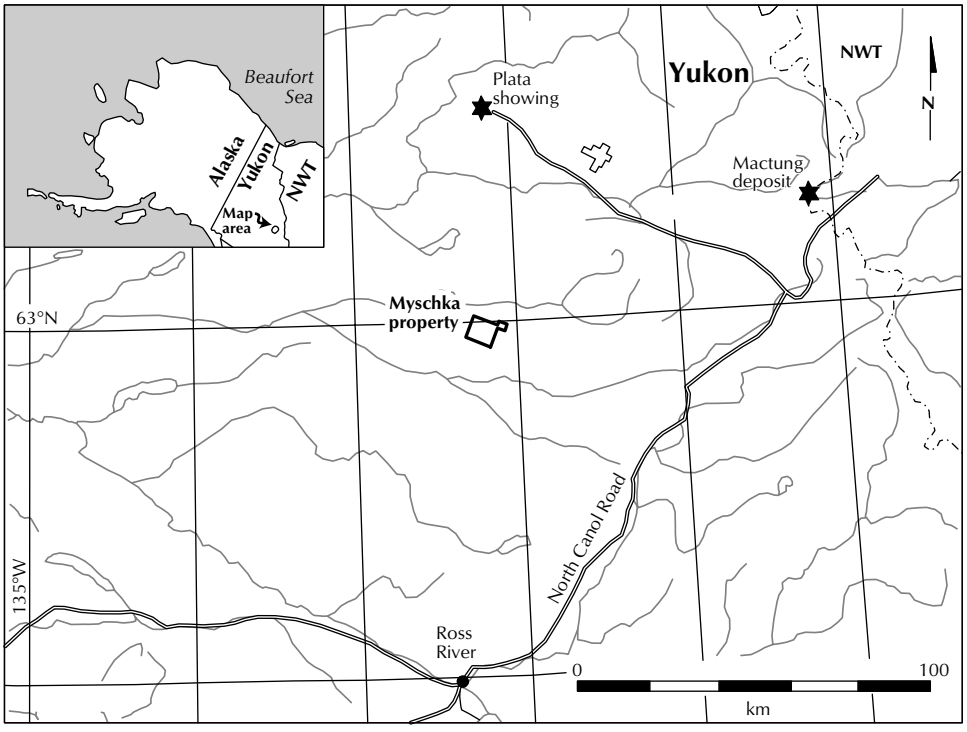


Figure 1. *Location of Myschka property.*

0.3 to 3.0 m. In 1974, the Atlas interest was transferred to Cima Resources Ltd., which, in 1977, drilled two holes totaling 252 m. The drilling intersected two parallel veins within a fault zone; the upper vein returned 133.7 g/t Ag, 5.3% Pb and 4.7% Zn across 1.2 m, and the lower one returned values up to 48.0 g/t Ag, 0.4% Pb and 1.6% Zn across 2.1 m (Yukon MINFILE, 2001).

The current north-central portion of the Myschka property was originally staked in 1968 as the Solo claims by the Hudson Bay Mining and Smelting Company, which conducted grid soil sampling and geological mapping in 1968 and 1969. In 1990, Noranda Exploration Company Ltd. staked the Rush claims covering portions of the southern Myschka claims. Selected samples returned values up to 3017 g/t Ag, 75% Pb and 0.2% Zn; a separate sample returned 665 g/t Ag (Yukon MINFILE, 2001).

In 1996-1997, Mr. Ron Berdahl, a Yukon prospector, staked the Andrew claims centred about 6 km southwest of the present Myschka property centre to cover an old occurrence described as Ag-Pb-Zn-Cu veins. A composite grab sample of oxidized surface material returned a value of 17% Zn (Burke, 2000). Subsequently, the claims were optioned to Noranda Exploration Company Ltd., which added the AMB 1-111 claims, and followed up in 2001-2002 with surface exploration and a diamond-drilling program. This work investigated the potential of this mineralization, considered to be of a sedimentary-exhalative (SEDEX) style. The work, however, proved that the mineralization is of hydrothermal origin (M. Burke, pers. comm., 2002).

The area has been mapped by the Geological Survey of Canada and has been covered by the National Geochemical Reconaissance stream-sediment sampling program (Friske et al., 1990), which has identified the property area as having highly anomalous arsenic, antimony and gold values. In 1998, Viceroy International Exploration Ltd., in the course of a regional gold reconnaissance program, conducted limited surface geochemical sampling and geological mapping in the area and staked the Myschka 1-16 claims. Viceroy also staked the Tarakan claims, 15 km northwest, and the Uragan claims, 6 km northeast, to cover gold occurrences. In 1999 Viceroy transferred its 100% interest in the claims to Novagold Resources Inc. which allowed the Myschka claims to lapse. In 2001, the central portion of the Myschka property was staked as the Sophia claims by Ron Berdahl. In 2002, Klad Enterprises Ltd. optioned these claims and staked the adjoining Myschka 1-96 and Dasha 1-6 claims, obtaining a 100% interest in the entire package.

REGIONAL GEOLOGY

The Myschka property is located within the Tintina Gold Belt (British Columbia and Yukon Chamber of Mines, 2000), which follows a trend of mid- to Late Cretaceous granitoid (diorite, granodiorite, quartz monzonite, syenite) intrusions that extend from central Alaska, across central Yukon, to the Yukon-British Columbia border. This belt is roughly parallel to the ancient North America craton boundary. In Yukon, the belt is superimposed on the Selwyn Basin, a thick sequence of shelf and off-shelf continental margin sedimentary rocks formed from late Precambrian to Triassic time (Gordey and Anderson, 1993).

The southeastern portion of the Selwyn Basin, including the Myschka property, is underlain by a broad package of Ordovician to Devonian Road River Group and Devono-Mississippian Earn Group sedimentary rocks, with upper Precambrian to Lower Cambrian Hyland Group sedimentary units extending northwest of the property. Hyland Group sedimentary rocks consist largely of coarse clastic 'grits', shales and lesser limestone and calcareous clastic rocks. Road River Group rocks consist mostly of thick chert horizons with lesser interbedded shale, limestone and calcareous mudstone, with minor mafic volcanic units. Earn Group rocks consist of chert-pebble conglomerate and greywacke, as well as lesser shale and sandstone.

The Mt. Selous Batholith, roughly 20 by 12 km, represents the largest Tombstone Suite pluton in the property area. The batholith is generally oval-shaped and elongated roughly southeast-northwest; the shape of its eastern contact suggests it extends eastwards beneath the Paleozoic sedimentary rock, which has been intruded by several much smaller satellitic stocks. Notably, the majority of known mineral occurrences in the area are found to the east of the batholith exposure. The intrusive rocks are largely medium- to coarse-grained weakly porphyritic hornblende-biotite to biotite-hornblende quartz diorite to quartz monzonite. Late felsic dykes (quartz-feldspar porphyritic granites) occur locally.

The area is transected by a number of northwest-striking faults and fault zones, the largest of which is attributed to an eastern extension of the Jurassic–Early Cretaceous Robert Service Thrust. This major regional-scale south-

dipping thrust fault extends across the southern property boundary, emplacing Hyland Group sedimentary rocks over the Road River and Earn Group packages, and forming an east-trending thrust fault (GSC Open File 2174). Distinctive fault zones found within the mid- to Late Cretaceous Tombstone Suite intrusive rocks suggest, however, that faulting could also be syn-plutonic (and control the mineralization). Faulting could even postdate the Late Cretaceous, and possibly be synchronous with the initialization of motion along the Tintina Fault (Flanigan et al., 2000b).

PROPERTY GEOLOGY

The property is centred on a 1200 m by 600 m west-southwest-elongated Tombstone Suite quartz diorite intrusion situated 10 km east of the Mt. Selous Batholith (Fig. 2). This apparently satellitic stock intrudes the Road River Group sequence of thin- to medium-bedded chert and lesser shale. A smaller quartz diorite stock occurs some 500 m southeast of the central stock. A swarm of east-southeast-trending quartz-feldspar porphyritic dykes occurs proximal to the central stock, particularly along the southeastern contact. Bedding of the sedimentary rocks extends roughly east-southeast, dipping steeply to the south-southwest. To the west, a northwest-trending fault separates the Road River Group rocks from the Earn Group chert-pebble conglomerate to the west. To the south of the map area, the Robert Service Thrust fault extension separates these rocks from the Hyland Group, which consists primarily of coarse clastic 'grits' and shale, but includes a kilometre-wide southeast-trending crystalline limestone unit.

The area adjacent and immediately north of the central stock contains a suite of east-west-trending lenticular mineralized zones of fracturing, brecciation and hydrothermal alteration. To date, four major zones have been identified: from north to south these are the Rainbow Zone; the Second Zone, which bifurcates into the Second A and Second B Zones; the Upper Zone just north of the intrusive; and the Back Zone along the southern intrusive contact. The zones have been delineated for strike lengths to 1500 m, with widths ranging from 20 to 100 m; they have a tendency to

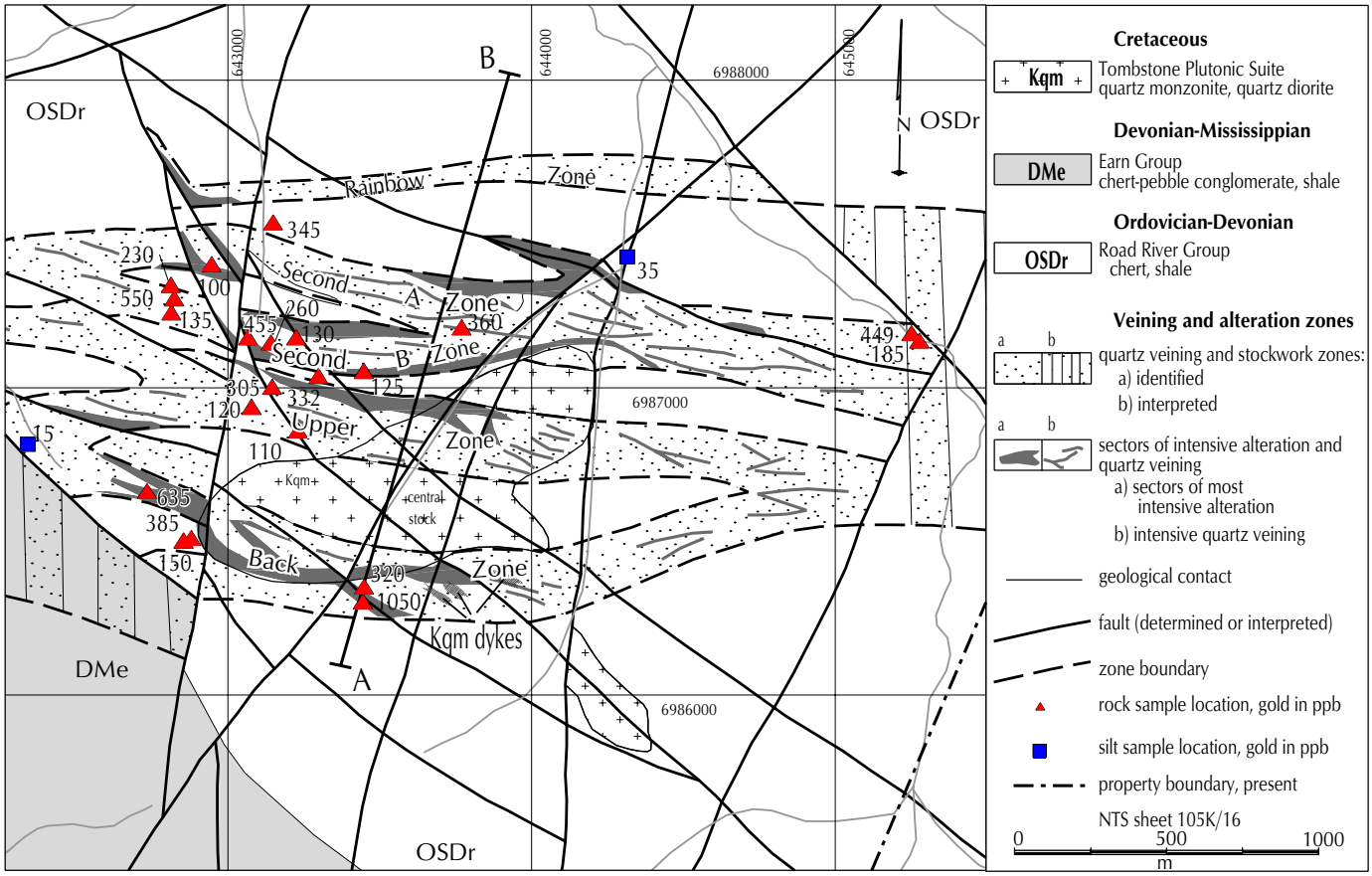


Figure 2. *Compilation map of Myschka area.*

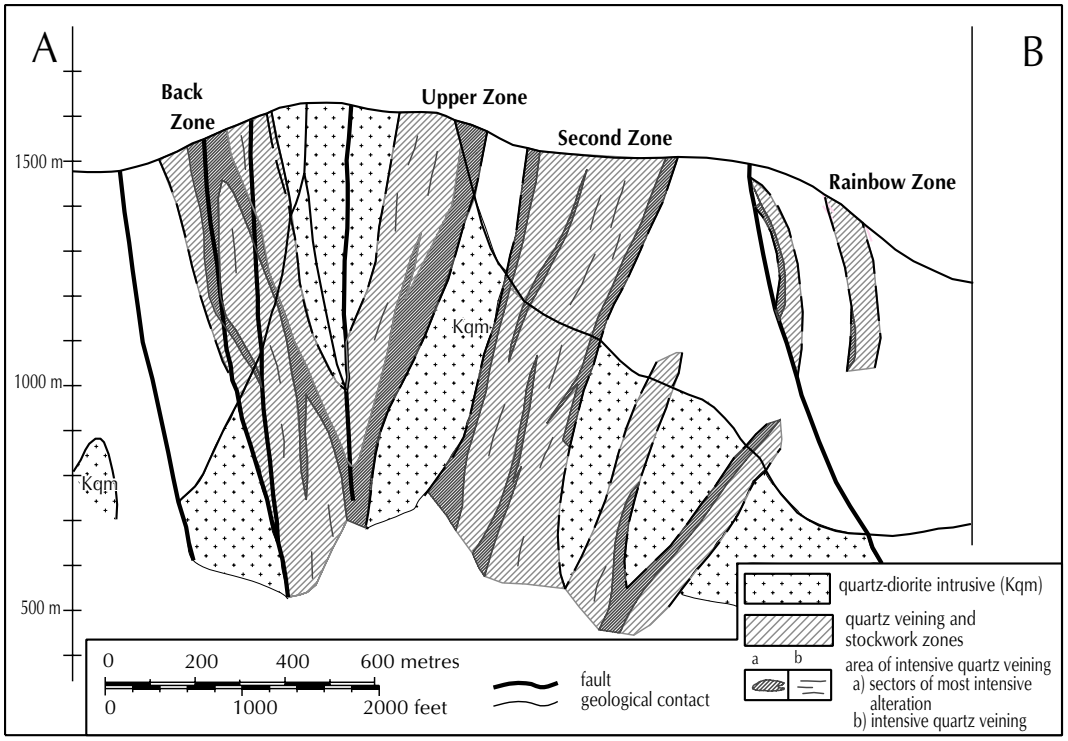


Figure 3. *Hypothetical section: line A-B (see Figure 2), Myschka property, looking west.*

coalesce into much wider brecciated packages up to 200 m wide. These breccia zones dip steeply (70-85°) southwards, with local north-dipping sections; they are interpreted to crosscut the intrusive rocks at shallow depths (Fig. 3). These zones contain intensive auriferous quartz stockwork and larger quartz-filled shear-like fractures, as well as intervals of 'bulk' mineralization. Probably, these and other similarly oriented zones also control some of the lead-zinc-silver veins.

Although narrow and less expressed in the form of brecciation, the west-northwest and north-northeast-trending faults are also important in controlling mineralization. A significant portion of higher grade gold mineralization occurs at the intersections of the major east-west-trending breccia zones and west-northwest-trending fault zones. In contrast, some of the north-south- and north-northeast-trending fault zones locally control high-grade lead-antimony-silver veins. However, these sulphide-enriched veins commonly occur along north- (or north-northwest-) trending faults where they intersect the major east-west-trending breccia zones. Displacement of the major east-west-trending zones by barren or weakly mineralized north-trending faults has occurred locally.

Variably oriented fault zones form a closely spaced intersecting network focusing on and adjacent to the central intrusive stock. This 'intersection area', marked by higher metal values in brecciated sedimentary rocks proximal to the stock, is also coincident with a large and well pronounced Au, Bi, Pb, Ag, Sb and much wider As soil anomaly overlying the essentially overburden-covered stock.

ALTERATION AND MINERALIZATION

A broad system of argillic (clay) alteration, silicification and locally intensive phyllic (sericite) alteration occurs within the Road River Group chert surrounding the central stock, particularly to the north and east, where the alteration extends more than 1 km outbound. Alteration, associated with strongly weathered gossans, is more intense within the east-west-trending breccia zones, which contain local areas of advanced argillic alteration and/or intense silicification. Quartz stockwork and thicker quartz-filled shear zones occur throughout the brecciated packages. Local zones of stronger alteration are also found along the northwest and north-northeast-trending faults. Strong to moderate hornfelsing also occurs adjacent to the stock.

A broad area of disseminated and fracture-controlled sulphide mineralization is coincident with the alteration area, largely north and east of the central stock. Fine- to medium-grained pyrite with subordinate arsenopyrite,

commonly altered to scorodite, are disseminated, both within quartz stockwork and altered sedimentary rocks. Local areas of stronger scorodite staining indicate zones of arsenopyrite enrichment.

Most sulphide grains within the mineralized area, typified by well developed gossans, have been completely leached, leaving a strongly limonitic 'boxwork.' However, local zones of relatively unweathered quartz-arsenopyrite veining occur throughout the mineralized area. There is a remarkable difference in gold values returned by strongly weathered and less weathered material. Strongly leached rock samples yielded anomalous but generally low gold values, extending into the 100-200 ppb Au range. In contrast, less weathered quartz-arsenopyrite (± pyrite) veins and strongly silicified rock, with disseminated pyrite ± arsenopyrite, returned higher gold values, commonly in the range of 300-650 ppb Au, extending up to 800 ppb. These variations in gold grades, and characteristic association of gold with high arsenic values, are typical of the exposed portion of the east-west-trending breccia zones in sedimentary rocks outside the intrusive stock.

Table 1. *Representative rock sample assay results for various sulphide assemblages*[1].

Sample	Au (ppb)	Ag (ppm)	As (ppm)	Bi (ppm)	Cu (ppm)	Pb (ppm)	Sb (ppm)	Zn (ppm)
Major gold-arsenic (pyrite-arsenopyrite) assemblage								
M3014	360	4.4	570	62	96	12	8	178
M5004	449	0.7	>10 000	10	70	7	35	18
M5006	185	3.2	405	<2	47	15	32	12
M1003	455	4.0	>10 000	20	84	18	28	22
Copper-arsenic (chalcopyrite-pyrite-arsenopyrite) assemblage								
M2134	125	41.2	>10 000	264	1.73%	<2	82	562
M1060	332	8.2	>10 000	22	744	35	252	15
M2133	40	5.0	18	82	1490	<2	2	542
Zinc-copper (sphalerite-chalcopyrite) assemblage								
M2046	<5	0.6	932	<2	243	34	50	2180
M2128	25	0.4	16	<2	62	12	8	1035
Lead-silver-arsenic-zinc (galena-arsenopyrite-sphalerite) assemblage								
M3023	20	113	250	<2	17	1.32%	168	160
M3024	385	652	>10 000	<2	169	10.85%	558	2270
M3025	25	133	1335	12	23	2.23%	100	1580
M3026	150	197	5760	<2	88	4.22%	178	1020
M3027	75	150	322	<2	42	2.10%	118	462
M1021	135	60.8	566	12	12	1030	212	4
M2104	10	25.4	3620	520	322	1520	102	138
M2075	305	39.6	>10 000	384	627	1770	1195	120
Antimony-lead-arsenic-silver (stibnite-arsenopyrite-galena) assemblage								
M1000	120	49.0	>10 000	834	191	5070	3420	66
M1016	230	46.6	>10 000	<2	33	3.46%	8530	96
M1019	550	57.2	>10 000	<2	15	6.87%	>10 000	228
M1043	1050	560	>10 000	1540	174	4.70%	>10 000	488
M1045	70	54.4	4430	82	13	1.96%	8210	54
M1046	320	116	>10 000	132	120	4.73%	>10 000	1225
M1048	635	409	>10 000	26	832	3820	2960	1955

[1]*Assays were performed in ALS Chemex labs of North Vancouver, B.C. All rock samples were pulverized until 85% of fragments were less than 75 microns in size; then an evenly mixed 30 g portion was analysed for 34-element aqua regua ICP-AES, as well as gold by fire assay with atomic absorbtion finish. «Overlimits» of Ag, Pb, Sb, Cu were reanalysed to provide respective elemental contents.*

In addition to the major auriferous pyrite-arsenopyrite assemblage, there are several other sulphide-rich mineral assemblages that, although smaller and more sporadically located, contribute to the mineral and geochemical zonation of the property. These assemblages are listed in Table 1. Generally, observed variations in the gold grades and values of associated metals, as well as mineralogical signatures, indicate the existence of several successive sulphide mineral assemblages (stages?) superimposed within the central property area. Auriferous quartz-pyrite-arsenopyrite stockwork and disseminated mineralization apparently represents the earliest stage, whereas other sulphide-rich assemblages occurred later, forming a geochemical evolutionary trend from gold-enriched (with relatively high Au/Ag ratio) associations, toward silver-enriched ones. Also quite evident is the presence of at least two generations of bismuth minerals, one associated with chalcopyrite and probably copper sulphosalts, the other associated with galena and lead-antimony sulphosalts.

SOIL GEOCHEMISTRY

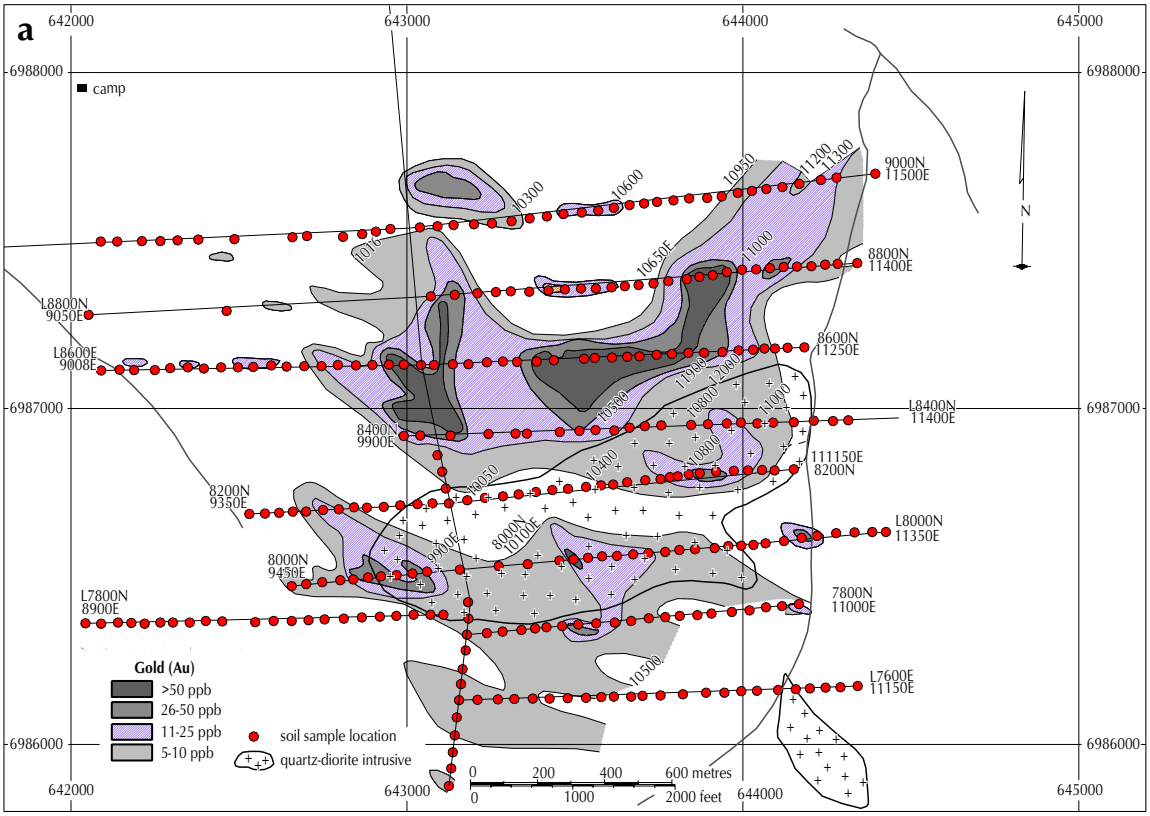
A total of 417 soil samples have been taken to date on the Myschka property. The sampling program revealed a broad area of anomalous values of Au, Ag, As, Pb, Sb, Cu, Zn and Bi (Fig. 4a-f). This complex anomaly covers the central stock, extends far to the east and west along the breccia and alteration zones, and is essentially open in these directions. The anomaly is 'mosaic-textured,' incorporating a number of local maxima attributed to the intersections of the major east-west trending zones with faults of other orientations. Very notably, some of these maxima occur within overburden overlying portions of the central intrusive stock. This supports the idea that major structures extend across (and within) the stock, perhaps hosting higher metal values here than within altered sedimentary rock. This feature, being relatively less pronounced for gold (with higher gold-in-soil values occurring in the breccia packages, mainly outside the stock contours), is clearly evident for Ag, As, Bi, Pb and other elements.

The gold-in-soil anomaly incorporates three well pronounced maxima. From west to east they measure 350 m by 200 m (with values from a minimum of 50 ppb to 260 ppb Au), 400 m by 200 m (50-110 ppb Au), and 300 m by 150 m (50-105 ppb Au; Fig. 4a). The most eastern anomaly is coincident with a west-northwest-trending fault zone crosscutting the major east-west-trending breccia packages at a low angle. Several strong silver-in-soil maxima are also present; the strongest one (with values from 10 to 65.6 g/t Ag), measuring 300 m by 250 m, is coincident with silver-bearing galena veining southwest of the stock (Fig. 4b). Other elements also form strong in-soil-maxima, including Sb (up to 786-990 ppm in soils; Fig. 4c), Bi (up to 72 ppm in soils; Fig. 4d), Pb (up to 1.24% in soils; Fig. 4e), Cu (up to 736 ppm in soils) and Zn (up to 3940 ppm in soils, higher than the highest zinc-in-rock value obtained). These metal anomalies have a larger aerial extent than the gold anomalies.

The largest one is the east-west elongate arsenic anomaly (locally more than 1% arsenic-in-soil values) that covers an area exceeding 1.5 by 2 km (Fig. 4f) and is open to the east and west.

Two very important features of the soil anomalies must be emphasized. Firstly, the occurrence of Ag, Pb, Sb, Bi and Zn maxima and overall anomalies attributed to the later mineralizing stages are found within the much wider As anomaly attributed to the earlier stage; this suggests 'telescoping' of spatial evolution of the mineralization toward the lateral centre of the system, marked by the central intrusive stock. This indicates essentially structural, rather than thermal, controlling factors caused this 'inverse,' or 'backward' (earlier assemblages throughout, later assemblages inside) geochemical trend. Interestingly, a similar geochemical trend apparently occurs on a larger scale within the entire Mt. Selous district, where Pb-Zn-Ag veins are more proximal to the batholith than Au-As mineralization.

Secondly, the stronger expression of Ag, Pb, Sb and Zn (later assemblages) mineralization, including soil anomalies, compared to Au mineralization (earlier assemblage) may indicate that the current erosion level exposes just 'the top' of the system, here dominated by later assemblages. As a result, a much stronger expression of the earlier gold-enriched assemblages can be expected at deeper levels. This model would be in agreement with relatively high As/Bi ratios typical of the property and, similar to numerous other Tintina Gold Belt occurrences, indicates a very high (almost uneroded) vertical level of the exposed mineralized system (Flanigan et al., 2000a).



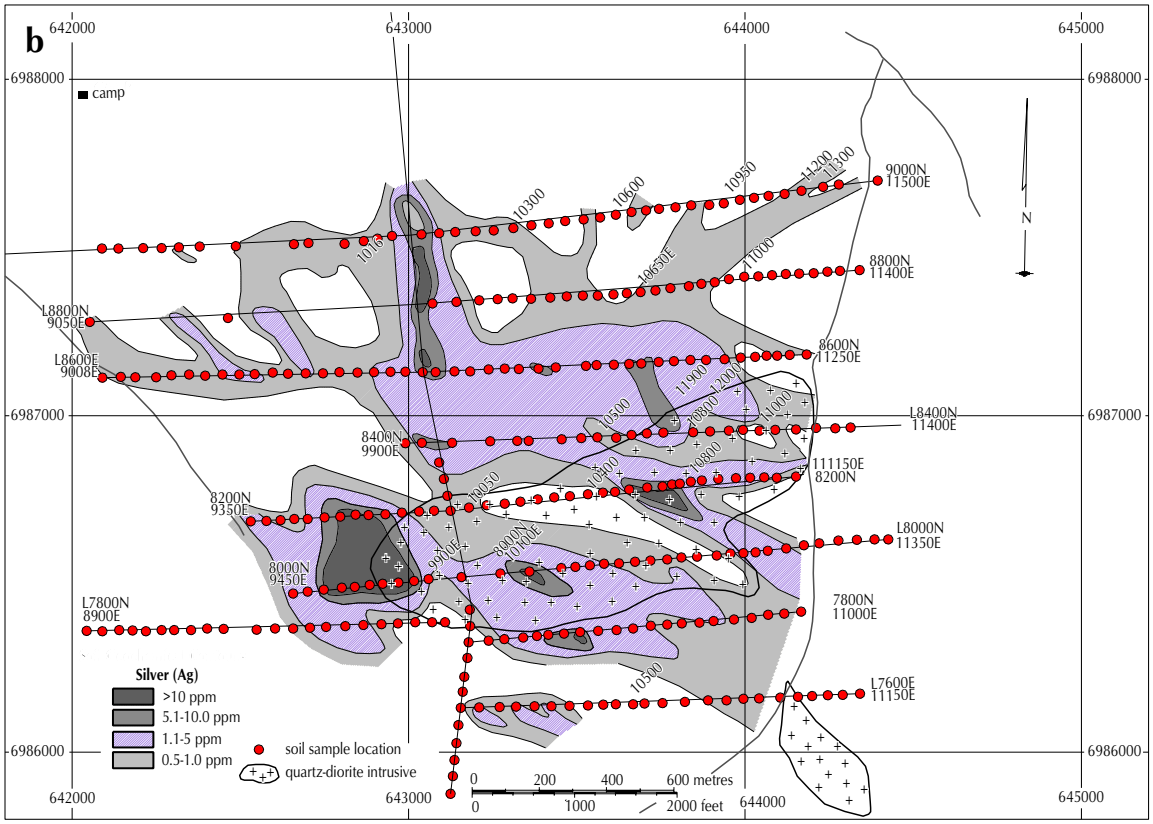
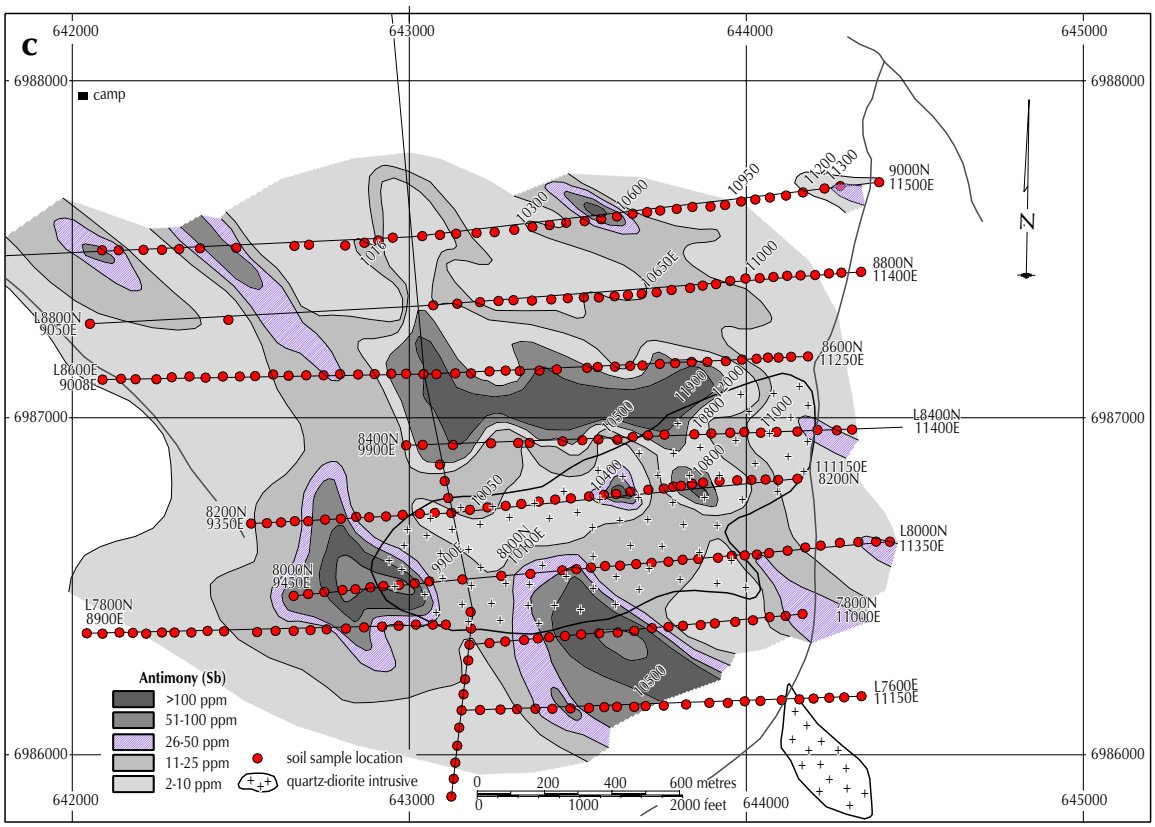
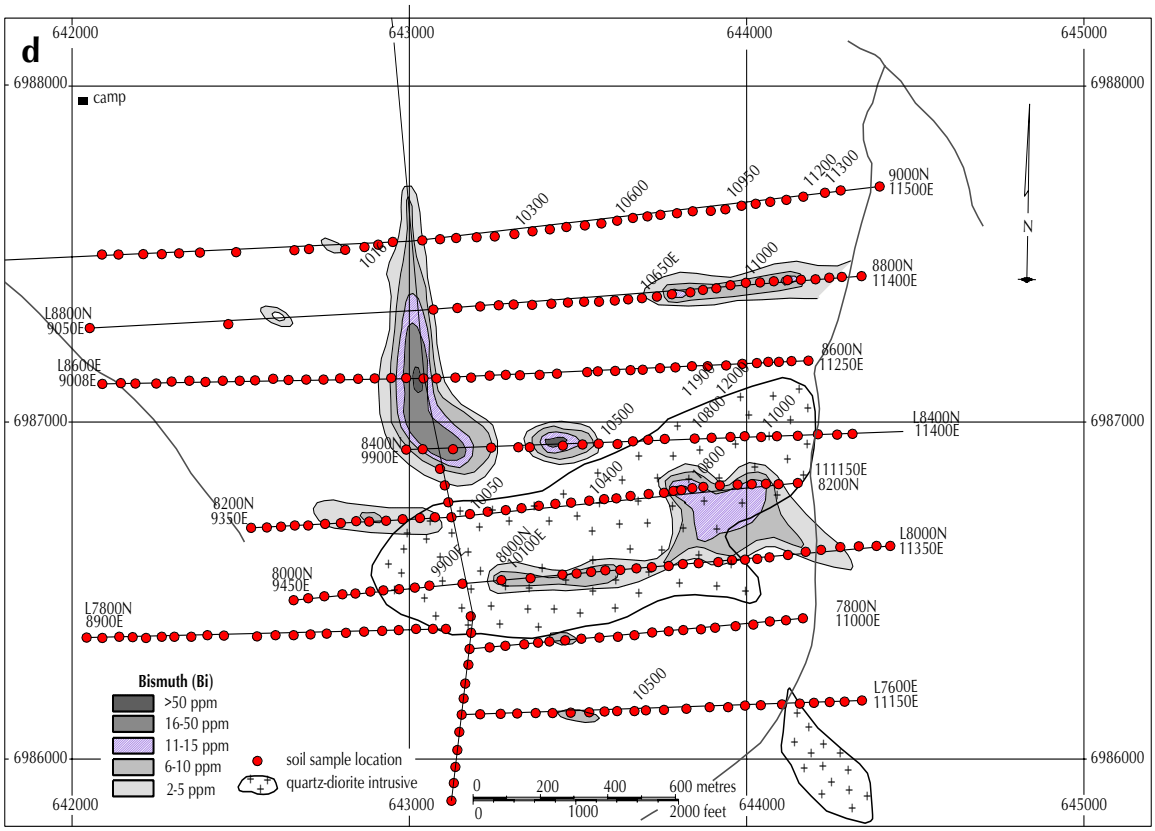


Figure 4. *Soil geochemical contours:*
(a) *gold*
(b) *silver*
(c) *antimony*
(d) *bismuth*
(e) *lead*
(f) *arsenic.*





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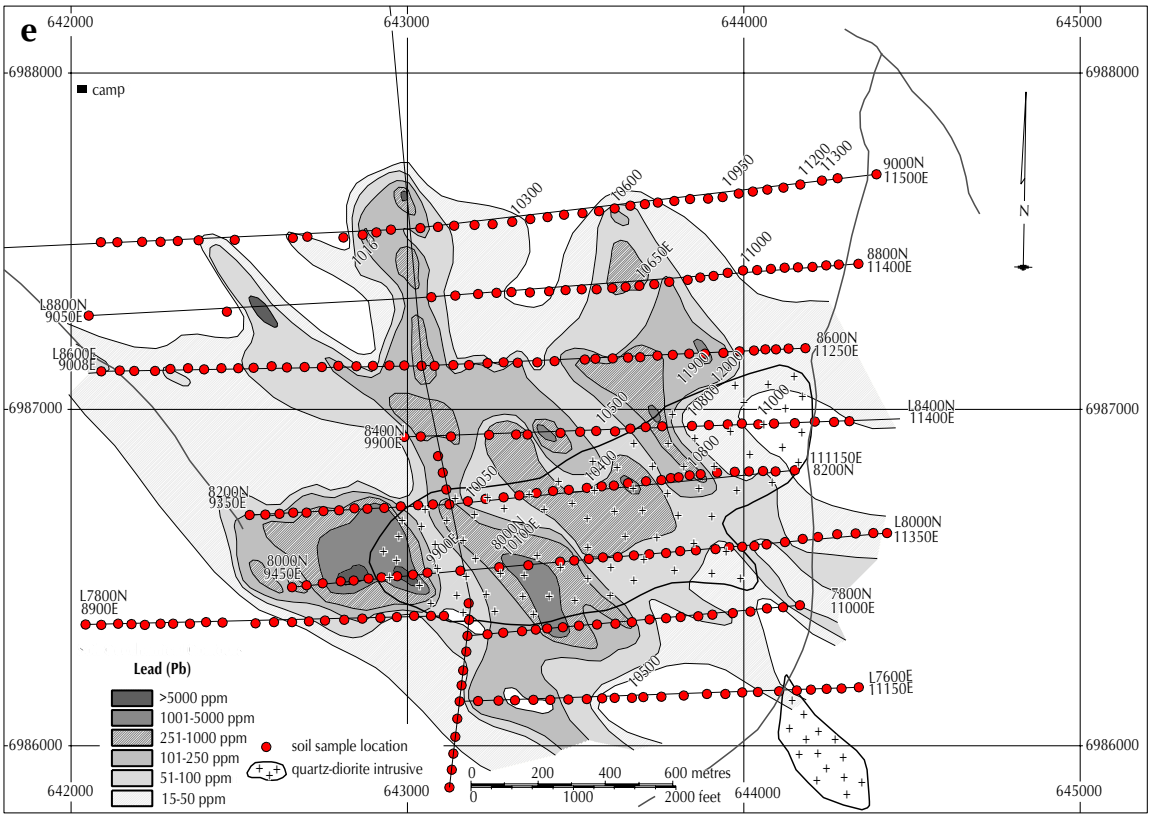

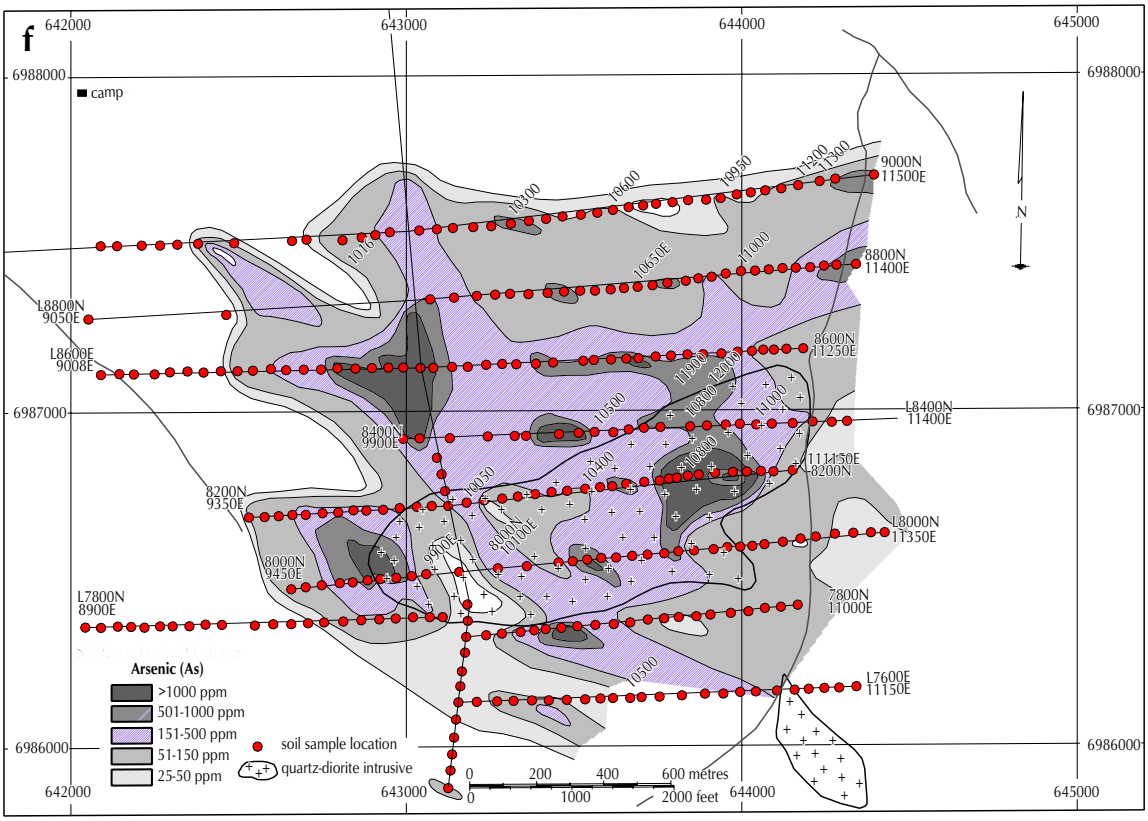

Figure 4.
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CONCLUSIONS

The Myschka property represents a newly discovered, large and very prospective target with potential to host significant bulk-tonnage gold mineralization. This is defined by the following characteristics:

1. A large cluster of gold, base metal and other occurrences in the area of the property situated above the 'hidden' portion of the Mt. Selous Batholith of the Tombstone Intrusive Suite, and its local control by a satellitic intrusive stock or intrusive centre;
2. Large widths (up to 200 m) and extent (over 1500 m) of breccia with intensive auriferous quartz stockwork and quartz-filled fracture zones;
3. Tendency of these auriferous sedimentary rock-hosted breccia zones to dip toward the intrusive stock, assuming that the mineralization within the stock at depth hosts higher gold values;
4. Large dimensions (1200 m by 600 m on surface) of the potentially mineralized intrusive stock, similar to those of known large gold deposits (e.g., Fort Knox);
5. The occurrence of fault zones of several orientations controlling mineralization and contributing to the abundance and grades of metals superimposed on the intrusive stock and surrounding metasedimentary rocks (fault intersection effect);
6. Multi-staged history of formation of auriferous mineralization;
7. Presence of a large (over 1.5 km by 2 km) multi-element geochemical anomaly coincident with the intrusive stock and adjacent portion of the metasedimentary rocks;
8. Favourable geochemical signatures suggesting minimal erosional levels of the mineralized system.

During the 2002 field season, the property was advanced to a drill-ready stage. A diamond-drill program proposed for 2003 is designed to test the subsurface continuation of major auriferous breccia zones into the intrusive stock.

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