TOODOGGONE - It's Not Too - Doggone Far!

by Tom Schroeter, Nick Carter, and Arne Birkeland

Nestled 300 kilometres north of Smithers, British Columbia, the Toodoggone area awaits its inevitable development. In 1925 Charles McClair attracted some attention to the area when he mined placer deposits, but that was fleeting as he and his partner went missing in 1927. Efforts to relocate the workings resulted in the formation of Two Brothers Gold Mines Ltd. in 1933 in which the legendary Grant McConachie (first president of CP Air) played an active role. Their efforts, although heroic, were unsuccessful. It wasn't until the 1960's that prospectors returned searching for gossanous zones indicative of porphyry type deposits. In 1968 the late Gordon Davies recognized greyish coloured quartz float on the Chappelle property, subsequently developed as the Baker gold mine which yielded 37,558 ounces of gold and 742,198 ounces of silver from 79,580 tonnes of ore during 1980 to 1983. The greyish colour turned out to be a fine grained mixture of electrum and argentite.

In 1979 Du Pont of Canada Exploration Limited announced a production decision for the Baker Mine. Du Pont and the British Columbia government built a 1620 metre gravel airstrip capable of handling Hercules aircraft. A 90 tonne per day mine and mill complex was constructed utilizing full air support from Smithers and access roads were built to the mine (13 kilometres) and later extended to the Lawyers property (a further 8 kilometres).

Extension of the Omineca Resource Road from its current terminus at Moose-vale Flats, 70 kilometres southeast from Sturdee airstrip, represents a critical step in supplying materials for further infrastructure and diesel power. Previous helicopter transport and air expediting has accounted for over 20 per cent of exploration costs. An agreement between Serem Inc. and the B.C. government to cost share the extension remains in place until March 31, 1987, pending a positive production decision.

Over 50 companies hold ground in the Toodoggone with more explored prospects held by Serem Inc., Energex Minerals Ltd., Multinational Resources Inc., St. Joe Canada, Golden Rule Resources Ltd., International Shasta Ltd., and Newmont Exploration of Canada Ltd. To date exploration has been seasonal with crews arriving as early as May and leaving as late as September. Mining at Baker Mine over 3 winters demonstrated no major constraints.

Since the early 1970's when the Toodoggone was recognized as a gold-silver 'camp', over 55 new mineral prospects have been identified and in excess of $40 million have been spent on exploration and development. To date the total mineral inventory identified in at least seven deposits is estimated at 400,000 ounces of gold and 7.6 million ounces of silver for a gross metal value of nearly $300 million. Over the past few years annual expenditures have ranged between $3.5 and $6.5 million.

The favourable Toodoggone belt,comprised predominantly of andesitic pyroclastic rocks, is 100 kilometres long by 20 kilometres wide and so far has barely been scratched by dedicated prospectors. Although remote, ground acquisition has proved easier than in less isolated, better established areas in the Province. Northwesterly trending faulting has played a major role in localizing mineralization both regionally over 20 kilometres and on a property scale over 1.5 kilometres. Smaller high angle graben related structures, such as those identified at the Lawyers property, and flatter thrust-type structures such as those at the JD and Golden Lion properties are also important. Characteristic ore minerals include electrum, native gold, native silver and minor base metals. There is a distinct absence of deleterious elements such as arsenic, antimony or mercury. Gangue minerals include amethystine to chalcedonic quartz, barite, calcite and minor pyrite. Ore and alteration assemblages typical of worldwide epithermal deposits are present in Toodoggone prospects, ranging vertically from base metal rich zones at depth (eg. Baker) to 'bonanza' precious metals rich zone (eg. Lawyers) and finally to near surface, hot spring zones (eg. Al).

Several age dates of host volcanic and intrusive rocks and alteration associated with mineralization suggest a coeval period of formation around 180 Ma (early Jurassic). This age represents one of the oldest documented areas of epithermal mineralization in the world.

The size of deposits discovered to date ranges from about 50,000 tonnes grading 12 g gold per tonne to greater then 1 million tonnes grading 7.2 g gold per tonne and 244 g silver per tonne. These can be classified as bonanza high grade types; however, the possibility of larger tonnage, lower grade deposits cannot be overlooked.

Traditional prospecting integrated with geological mapping and careful, large-volume sampling have proved most effective. Methods of sampling involve extensive back-hoe trenching, blasting, and large diameter diamond drilling. The best geochemical signatures are not surprisingly gold and silver. Locally, increased amounts of barium may be significant. Soil and silt sampling have been very effective; however, these methods are limited in areas of heavy overburden. Electromagnetic and induced polarization surveys have aided in identifying contrasting zones of high-resistivity silica and low-resistivity clay alteration which tends to flank or halo the former. Future discoveries may result from the application of depth-zoning geological models.

LAWYERS DEPOSITS

The Amethyst zone on the Lawyers property, 8 kilometres north of Baker mine, was found in 1973 by Kennco during routine follow-up of silver silt geochemical anomalies. Between 1974 and 1975 a small program of trenching and diamond drilling yielded a drill intersection of 108 g silver per tonne and 6.5 g gold per tonne over 27.5 metres. However, with the drop in gold prices in 1975, Kennco ceased work. In 1978 Serem Inc. examined the property, recognized its potential commercial size, and obtained an option in 1979. Since then work completed on 3 zones (Amethyst Gold Breccia, Cliff Creek and Duke's Ridge)

includes 20,539 and 2331 metres of surface and underground diamond drilling respectively, 1380 metres of drifting on the Amethyst Gold Breccia (AGB) zone, environmental studies, camp construction and a feasibility study.

Ore reserves (cut and diluted) total 941,300 tonnes grading 259.6 g silver per tonne and 7.182 g gold per tonne (12.375 g gold equivalent per tonne). Of this approximately 50 per cent is contained in the AGB zone and the remainder in the Cliff Creek zone (45%) and the Duke's Ridge zone (5%). Recoveries are estimated at 95% for gold and 82% for silver.

The AGB zone has been traced over a strike length in excess of 600 metres (including 430 metres drill tested), a width varying between 60 and 75 metres, and a minimum depth of 150 metres. High grade, bonanza-type mineralization occurs in ore shoots which pinch and swell but average 2.3 metres in thickness. Mineralization consists predominantly of native gold, native silver, electrum and argentite (acanthite) with minor chalcopyrite, sphalerite and galena in a gangue of chalcedony, quartz-amethyst, and calcite. This forms fracture fillings occurring as stockwork veins as well as the matrix within breccia zones, both controlled by a north and north-northeast trending fracture system which dips steeply to the west. Multiple episodes of veining and brecciation have been recognized. The minerlaized zone appears to occur along a paleo-half-graben structure with quartz andesite in the footwall and trachyte in the hanging wall. Locally a welded tuff and/or aphanitic tuff overlies the quartz andesite.

The zone has been explored by three adits 50 vertical metres apart and the continuity of mineralization in ore shoots has been established over a vertical range of at least 150 metres.

The Cliff Creek Breccia zone has only been drilled over a strike length of 160 metres but has been traced by trenching over 300 metres. The geochemical anomoly is greater than 1.5 kilometres. The zone has been tested to a depth of 250 metres. A wide argillic alteration zone exists up to 20 metres on both sides of the vein system (cf. AGB zone).

The Duke's Ridge zone contains breccia zones similar to those in the AGB zone and requires further work.

A production decision by Serem Inc. appears imminent with a daily milling rate of approximately 500 tonnes per day and a workforce of approximately 140 persons. A minimum mine-life of 5 years is expected with the potential for discovery of additional ore considered excellent. To date, approximately 20 per cent of the favourable ground has been adequately tested.

AL DEPOSITS

Energex Minerals Ltd. holds 565 claim units covering more than 14570 hectares in the Toodoggone gold camp. In 1979 Energex acquired the Al, Moose and JD properties; more than $7.5 million has been spent since that time.

The property covers a typically complex sequence of porphyritic, subaerial andesitic to dacitic Toodoggone volcanic rocks which dip gently south to southwest.

Three north-trending, radial fault systems, possibly associated with a large collapsed caldera, cross the Al property. Surface exploration, IP-resistivity, and over 12,000 metres of diamond drilling have delineated three gold deposits with drill proven reserves (the Bonanza, Thesis III and BV deposits) as well as numerous, less well-explored gold showings. Epithermal gold mineralization, with a strong barite association, occurs along the regional faults within intensely silicified zones flanked by strongly argillized andesitic wall rocks. The silicified cores of these alteration zones are tabular to elliptical in plan and range up to 150 metres in length and 45 to 90 metres in width.

Energex's 1985 exploration program developed a shallow mineral inventory for the three deposits of approximately 235,820 tonnes grading 8.57 g gold per tonne in all categories. Closely spaced diamond drilling in 1986 brought this inventory into the drill proven-problable categories and added significantly

to probable and possible drill reserves. Trenching and diamond drilling established the continuity of host mineralization along strike and to depth. Drill intersections from two additional prospects, the Thesis II and Bonanza South, yielded excellent assays, strengthening indications that these zones are extensions of the drilled deposits. Less than 20 per cent of the length of the mineralizing structures on the A1 property has been tested by drilling.

The Bonanza Fault trends north-south and appears to extend for over five kilometres to the Manson Creek-Golden Rule METS deposit on Metsantan Mountain. The Bonanza deposit, comprised of both subvertical tabular 'veins' and stacked, subhorizontal sheet to lozenge shaped silicified zones mineralized with free gold, barite, minor copper sulfides, and pyrite, lies on this fault. The nearby Ridge deposit lies on a northeastern splay of the main structure. The Bonanza deposit has been tested for a strike length of 305 metres and to a depth of 46 metres by over 1500 metres of diamond drilling in 43 holes.

The Thesis Fault crosses the A1 property diagonally from northwest to southeast and lies to the west of the Bonanza Fault. It has been traced for over 3.2 kilometres. The Thesis III deposit, positioned midway along this fault system is the most intensively explored section of this structure. Free gold and barite are associated with silica and sulfides across widths of up to 30 metres. Over 2700 metres of drilling and 900 metres of trenching have tested this deposit. An example of high grade drill results to date includes 11.3 metres of 51.4 g gold per tonne (A85-01). The Thesis II zone, a possible extension of the Thesis III deposit, is located 427 metres to the southeast along the Thesis Fault. In 1986, diamond drilling encountered a strongly silicified gold-bearing structure, similar to the Thesis III ore host.

The BV Fault, 0.8 kilometres to the south of the Thesis Fault, trends southeast with both structures converging at the southeast corner of the A1 claims. The BV Fault is more than 1.6 kilometres long, with the BV deposit, a major silica/barite vein system, located at its midpoint.

The BV deposit has been tested by 37 diamond drill holes with the system displaying good continuity. Typical 1986 drill intersections included 8.8 metres of 25.7 g gold per tonne (A86-80) and 7.5 metres of 22.6 g gold per tonne (A86-77).

Another mineralized zone with similar characteristics to the BV deposit, lies 915 metres to the southeast along the BV Fault system. Follow up trenching is planned on this and other geophysical/geochemical anomalies.

Depending on access it is aniticipated that production from three open pits will commence in 1988. High grade underground mining operations will depend on the results of deeper drilling scheduled for 1987. Energex is also evaluating a seasonal leaching program on lower grade open pit wall rock.

Sufficient reserves now appear attainable on the property to commence production. Access is the major economic factor dictating the size, duration and cut-off grade of any operation. The proposed extension to the Omineca Mine Access Road will strongly influence the nature of Energex's production decisions during the next year. As far as the Company is concerned, mining the Al deposits is no longer a question of "if", but "when" amd at what scale.

CHAPPELLE PROPERTY (Baker Mine)

Most known gold-silver quartz veins occur in a window of late Triassic Takla Group volcanic rocks marginal to the Black Lake granitic stock. Takla Group andesites and dacites are in fault contact with, or are unconformably overlain by slightly younger Toodoggone volcanic rocks. Late Permian limestones and lesser cherts unerlie Takla Group rocks south of the known vein structures.

Gold-silver bearing quartz veins strike northeast and east-southeast and several have a spatial relationship with quartz-feldspar porphyry intrusions which may represent feeders for lithologically similar Toodoggone

volcanic rocks.

'A' Vein, mined by DuPont between 1981 and 1983, is part of a northeast-striking, steeply northwest-dipping quartz vein system known to extend over a strike length of 400 metres. Better gold-silver grades (initial estimate: 90,000 tonnes grading 33.9 g/t gold and 680.2 g/t silver) were contained in a flat-lying shoot with a 200 metre strike length, a width of 2-3 metres and a thickness of 40 metres. Principal ore minerals in 'A' Vein were fine grained electrum and acanthite (argentite) which occur with disseminated pyrite, chalcopyrite and sphalerite in a quartz and minor carbonate gangue.

Extensive cross-faulting resulted in greater than anticipated dilution, such that recovered grades were about half those originally estimated.

Multinational Resources Inc. acquired the mineral rights to the Chappelle property from DuPont Canada Inc. in mid-1985 and embarked on an exploratory drilling program to test several of the other known vein systems. Two holes were drilled on the 'B' Zone, 400 metres northeast of 'A' Vein, and one of these yielded significant gold-silver assays.

'B' Zone had been discovered during the eariliest stages of exploration on the property and limited trenching revealed east-southeast striking, moderately north-dipping, 0.6 metre wide quartz-pyrite veins and closely spaced 0.5-1 centimetre quartz stringers which yielded low precious metals values. One hole drilled by DuPont in 1981 did not intersect significant values.

Additional diamond drilling by Multinational in 1986 disclosed the presence of a northeast-striking, steeply northwest-dipping quartz (carbonate) vein over a strike length of at least 150 metres and true widths in the 2 to 7 metre range. The structure apparently terminates below surface and is oblique to the trend of the veins and stringers exposed in the surface cuts. These are hosted by volcanic rocks displaying moderate to intense sericite and clay mineral alteration and are interpreted to represent a hanging wall alteration zone.

'B' Zone is apparently the northeast extension of the structure which hosts 'A' Vein. Mineralogy of the two zones is similar and better mineralized sections in both are concentrated near the hanging wall of the structure. Work to date indicates 'B' Zone is not as structurally complex as 'A' Vein.

Some exceptionally good intersections on 'B' Zone include 58.4 g gold per tonne and 728 g silver per tonne over a core length of 5 metres in the last hole drilled in 1986. Better grades apparently occur in a gently northeast raking shoot over a 60 metre vertical interval within the plane of the vein. Work to date indicates some 50,000 tonnes grading 17 - 20 g gold per tonne and 140 g silver per tonne within 'B' Zone which is open along strike and to depth.

A significant exploration and development program is scheduled for 'B' Zone in 1987. The fact that this zone has only limited surface expression necessitates re-evaluation of other vein structures on the property.

METS

During 1986 Manson Creek Resources Ltd. completed 20 diamond drill holes totalling 1653 metres.

A quartz-barite-gold-bearing breccia structure with flanking clay alteration traced on a surface for 2400 metres, was intersected over a strike length of 150 metres, a width of 5 to 10 metres and a depth of 90 metres. A preliminary drill indicated mineral inventory of 83,500 tonnes grading 11.3 g/t Au has been outlined in a high grade gold bearing ore shoot. A large diamond drill program is planned for 1987 to further test and delineate the gold zone which is open along strike, down dip and along the plunge direction.

OUTLOOK

Over the next couple of years, several development projects are planned for this high grade bonanza gold camp thereby establishing a major new gold mining camp in British Columbia. Deposits are small in size but potentially big in dollars returned. The camp is in a 'newborn' stage of exploration/development compared to other classic epithermal camps such as El Indio, Comstock Lode, Creede, and Goldfields. Test milling, bulk sampling, and even heap leaching studies continue. Toodoggone deposits have only been scratched from the surface with less than 20 per cent of favourable structures being explored. What happens at depth? - only time will tell! 1987 shapes up to be a very exciting and interesting year in the Toodoggone!

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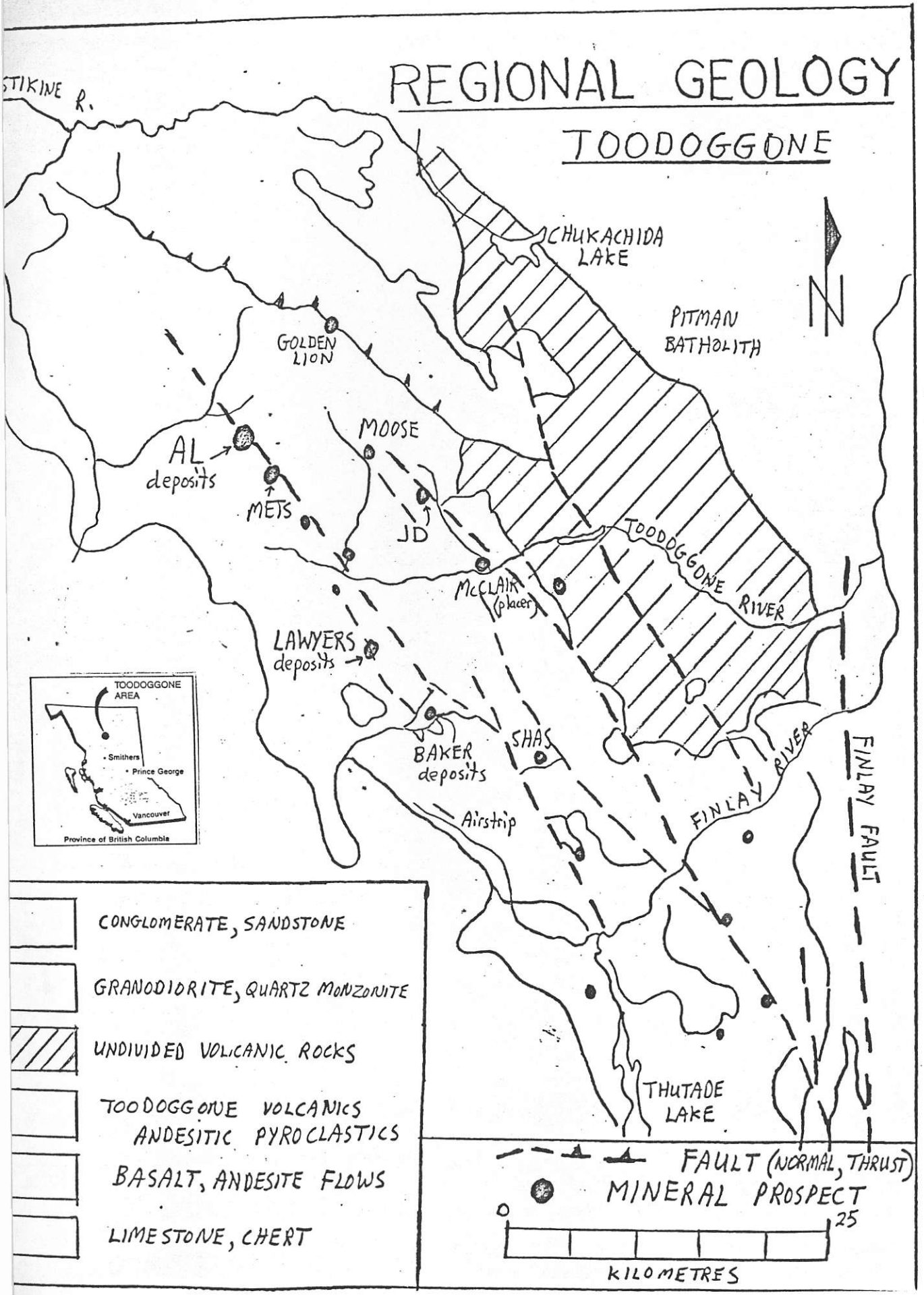
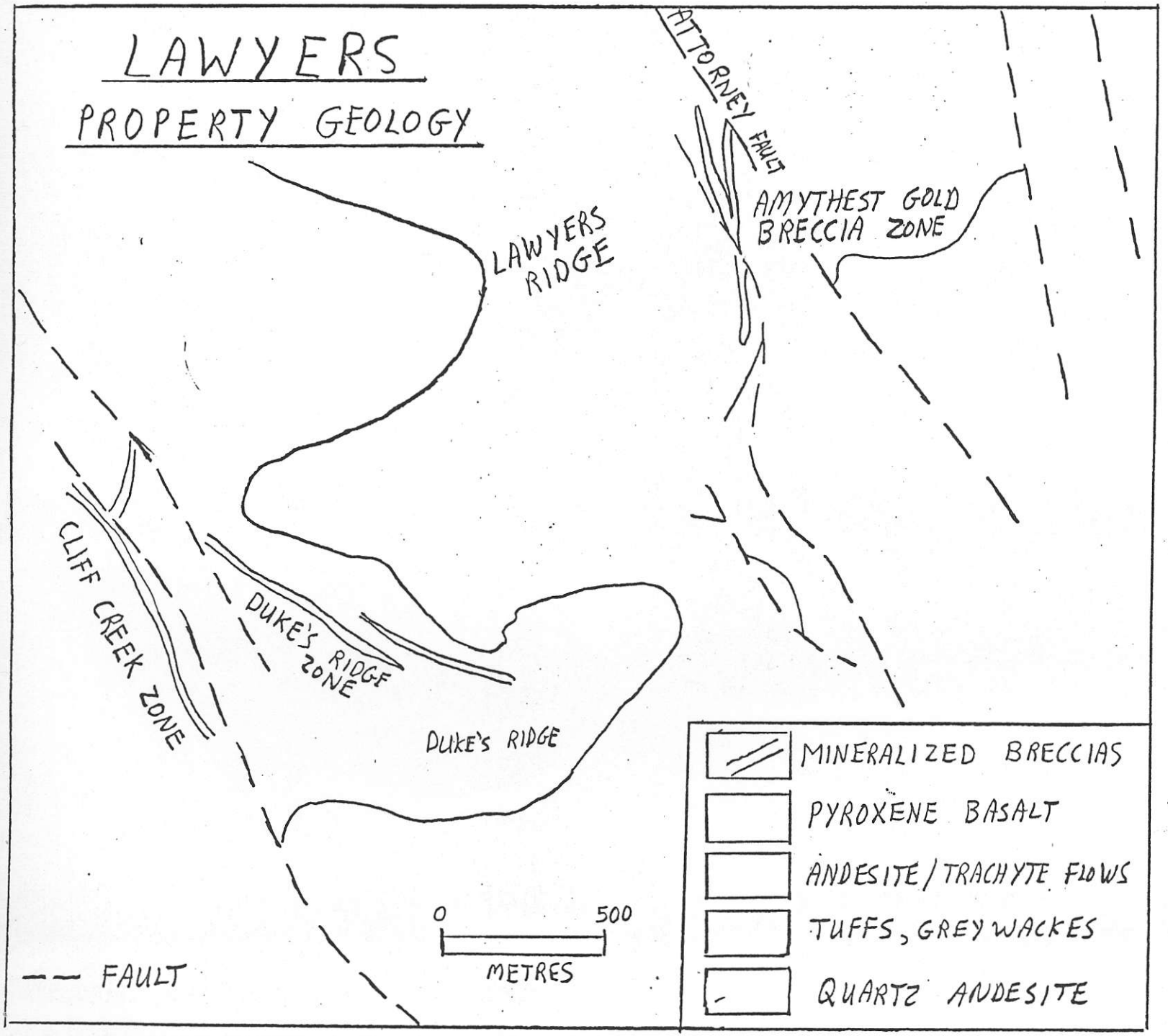
REGIONAL GEOLOGY

TOODOGGONE




LAWYERS
PROPERTY GEOLOGY
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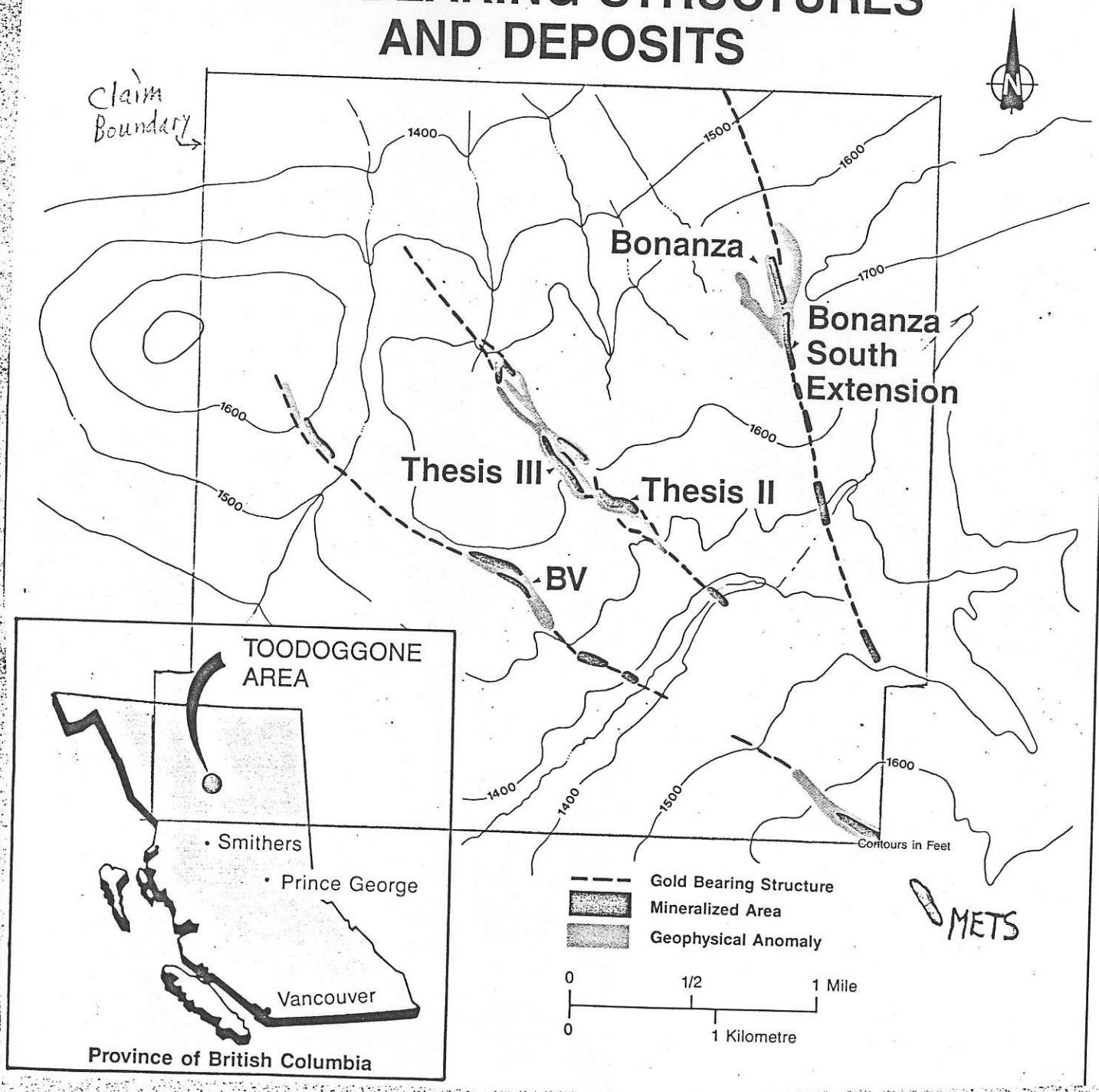
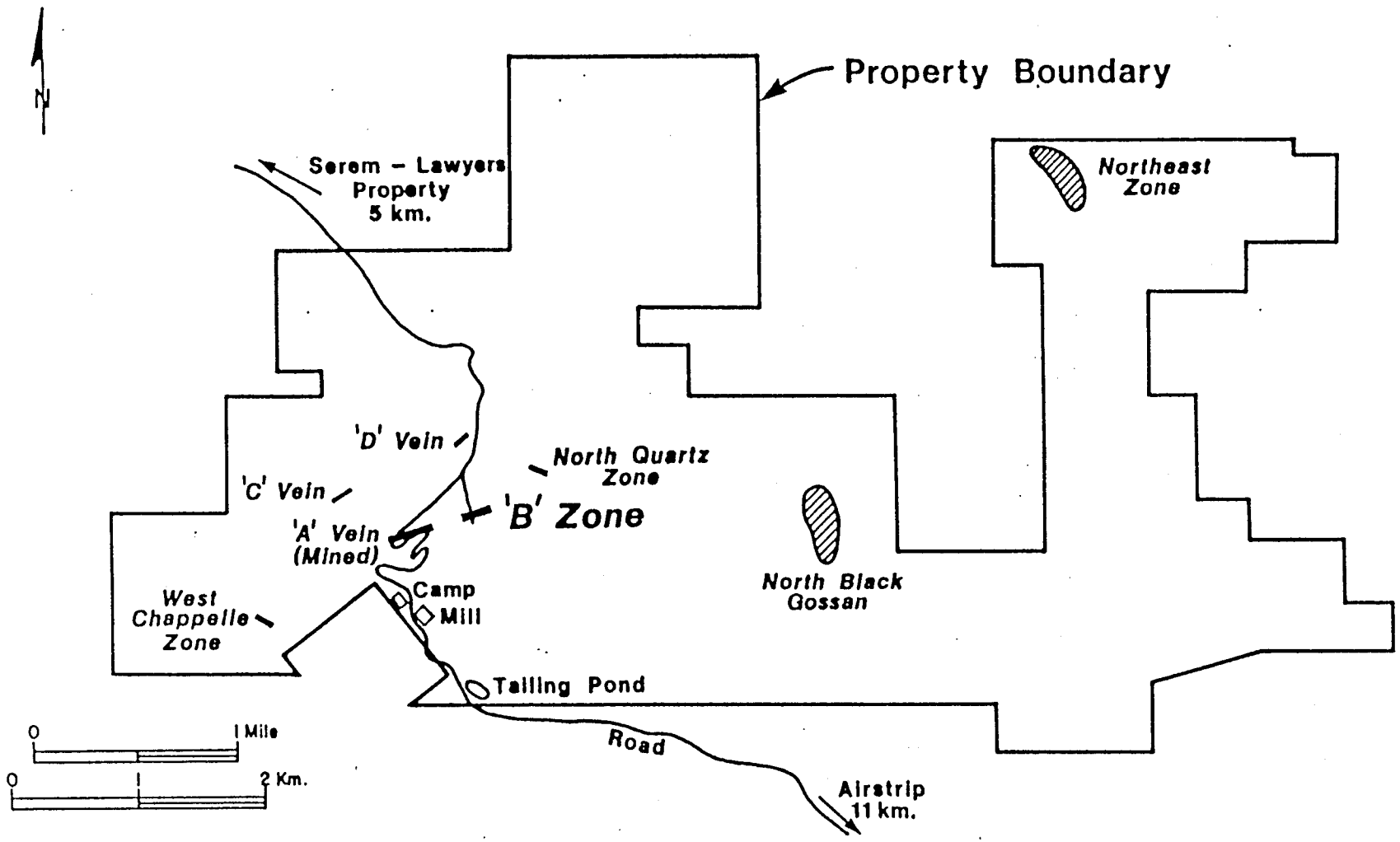
GOLD BEARING STRUCTURES AND DEPOSITS





MULTINATIONAL RESOURCES INC.

CHAPPELLE GOLD PROPERTY

TOODOGGONE AREA, B.C.