STRUCTURAL ANALYSIS OF THE TBMB-BOUND TREND OF STRATIFORM MINERALIZATION, SWIFT RIVER, 105B-3.

094196

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Work performed on claims:
TBMB 1-6, 13-15
Bond 1, 2, 5, 6

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 20,400 .

for [illegible], Exploration and [illegible] for Commissioner [illegible].

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INTRODUCTION

Zinc-rich base metal mineralization in the upper Swift River valley has been known since 1946, when Hudson's Bay Mining and Smelting prospectors discovered various showings that included the Dan (Bar), Mod and Rusty Valley areas. Their work included limited diamond drilling of outcropping mineralization, which found significant zinc grades. Zinc was not of particular interest at that time.

A further exploration programme by Boswell River Mines in the late 1960s covered the area with a geochemical survey, follow-up geophysics and drilling of anomalies. Mineralization that had been found was considered to be of contact metasomatic origin due to the calc-silicate gangue mineralogy and proximity to known intrusions. The immediate area of the TBMB showings was later staked by McRory and Preston and then acquired by Hardy Hibbing, who has held it since then and carried out sporadic geochemistry and trenching.

The claims now held by First Yukon Silver in the Swift River area ($3^1/_2$ km to the NE) were staked because the mineralization was interpreted to be stratiform in nature rather than skarn and as such would have potential of continuation along strike. Subsequent short exploration programmes by Cominco (drilling during1993) and Birch Mountain Resources (drilling in 1997) indicated that mineralization is traceable over about 8 km strike length along the Swift River valley, but since much reliance was held on geophysical anomalies their efforts investigated the immediate area of pyrrhotite or magnetite-rich horizons.

First Yukon Silver's exposures at the 'Window' (Dan prospect) indicate that the the host rocks to the Zn-Pb±Cu mineralization are polydeformed. No previous attempt had been made to understand the structure of the region, so a structural analysis was commenced in 1999 with work at the 'Window' and has been continued during 2000 with further work near the Window with more extensive mapping on the TBMB and Bond claim groups, which contain further statiform mineralization along a trend that is about $3^1/_2$ km south of the Dan-Crescent Lake trend. This report gives details of the mapping of this southern trend.

TECTONICS AND REGIONAL GEOLOGY

The mineralized areas of the upper Swift River drainages are within the eastern part of the Dorsey Terrane (Fig. 1), whose affinity is currently in debate: part of the western sequence is lithologically similar to North American Proterozoic and Lower Palaeozoic strata. The eastern assemblages are deformed volcanic and siliciclastic sequences that may represent a mid-Palaeozoic rift or backarc tectonic setting.

Across the Swift River to the NE are imbricated Proterozoic to middle Palaeozoic

Figure 1

a: Location map: the road to the Pine Lake Airstrip is at km 1162 on the Alaska Highway and the property is accessible by four wheel drive road west from the airstrip.

b: Tectonic assemblage map for the Swift River region (after Wheeler and McFeely (1991). Dy denotes the Dorsey Terrane. Mid Cretaceous Cassiar, Hake and Seagull (abbreviated Sea) batholiths are shown.

c: Regional geology after Gordey and Makepeace (1999). Units as per their notation. Of particular note are: DMEC = Devono-Mississippian black shale unit; DMN8 = Dorsey Assemblage; DTrS = Swift River Assemblage; EJgA = Jurassic diorite intrusion; Kg = Cretaceous granite intrusions.

Figure 2

Location map for the Swift River properties, showing the contacts of the Jurassic intrusion and black shale / Ram Creek assemblage contact (from Cominco grid mapping), plus assemblage boundaries from Roots et al. (2000). Scale 1: 50,000.

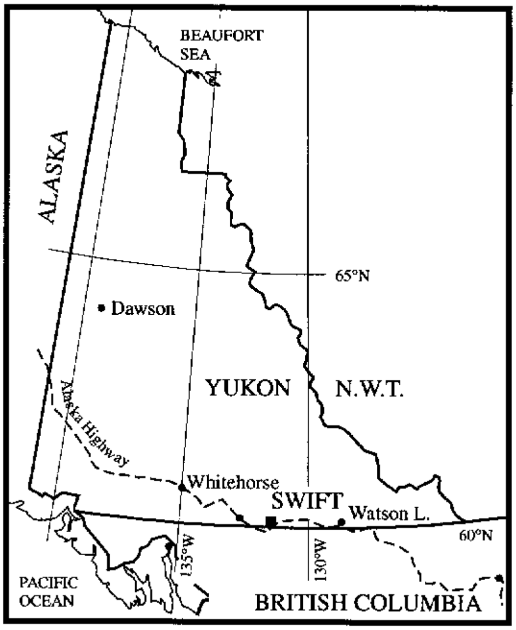

FIGURE 1a

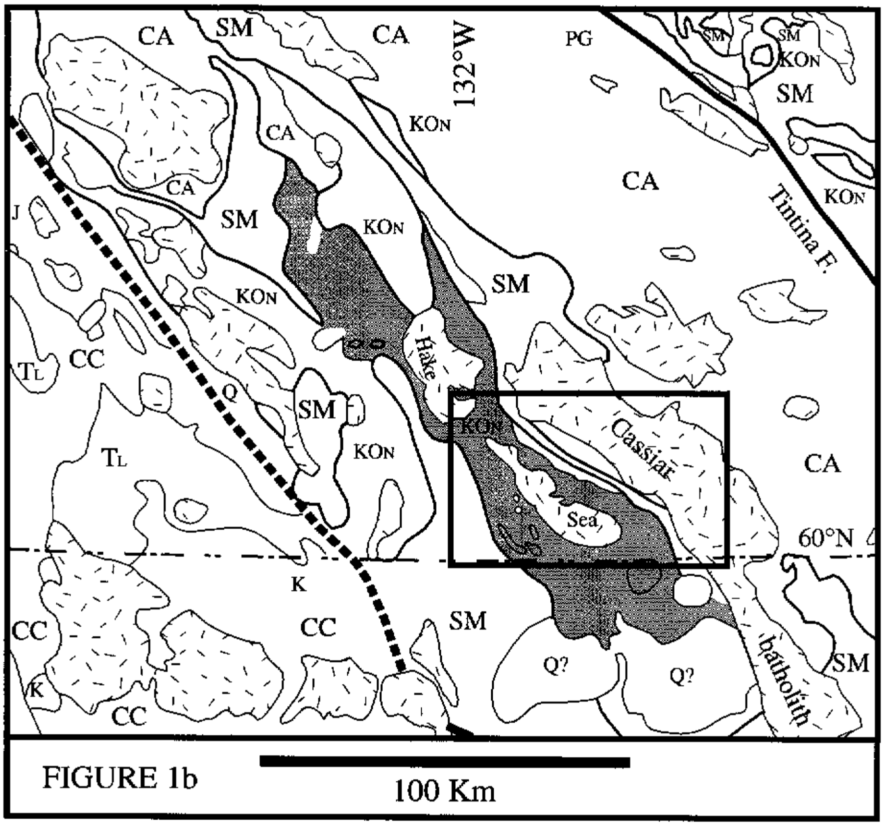

FIGURE 1b

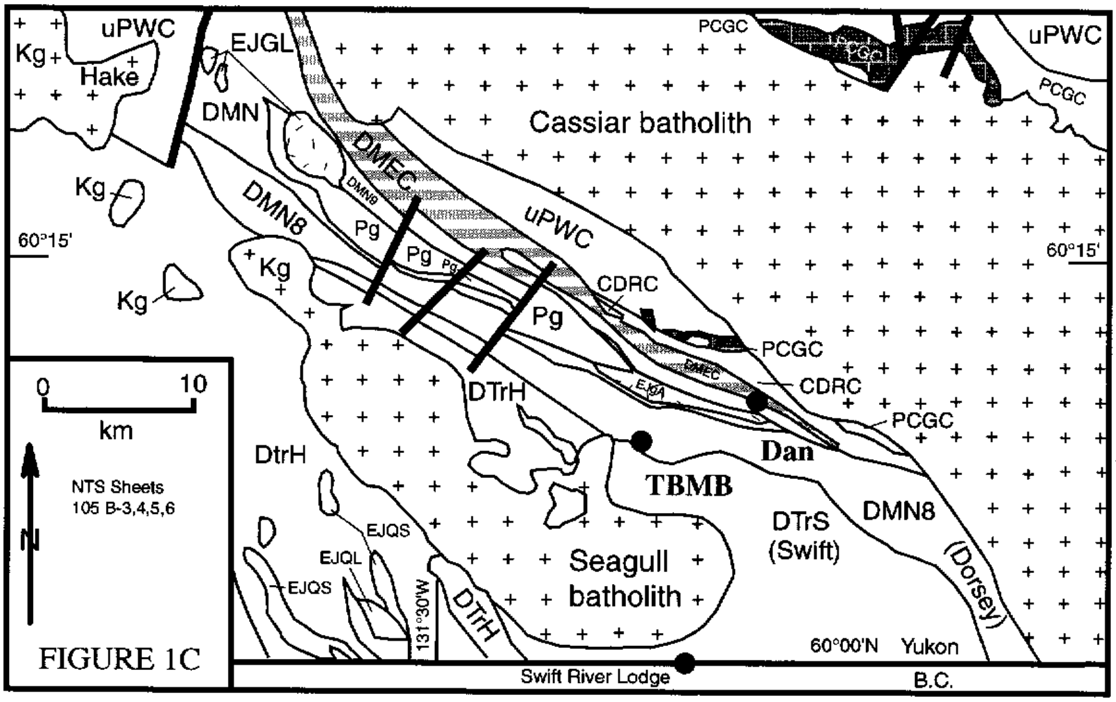

FIGURE 1C

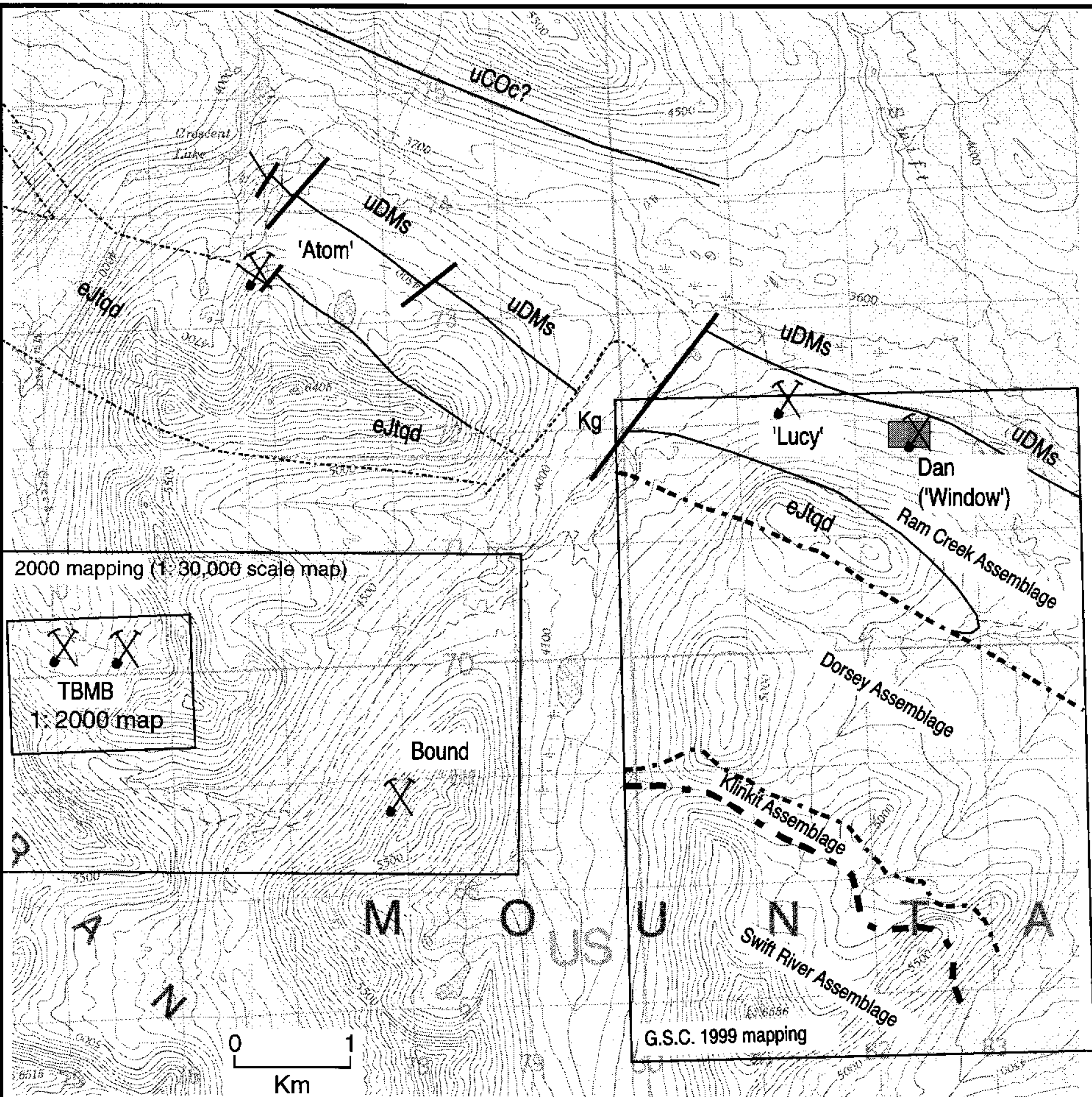

Figure 2. Location of prospects, boundaries of black shale / Ram Creek assemblage, Jurassic diorite and extent of mapping by Roots et al. (2000).

assemblages of North American strata displaced by dextral offset along the Tintina-Rocky Mountain fault system (the Cassiar Terrane).

The eastern assemblages of the Dorsey Terrane are of uncertain affinity, but likely correlate with Yukon-Tanana Terrane. In the Swift River area these assemblages are, from northeast to southwest (Roots et al., 2000):

(i) Ram Creek Assemblage: metavolcanics (both acid and basic), siliciclastics and marble;
(ii) Dorsey Assemblage: meta-tuff, siliceous schist and quartzite, calc-silicate and siliceous schist and quartz-eye felsic schist;
(iii) Klinkit Assemblage: metavolcnics and augen schist, marble, carbonaceous schist, metagrit and quartzite;
(iv) Swift River Assemblage: phyllite, quartzite, metagrit, siliceous phyllite and laminated quartzite.

Roots et al. (2000) note a faulted contact between the Klinkit and Swift River assemblages on the ridges immmediately east of the present mapping on the Bond claims, but suggest a conformable contact between Dorsey and Klinkit. Simple along-strike projection of their assemblage boundaries northwestward would indicate that the mineralised strata of the TBMB-Bond trend are within the Klinkit Assemblage.

Both Dorsey and Cassiar Terranes have been intruded by Palaeozoic and Mesozoic plutonic suites. In the immediate area of interest the Ram Creek and Dorsey assemblages are separated by a sill-like sheared diorite intrusion of ≥500 metres thickness. The mid Cretaceous Seagull Batholith, a highly evolved F-B enriched granite *sensu stricto* , crops out 5 km south of the TBMB and a stock that is sattelite to this (geochemical studies in Liverton, 1992) is just exposed in the deeply incised valley of the creek draining the Mod-Bound area and also at the northern limit of the Bond ridge (UTM 79 250E, 71 200N & 78 500E, 70 000N). To the north of the Swift River the Cassiar Terrane strata are intruded by the Cassiar Batholith of similar age (Fig 1c).

The ample plutonism in the area has produced common thermal metamorphism / metasomatism throughout the Dorsey Terrane rocks: pelites show biotite development adjacent to the Jurassic intrusion and carbonate rocks contain calc-silicate assemblages. Amphibole and epidote are developed in the volcanic rocks.

THE STRUCTURAL MODEL DEVELOPED FROM THE DAN AREA

Three fold generations have been recognised that form a progressive deformation. Structures in the studied area clearly result from two events of highly ductile deformation (D_1-D_2) and from a late event of brittle-ductile deformation (D_3), all under sub- to greenschist facies metamorphism. The two earlier events imprinted several micro- to mesoscopic-scale structures on the sedimentary layering (S_0), such as folds (F_1, F_2) and their associated planar and linear structures: axial plane foliations (S_1, S_2) and intersection lineations ($L_{1\text{-}0}$, $L_{2\text{-}1}$), fold axial planes (PA_1, PA_2), and fold axis (B_1, B_2). The area is therefore underlain by a packet of ESE-WNW trending S-tectonites containing three planar structures commonly sub-parallel to each other ($S_0//S_1//S_2$) and dipping shallowly to steeply, generally to the southwest. Linear structures such as L_{1-0}, L_{2-1}, B_1, B_2 are also sub-parallel and trend NW-SE, with a gentle plunge to the NW or SE. The D_3 event affected the D_1-D_2 packet of tectonites and developed folds (F_3) with their associated planar structures, such axial plane foliations (S_3), and a set of shallowly dipping fracture planes (S3a) that control the erosion of the outcrops and are a type of bc fracture relative to the F_2 folds. D_3 linear structures (fold axis and intersection lineation) are obviously controlled by the dip of $S_0//S_1//S_2$ but have not been treated in detail, because the field work soon indicated that D_3 is not significant for the spatial control of rocks and mineralisation.

F_1 DEFORMATION

F_1 folds are entirely isoclinal in style, so their hinges are contained within the packet of layers and commonly exhibit a size ('wavelength') of 0.1-1.0 m, whereas the fold limbs are very long and coincident with the sedimentary layering, indicating that that D_1 was an event of very ductile deformation. These F_1 folds compare well with those of class 3 of Ramsay (1967). F_1 folds developed a strong axial planar foliation (S_1) that is sub-parallel to S_0, unless in the F_1 hinges, where S_1 cuts across the primary layering. S_1 is commonly a mineral foliation marked by the plane-parallel orientation of flattened crystals of carbonate and quartz, and phyllosilicates such as fine-grained white mica (sericite), chlorite and perhaps some biotite. Quartz and white micas are common in quartzite and rhyolite, whereas the other minerals are more commonly seen in the marble and metapelitic units. A slaty cleavage may be seen in some fine-grained siliciclastic units. The intersection of S_1 and S_0 develops a strong lineation (L_{1-0}) that follows the attitude of the B_1 fold axes.

THE D_2 DEFORMATION

The D_2 event of deformation is characterized by F_2 folds and their associated axial plane foliation (S_2) that affect S_0 and all D_1 tectonic structures, developing trains of several pairs of mesoscopic folds well exposed at the DAN ('Window' exposure) and in other parts of the area. In fact, abundant field data clearly indicate that F_2 folds develop a co-axial pattern of fold interference with F_1 (type 3 of Ramsay, 1967). The mesoscopic F_2 folds are NW-SE trending, commonly tight, display m- to 10 m-scale, and are moderately to steeply inclined, or even upright , with axial plane dipping between 80° to SW and 90°, in the eastern part of the DAN, and around 40°-60° to SW in the western part. These folds develop a penetrative axial plane foliation (S_2) that keeps, in general, the same orientation and associated mineralogy as S_1, reflecting similar conditions of greenschist facies metamorphism and deformation during D_1-D_2. The intersection of planes S_2 with S_1 and S_0 develops a penetrative lineation $L_{2-1/0}$ that overprints L_{1-0} and becomes parallel to it over most of the area.

THE D_3 DEFORMATION

This event imprinted folds (F_3), axial plane foliations (S_3), and a set of low-angle dipping fracture planes (S_{3a}), that affect the D_1-D_2 tectonites in a sub-perpendicular relationship that is systematic across the studied area. Nevertheless, D_3 structures are not relevant to the spatial distribution of the layers. The F_3 folds are gentle to open, and have axial plane (PA_3) and S_3 axial plane foliation all trending N-S, in average, with a steep to sub-vertical dip to westerly and easterly directions. The folds are sub-vertical bends that affect the anisotropic packet described in the previous sections, so the fold axes and the intersection lineation (B_3 and $L_{3-2/1/0}$) generally plunge steeply southerly, as it is controlled by the dip of one or all of S_0, S_1, or S_2. Although the F_3 bends are generally of 1m size, they may well be smaller or larger in wavelength, and sometimes display a kink-style.

STRUCTURAL MAPPING ON THE TBMB CLAIMS

Examination of exposures around the claim block during both 1999 and 2000 field seasons indicated that the structural style of this area was similar to that mapped at the Dan trend. In order to delineate structure over the whole claim block it was decided to attempt to map the larger scale F_2 structures during the 2000 field season. Isoclinal F_1 folds are observed in the areas of good exposure east of trench 'C', but the scale of this present work and extent of rock exposure did not permit depiction of those structures on a map (see Figs.3a & 3b).

An approximately 1500 m X 1000 m area around TBMB was mapped at 1:2,000 scale. Outcrops were located with the aid of a 12-channel GPS receiver plus re-occupying existing survey stations across the studied areas. Outcrops that required detailed mapping at 1:100 and 1:200 scales were surveyed with the aid of tape and compass (e.g., Fig. 6).

The marble unit that crosses the TBMB property serves as the main marker horizon for mapping. The procedure adopted for the 2000-scale mapping was to carefully observe and measure all S_0, S_1 and S_2 foliations in the frequent exposures on the east side of the claims, and also along the creek bed and road cuts on the west. Two excellent sets of continuous outcrop, and the spatial relationship between the S_2 foliation with the S_0/S_1 planes, plus the asymmetry of m- to dm-scale parasite F_2 folds, all work to demonstrate the existence of two larger F_2 overturned anticlines in the area, respectively termed Northern and Southern. The normal limbs of these F_2

Figure 3a. TBMB claims: natural rock exposures 120m ENE of trench 'C' (point 39 on 1:2000 scale map): isoclinal F_1 folds.

Figure 3b. Detail of F_1 folds in impure carbonate. Clino-rule is 25 cm long.

folds dip 30° to 55°, to SSW, whereas the overturned limbs dip between 70° to 85° to the SSW. Definition of these major folds allowed us to infer an intervening overturned F_2 syncline.

NORTHERN ANTICLINE

This structure (Figs. 4 & 5), nearly 1 km-wide, is clearly defined along outcrops 3 to 16 (NE part of the area). Outcrops situated to the south of the trace of the axial plane (numbers 3 to 9) systematically display S_2 dipping more than S_0/S_1, and define the normal limb. In those outcrops situated to the north (numbers 10-16) S_2 dips less than S_0/S_1, and this fact combined with the other criteria, define the overturned and short limb. The anticline's hinge is well exposed along a 70m-long, NE-SW trending trench (by survey station C), in which Zn mineralization is found, hosted in metavolcanic rocks and following the fold pattern. This is depicted in profile (Fig. 6), which clearly shows the disharmonic structures in the hinge zone of the major fold.

From outcrop 16 (elevation 5429 feet) the overturned limb continues to crop out continuously, up to the northern limit of the area. The outcrop lies on the steep slope of a spur whose crest - to the north - is sustained by continuous exposure of ESE-trending, sub-vertical metasiliciclastic rocks. This crest turns to the south, in the eastern part of the area, and cuts across the strike of different rock units (outcrops 59 to 52). Maximum elevation (6006 feet) of the crest is at point 54. Outcrops 59, 58 and 57 correspond to a > 100m-wide and continuous exposure of marble occupying the hinge of the anticline. From almost everywhere in the area that marble exposure is easily distinguished by the pinkish yellow color of the rock. Due to the effect of topography, the carbonate unit at the hinge of the Northern anticline is again eroded eastwards of points 59, 58 and 57, and the marble turns again into two limbs. The application of the V-rule for planes dipping against the gradient of valleys imply that, eastwards, both limbs turn abruptly to SE, and trace outside the map area.

STRATIGRAPHY AND MINERALIZATION

The lithostratigraphy of the area consists of five units: a Lower, an Intermediate and an Upper siliciclastic units (respectively LU, IU, UU on the 1:2000 scale map), plus volcanic and marble units (respectively VU and MU). Mineralization exposed in the various trenches on the TBMB property occurs at several horizons within this succession. The main trench (by survey staion 'A') exposes massive galena and sphalerite associated with marble and calc-silicate rock of the marble unit (CU); sphalerite at trench 'C' is within the volcanic unit (VU); and pyrrhotite-chalcopyrite mineralization by station E (see assessment report for 1999: 093954) is contained within the siliceous upper unit (UU). Zinc mineralization encountered in the Boswell River Mines drillhole 140 m to the SW of station 'A' may also correlate with the latter horizon rather than being the down-dip extension of the main trench mineralization.

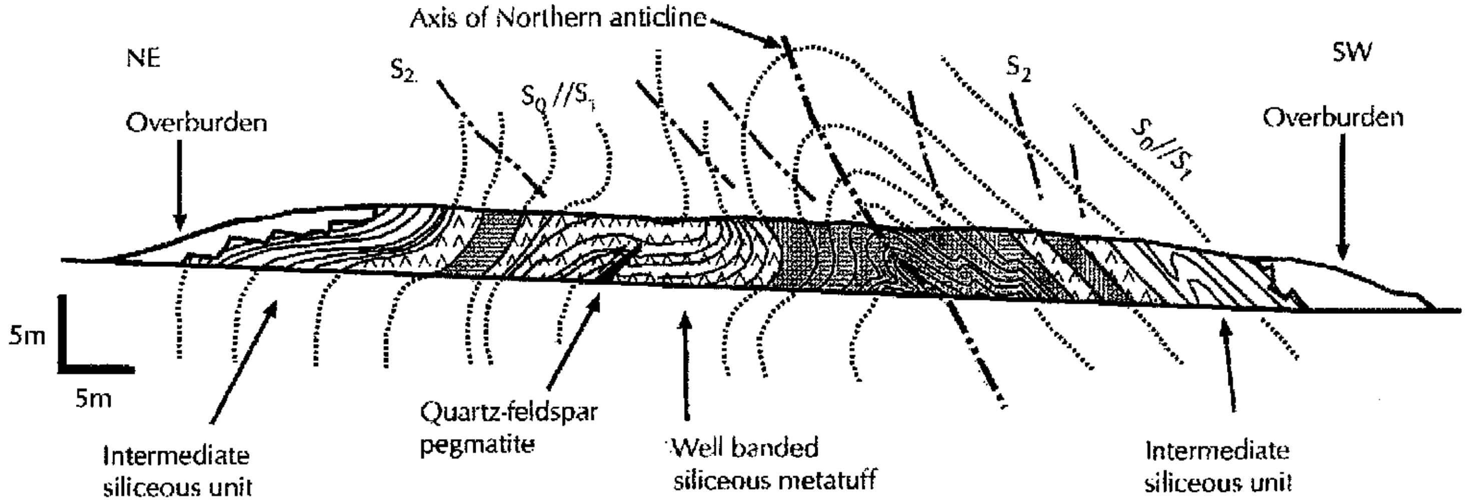

Figure 6.
Profile of the east face of trench 'C' on the TBMB claims showing the hinge zone of the northern anticline.

STRUCTURAL MAPPING OF THE BOND CLAIMS

In order to demonstrate the regional scale of F_2 folding the ridge crest east of the BOUND showing was traversed using a 12 channel GPS receiver for positioning. Using similar techniques of observation of the relationships of S_0, S_1, S_2 and minor fold axes as used for the TBMB claims the position of the major F_2 axis (northern anticline) was deduced (Fig 7). The structural data collected in the field cross section along the Bond ridge (Figs. 2 & 7) revealed the same rock types, as well as the same D_1-D_3 structures and structural geometry as described from the TBMB, which is also very similar to that at the DAN-LUCY trend. Because the ESE-trending layers are continuously exposed across the N-S trending crest of the Bond ridge the structural data allows us to define a major overturned F_2 anticline that is the eastern continuation of the Northern anticline in the TBMB map area. Actually, the angular relationships between S_2 and S_0/S_1 across the fold crest indicate that the southern part of the profile corresponds to the longer and normal limb of the anticline, whereas the northern part of the crest, in which the layers are sub-vertical, corresponds to the shorter and overturned limb. The marble layer crops out in the overturned limb, at the crest, and may be followed to the west, in a series of outcrops situated down the slope of the hill (see assessment report 093954). It also occurs along the normal limb of the structures.

This mapping indicates that it is feasible to correlate the sporadically mineralized carbonate horizon from the TBMB through the MOD to the BOUND showing. Mapping further eastward has not been attempted, but the poor rock exposure in that direction may not be adequate for structural mapping (the carbonate could not be traced eastward due to scree cover, see assessment report 093758).

IMPLICATIONS FOR FURTHER MINERAL EXPLORATION AT CLAIM SCALE

There are several obvious conclusions that may be drawn from this structural analysis:

(i) The scale of the F_2 folding is such that there are several locations on the claim block where any particular mineral horizon may be intersected. One linear trend is not all that is to be followed!

(ii) Mineralization is found in at least three stratigraphic levels, although to date the carbonate unit offers the best known grades.

(iii) An obvious unexplored location to search for further mineralization is on the northern part of the TBMB claim block, where the NE limb of the northern anticline traces.

(iv) On the BOND claims the trace of the southern limb of the carbonate unit is not accurately constrained at the ridge top. Neither has it been prospected. Similarly the carbonate-calc-silicate horizon that traces across the STRATA claims has not been located to the south along the BOND ridge.

IMPLICATIONS FOR REGIONAL MAPPING AND ORE POTENTIAL

There are obvious differences between the structural picture presented here and a simple 'layer-cake' interpretation of the sequence of assemblages in the eastern Dorsey Terrane.
The mapping of the marble unit on the TBMB and Bond ridge has led to a more regional interpretation in which the marble unit follows the pattern of the Northern anticline traced to the east of the TBMB area up to the Bond ridge (Fig. 7). This simple mapped sequence may support the hypothesis that the rock units described herein belong to the Ram Creek assemblage, the same that hosts the mineralization at the DAN, LUCY and ATOM showings (Fig. 2). This rather radical proposition, on the base of similar rock types and mineralization, is also supported by the same metamorphism, inventory of structures, and structural evolution for the rocks within the two areas. It also fits with the stratigraphic column worked out by Nelson (2000) in northern British Columbia, whereby the Swift River assemblage rests on the Ram Creek assemblage and is overlain by the Klinkit assemblage. If so, the rocks of the TBMB-Bound area would turn around the hinge of the Northern anticline, eastwards of the Bond ridge, and disappear underneath the Swift River assemblage mapped by Roots et al. (2000) further to the east.

Regional cross sections are shown (Fig. 8), based on the train of km-scale F_2 anticlines and synclines that has been demonstrated for the DAN and TBMB-BOND areas. Thus, despite the obvious fact that the area between the TBMB and ATOM showings (Fig. 2) still requires geological mapping, the tentative solution here provided allows a detailed interpretation of the map distribution of the assemblages within the eastern part of the Dorsey Terrane and at least provides some food for thought! Such a model also improves the understanding of the potential of the area for base metal sulphide mineralization, and its structural controls.

Concerning the tectonic evolution of the area, the surface envelope of the F_2 folds dips gently to SSW (see report for 2000 on the Dan showing, Park claim group). It is valid to consider this surface to be sub-parallel to the orientation attained by the layers just after D_1, or that such an orientation exerted control on the enveloping surface. Consequently, tectonics in the Swift River equals an event of simple shear along a surface that is sub-horizontal or dips shallowly to SSW, resulting in widespread folds and possibly associated thrust faults. However, it is not straightforward to simply say that these structures represent a relative movement of the top towards the reworked continental margin (the Cassiar Terrane) and towards the North American craton, just based on the classic approach (Bell, 1981) for fold (and thrust) vergence.
Such an event of simple shear may be also produced in three ways in which the strong compression is achieved by underthrust rather than upthrust:

(1) If the craton moves down to the southwest and brings together its reworked margin, so the deformed basement gets involved in a new tectonic cycle;

(2) If both the craton and its sedimentary cover comes down into a subduction zone; and

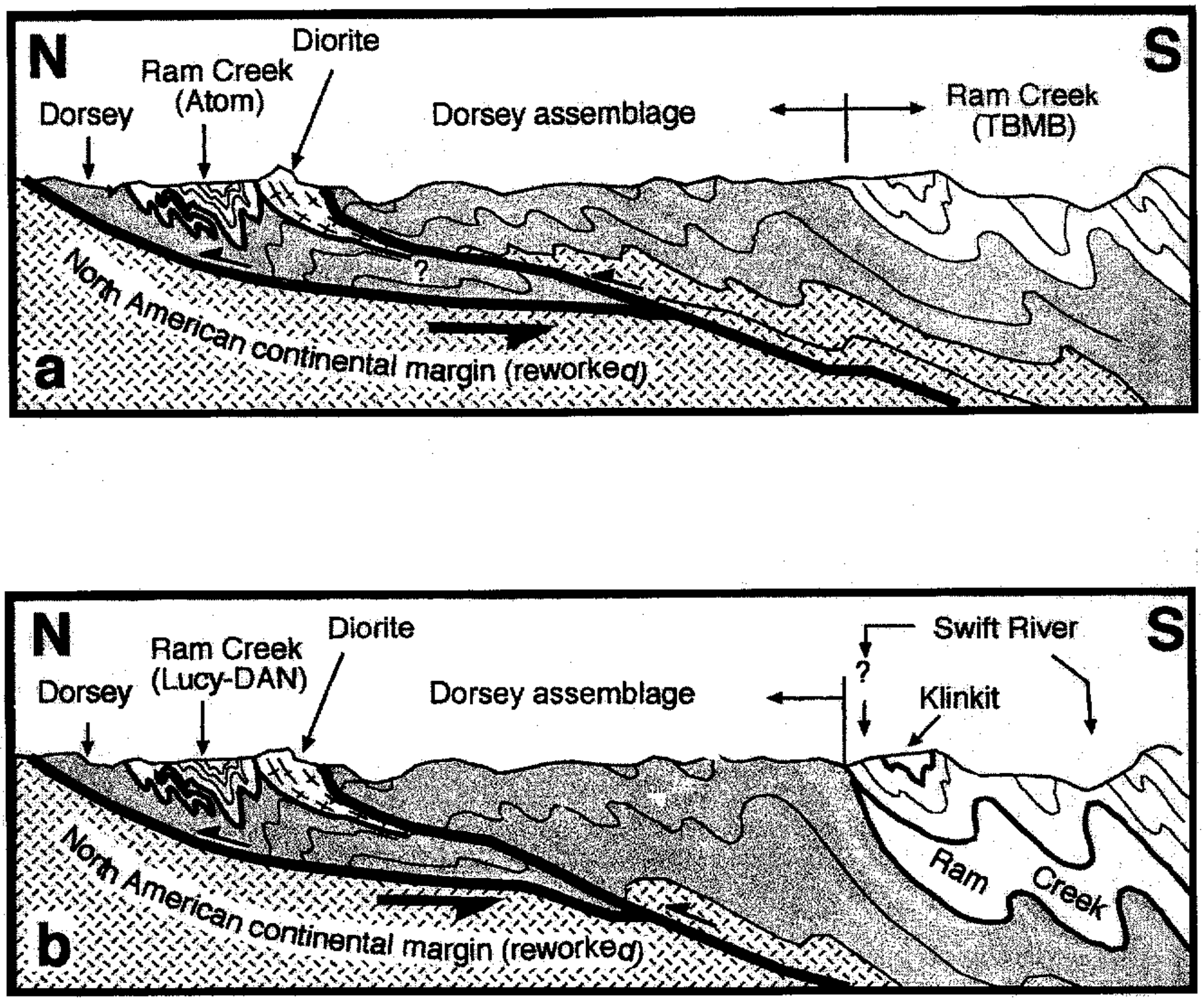

Figure 8.
Regional scale cartoon sections to illustrate possible large-scale structure and relationship between the various assemblages in the Swift River area. The TBMB property could be hosted by Ram Creek Assemblage, in which case the mineralization correlates with that of the Dan-Lucy-Atom trend; or it could be part of another of the assemblages, e.g., Swift River. Such interpretations are at present speculative. Mapping north of the TBMB claims is scheduled for the 2001 season.

(3) Full inversion of a sedimentary basin results in part of the basin material being shed onto the basin margin, even if this margin moves underneath the cover, in order to close the basin.
If the eastern Dorsey Terrane is the record of a back-arc basin situated between the western (reworked) margin of the North American plate and oceanic lithosphere subducting to the northeast, the Dorsey assemblage being the basement for the Ram Creek, Swift River, and Klinkit assemblages (Nelson, 2000), then the structures in the upper Swift River area fit a combination of the first and third scenarios mentioned above.

The significance for prospecting is that a much larger region than previously recognised has potential for base metal mineralization. Rather than being individual showings the known mineralization represents part of regional-scale potential ore-bearing horizons.

RECOMMENDATIONS SPECIFIC TO TBMB-BOND

There are now a number of regions that require further mapping and prospecting.

(i) Mapping of the BOND ridge should be extended to locate the southern limbs of the carbonate unit and also to the north of the present work to map the volcanic units;

(ii) Mapping could be extended onto the high ridge at the west edge of the TBMB block, together with rock sampling to locate any mineralized horizons in the volcanic unit;

(iii) Previous work (assessment report 093954) has indicated that a magnetic survey may be adequate to detect the mineralization in the carbonate unit. The northern half of the TBMB block at least should be surveyed to attempt to accurately trace this horizon beneath the till cover;

(iv) An attempt could be made to trace the Cu mineralization SE from trench 'E' up the steep face. This will require mapping of float.

Timothy Liverton

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COST STATEMENT

Professor Luiz J.H. D'el-Rey Silva:	28th.-30th. Aug, 4 to 14th. Sept		
	13 days @ $700	$	9100.00
Dr. T. Liverton	30th. Aug, 4-14th. Sept		
	12 days @ $600	$	7200.00
Report preparation	2 days @ $600	$	1200.00
H. Hibbing	4 days @ $250.00	$	1000.00
Travel to Whitehorse: Prof. D'el-Rey		$	2630.78
Accomodation, Whitehorse		$	299.06
Meals		$	73.00
Travel to & from Whitehorse	@ 0.42/km	$	762.72
4 wd Vehicle	13 days @ $ 100-	$	1300.00
Accomodation, Great Divide	8 x $ 75-	$	600.00
Meals, Great Divide		$	380.00
Fuel		$	158.00
Batteries		$	20.00
Prints, photocopies	Integraphics	$	44.30
Total		$	24,767.86

STATEMENT OF QUALIFICATIONS

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Degrees obtained:

Degree in Geology: Universidade de Brasília (UnB, Brasília, Brazil), 1971.

MSc. in Structural Geology: Universidade Federal da Bahia (UFBa, Salvador, Brazil) 1982-1984.

Thesis title in Portuguese: Geologia e controle estrutural do depósito cuprífero Caraiba - Vale do Curaçá/Ba, Brasil. UFBa, 152p.
Thesis title in English: Geology and structural controls of the Caraíba copper deposit, Curaçá River Valley / Ba, Brazil, UFBa, 152p.

PhD in Structural Geology and Tectonics: Royal Holloway University London (RHUL-Egham, UK), 1992.

Thesis title: Tectonic Evolution of the southern part of the Sergipano Fold Belt, Northeastern Brazil, RHUL, 258p.

Professional Experience:

17 years experience as an exploration and mine geologist, working at different mining areas of Brazil, and also including:

- Head of the Mining and Exploration Geology Divisions of the Caraíba Company: respectively 1977-1983 and 1985-1989.
- Operation Superintendent of the Caraíba Copper Mine: 1983-1984
- Planning Superintendent of the Caraíba Mine: 1986.
- Professor of Structural Geology and Tectonics, Institute of Geosciences, University of Brasília (IG-UnB, Brazil), 1993 to present.

Professional membership:

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Fellow of the Geological Society of America, since 1992 (Number 2000614)
Fellow of the Geological Society of Brazil, since 1978.
Fellow of the Brazilian Academy of Sciences, since 1999.

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STATEMENT OF QUALIFICATIONS

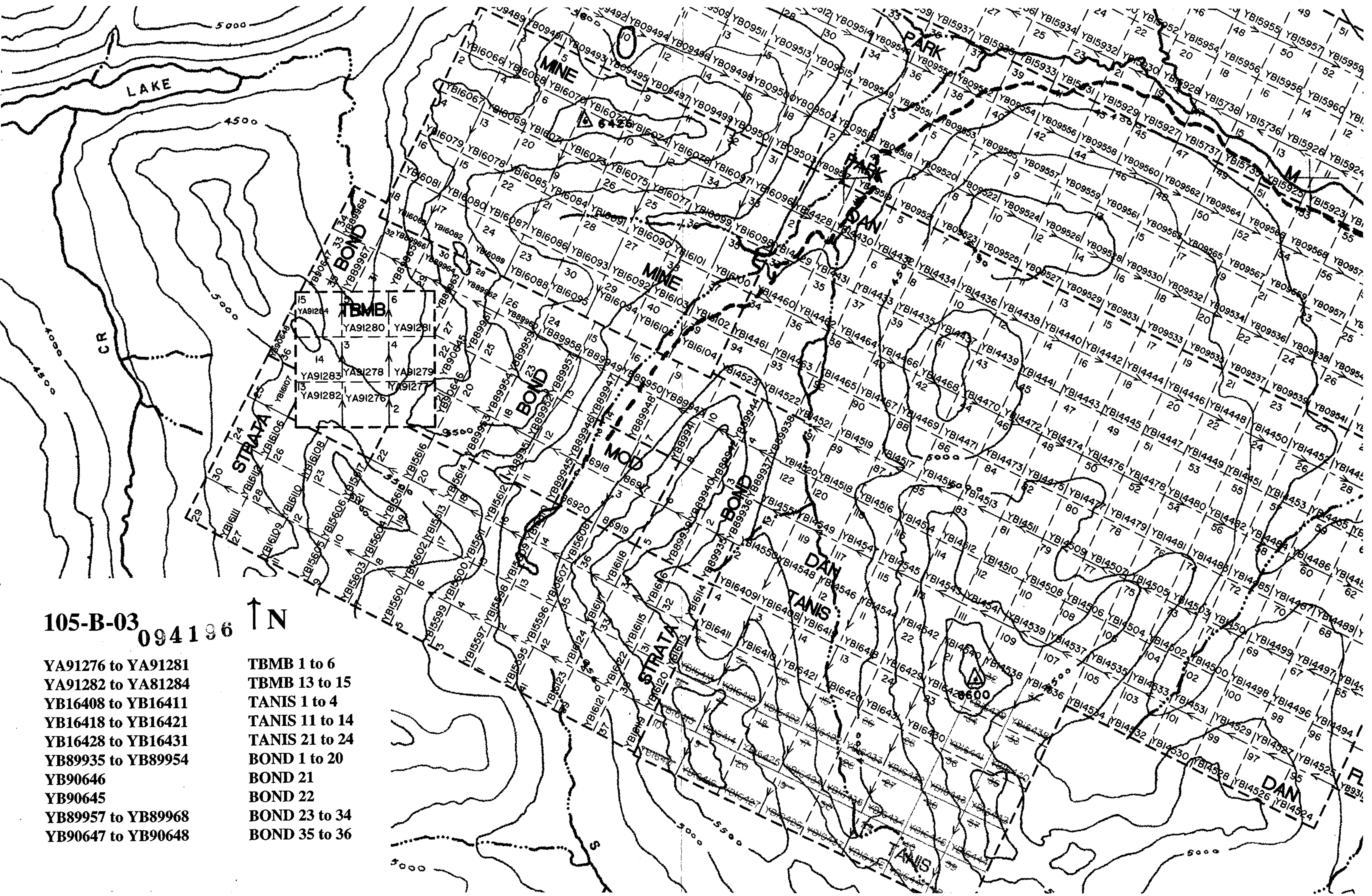
Timothy Liverton

Academic qualifications:
BSc in geology and geophysics, University of Sydney conferred, 1965
BSc (Hons) in economic geology, University of Adelaide, conferred 1968
PhD in geochemistry, petrology and structural geology, University of London 1992,
Thesis title: 'Tectonics and Metallogeny of the Thirtymile Range, Yukon Territory, Canada' pp. 325.

26 years experience in mining and exploration geology in Australia, Canada, USA, Norway, Portugal and Brazil

1997-1998 Visiting Professor in Economic Geology at the Universidade de Brasília

Fellow of the Geological Society, Member of the Geological Society of America, Fellow of the Geological Association of Canada, Member of the Society of Economic Geologists.



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YA91282 to YA81284	**TBMB 13 to 15**
YB16408 to YB16411	**TANIS 1 to 4**
YB16418 to YB16421	**TANIS 11 to 14**
YB16428 to YB16431	**TANIS 21 to 24**
YB89935 to YB89954	**BOND 1 to 20**
YB90646	**BOND 21**
YB90645	**BOND 22**
YB89957 to YB89968	**BOND 23 to 34**
YB90647 to YB90648	**BOND 35 to 36**

LITHOSTRUCTURAL MAP (SOLID GEOLOGY) OF THE TBMB REGION, SWIFT RIVER AREA, 105B-3, SE YUKON

Dr. LUIZ J.H. D'EL-REY SILVA: INSTITUTO DE GEOCIENCIAS, UNIVERSIDADE DE BRASILIA, BRASIL & TIMOTHY LIVERTON: YUKON

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