Liard M.D.
104 G/8W, 1W
57° 15 N
130° 26 W

BALL CREEK PROJECT

for

G. R. C. Exploration Company

by

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INTRODUCTION

To facilitate reference in this report, the various branches of Ball Creek and the many distinct gossan zones that occur along these basins have been named. Ball Creek flows easterly into Iskut River and a major branch flows from the northwest and enters Ball Creek 6 kilometers west of the Iskut River. This branch will be referred to as North Fork. Also, 13 kilometers west of Iskut River, Ball Creek has two merging branches; a major one from the northwest and a minor one called South Branch, from the southwest.

Lying along the main part of Ball Creek are two conspicuous gossans. the Goat zone on the north side, 9 kilometers west of Iskut River and the Ball Creek zone on the south side, 9.5 kilometers west of Iskut River. Opposite the Ball Creek zone, high on the cliffs north of the creek, lies the Cliff zone. Lying along the west side of North Fork, above the timber line, is the Camp zone. Another large conspicuous gossan lies in the upper reaches of South Fork and this will be referred to as the South Fork gossan.

Interest in the property began in 1963, when Southwest Potash staked the Mary claim group to cover the Cliff zone. Work was minimal and consisted of geological mapping, geochemistry and 199 feet of diamond drilling with a very small drill.

In 1966, Stikine Exploration restaked the area but did no work.

In 1970, Newmont staked the Greg Group over the area now covered by the Tara Claims. The company did some geological mapping, geochemistry and geophysics. Also, in 1970, Great Plains Development Company Ltd. staked the ME and ROG claims.

In 1971, Newmont allowed its claims to lapse and subsequently Great Plains staked the Tara 1-27 claims over these lapsed claims.

Work from 1970 through 1975 by Great Plains Development, including 2013 m (6,606 feet) of diamond drilling, disclosed only small amounts of copper and lesser molybdenum mineralization. Encouragement was not sufficient to warrant further exploration work. Great Plains Development did nothing after 1975. Up to this point all work had been concentrated on the large gossan zones to the north of Ball Creek on what were considered as copper prospects (Camp, Cliff, Goat zones).

Mr. D. Mann, while with Great Plains Development, noted the alteration and molybdenum mineralization found to the south of Ball Creek and suggested exploration for molybdenum. In 1979, Mr. Don Bryant, acting as a consultant for Mr. Mann, made two visits to the area and recommended work on the Ball Creek zone. In the fall of 1979, he returned with Mr. J. R. Woodcock to do some preliminary mapping and rock geochemistry and to acquire additional claims.

This work resulted in a decision to do additional mapping plus about

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1000 meters of diamond drilling in 1980.

Because of the excessive exploration activity in British Columbia. efforts to get a major drill contractor were unsuccessful although enquiries started in November 1979 and continued through early 1980. Finally, in July, Lyons Diamond Drilling contracted for a minimum of 3000 feet of drilling.

Employees for J. R. Woodcock Consultants Ltd. arrived in the area July 3 to begin camp construction and mapping. Lyons brothers arrived with their equipment on July 27 and began drilling on August 1, 1980.

Lyons Diamond Drilling Ltd. is a new company with little capital. The drill was not in good condition and as a result performance was poor with numerous breakdowns. The drillers decided to purchase a more powerful drill and a new mast. Bad luck continued and even the new mast collapsed. On October 21, with little or no progress in drilling and with winter setting in, the drilling was halted and the camp and equipment removed. Although the original planned footage of drilling was achieved, the extra depth of holes that were subsequently desired could not be achieved.

Drilling conditions were generally good. Some of the ground in the first 85 meters of Hole 80-1 was very broken and this necessitated 12 meters of triconing. However, the remainder of Hole 80-1 and most of Hole 80-2 was in good ground. Extreme water pressure was encountered at depth in Hole 80-2 causing numerous delays and a general slowing down of the drilling operation.

A total of 953.1 m (3127 ft.) of diamond drilling was completed fulfilling the preliminary objective of 3000' of drilling. This included 401.4 m (1317 ft.) in Hole 80-1 and 551.7 m (1810 ft.) in Hole 80-2.

In addition, the rock geochemistry coverage over the target was increased with 140 additional rock samples. A stadia controlled geology map, scale 1:1000, was made of the rugged Ball Creek target. Three days of reconnaissance prospecting and rock geochem work was done on the bright gossans to the north of Ball Creek (Cliff zone and part of Goat zone). A few days were also spent staking a large bright gossan about 8 km to the southwest along Ball Creek. These claims, named the Ball claims, included 70 units.

Examination of the core included the logging of lithologies, mineralization and other petrographical features. Alteration types, intensities, etc. were noted. The number and type of quartz veins (white quartz versus bluish, translucent quartz) and the number of carbonate veins were recorded. The amount of pyrite was estimated and categorized as low, medium or high.

The core was systematically split and sampled, with 3-meter samples taken approximately every 12 meters. Sampling intervals were adjusted

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The core is stored on Ball Creek near eastern edge of the property

in places in an attempt to maintain one rock type in any sample. These samples were analyzed geochemically for Mo, Cu, Pb, Zn, Mn, F, and S. A few selected samples were also analyzed for Sn and W. A few samples with high copper and molybdenum values were subsequently assayed for Cu, Au and Ag.

The surface rock geochemical data is presented on a topographic base map (scale 1:5000) produced by Integrated Resources Photography Ltd. Individual maps present the results of each element and for the sample numbers. The geochemical results from the core are presented on a profile (scale 1:1000) which also includes the geology. The number of quartz veinlets is also presented on a separate profile.

J. R. Woodcock directed the program and visited the property several times during the program. He initiated the surface mapping and the definition of the geologic units. He also reviewed all the core making suggestions for the logging. Dennis Gorc was responsible for management of the program and logging the core. In addition, he helped with the mapping and the collection of the rock geochemical samples.

Other personnel include Paul Stanneck who was responsible for the setting up of the camp and Phillip Gawthrop and Scott Robinson who assisted Mr. Gorc. In addition, Mr. Donald Mann and Mr. Whit Cameron of G. R. C. Exploration Company Ltd. and Mr. Donald Bryant visited the property several times and made suggestions and observations concerning the core and the surface geology.

LOCATION AND ACCESS

The Ball Creek property is located in the Liard Mining Division straddling N.T.S. map sheets 104G-8W and 104G-1W with the center of the property at latitude 57° 16.5' and longitude 103° 24'. Although only 10 km. (6.2 miles) west of highway 37, the rugged terrain makes the property accessible only by helicopter. The nearest settlement is Iskut, B. C. located 70 km. (43.5 miles) to the northwest along highway 37.

Tenajohn Center, a roadhouse near Iskut, can provide accommodation and meals. Mrs. Betty Burris at Tenajohn Center also supplied expediting services and facilities for helicopters to land and refuel.

Helicopters are usually based at Dease Lake, 70 km (435 miles) to the north of Iskut; Stewart, 150 km (93.2 miles) south of the property and Watson Lake, 305 km (190 miles) north of the property. Occasionally a helicopter can also be obtained from Tenajohn Center or from Schaft Creek, 50 km northwest of Ball Creek. The 1980 program also made extensive use of a helicopter contracted to B. C. Hydro and temporarily based near Bobquin Lake. Trans Provincial

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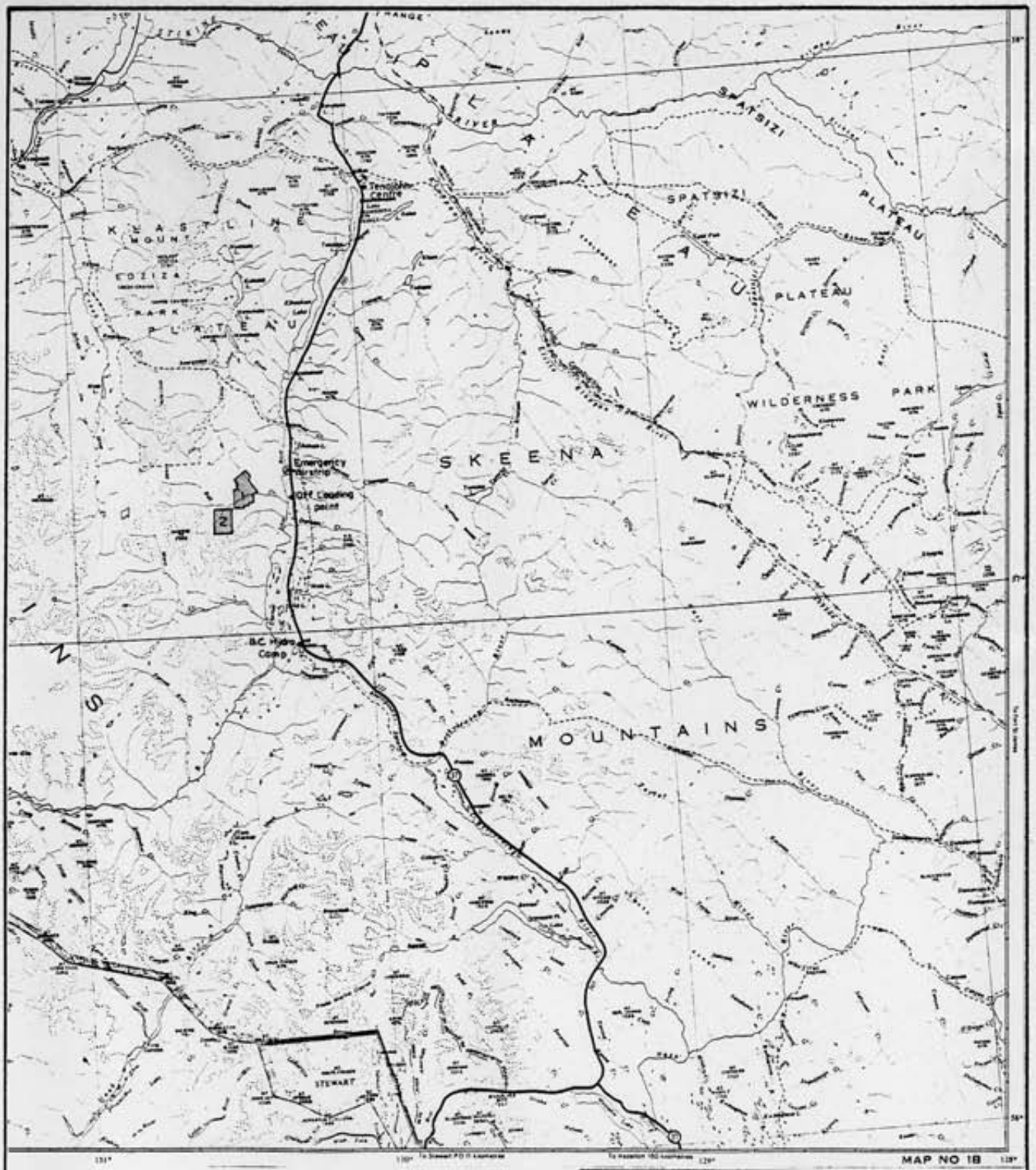

LEGEND

1 Ball Creek Property

2 Ball Claims

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VANGULF EXPLORATION CO.

LOCATION MAP

LIARD M.D., B.C.

SCALE 1: 300,000

0 8 MILES

0 10 KM.

J.R. WOODCOCK CONSULTANTS

DATE: JANUARY 1981 FIGURE 1

Airlines has scheduled flights from Terrace to Bobquin Lake, Schaft Creek and Iskut.

Almost all supplies including fuel must be shipped up from the cities to the south. Lindsay's Trucking provide a weekly service along Highway 37 and will drop goods at any desired location provided adequate instructions are given.

The extreme topographical relief in the vicinity of the Ball Creek property can cause serious problems in working on the property. The relief along much of the cliff zone and over parts of the Ball Creek target is in places so extreme that the aid of an experienced mountain climber would be needed to safely reconnoiter. Although this does not apply to the entire area, movement about the property is slow and difficult and often accessible only because of vegetation which provides handholds.

Such relief severely limits the choice of drill sites. The two drill sites of 1980 are two that could be prepared without excessive costs. Even then the site for 80-2, located at the lower edge of the cliffs, required extensive hand excavation and crib construction. Construction of additional sites higher on the hill would be costly and would also entail a helicopter based at camp to move men and equipment between drill sites and camp.

A combination of heavy snowfall and steep relief makes snow slides a common occurrence along the Ball Creek valley. Such slides preclude surface exploration in early spring. These slides in addition with the steep relief would severely limit any future access road and likely necessitate that any production adit be collared at the junction of the North Fork with Ball Creek located three kilometers east of the Ball Creek target.

MINERAL CLAIM DATA

The Ball Creek property initially included the ME and the ROG claims staked in 1970 for Great Plains Development Company and Chevron Standard Limited (partners in the Kinskan Joint Venture Agreement). This joint venture was owned 57.5% by Great Plains Development and 42.5% by Chevron Standard Limited. Subsequently the assets of Great Plains Development Company Ltd. were acquired by Norcen Energy Resources Ltd.

In the period 1971 to 1973, the property expanded to the north with the addition of the TARA, MENT, MOM, BARE, BR and VKR claims (Table I). After 1975, the partners ceased exploring the property. In 1979, some of these claims lapsed (Table II).

In 1979, G.R.C. Exploration Company Ltd. started to negotiate an option on the Ball Creek property from the Joint Venture Partners and in conjunction with the proposed option, the DON 1, 2, 3. 4 and 5

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grid claims were staked as agent for John R. Woodcock. An unrecorded bill of sale transfers these claims to Norcen Energy Resources Ltd.

In 1980, to facilitate an application of assessment work, the sizes of the DON 1 to 4 claims were reduced and the DON 5 claim allowed to lapse (Table III and IV). Also in 1980, 4 claims including seventy units were staked as agent for John R. Woodcock over a large gossan about 7 kilometers southwest of the Ball Creek property. The claims, the BALL 1, BALL 2, BALL 3, and BALL 4 are on the South Fork of Ball Creek (Table V).

The data for the claims are tabulated on Table I to Table V which are as follows:

TABLE I

Data on Claims Existing Prior to 1980

CLAIM NAME	RECORD NUMBER	RECORD DATE
ME 1 - 18	46259-76	August 19, 1970
ROG 1 - 20	48091-10	August 25, 1970
ROG 22 - 27	48111-16	August 25, 1970
ROG 29	48117	August 25, 1970
ROG 31	48118	August 25, 1970
ROG 33 - 34	48119-20	August 25, 1970
TARA 1 - 27	55799-825	Sept. 28, 1971
MOM 4 - 11	68388-95	Sept. 21, 1972
BR 1 - 3	69897-99	July 18, 1973
BARE 1 - 2	69895-96	July 18, 1973
MENT 7 (Fr.)	55085	August 18, 1971

TABLE II

Data on Lapsed Claims of Original Group

CLAIM NAME	RECORD NUMBER	LAPSE DATE
ROG 35 - 40	48121-26	August 25, 1979
VKR 1 - 6	70639-44	Sept. 24, 1979
BARE 3 - 11	70630-38	Sept. 24, 1979
BARE 12 - 13	71204-05	Sept. 24, 1979
BARE 14 - 15	70854-55	Sept. 24, 1979
MENT 1 - 6	55079-84	Aug. 18, 1979

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TABLE III

Data on Don Claims

CLAIM NAME	TAG NO.	RECORD NO.	RECORD DATE	ORIGINAL SIZE	REDUCED SIZE
DON 1	43339	1136	November 9, 1979	20 units	9 units
DON 2	43340	1137	November 9, 1979	20 units	15 units
DON 3	43341	1138	November 9, 1979	18 units	9 units
DON 4	43342	1139	November 9, 1979	16 units	8 units
DON 5	43343	1140	November 9, 1979	16 units	---

TABLE IV

1980 Grouping of Claims

BALL 1 GROUP	BALL 2 GROUP	BALL 3 GROUP	ADDITIONAL CLAIMS (NOT GROUPED)
ROG 1 - 18	ME 3	ME 7 - 18	TARA 1 - 27
ROG 27	ME 5	BARE 2	MOM 4 - 11
ROG 29	BARE 1	DON 1 - 4	BR 1 - 3
ROG 31	ROG 19 - 20		
ME 1 - 2	ROG 22 - 26		
ME 44	ROG 33 - 34		
ME 6	MENT 7 (Fr.)		

TABLE V

Data on Ball Claims (South Fork)

CLAIM NAME	TAG NO.	RECORD NO.	RECORD DATE	SIZE
BALL 1	38251	1595	Sept. 23, 1980	20 units
BALL 2	38252	1596	Sept. 23, 1980	15 units
BALL 3	38253	1597	Sept. 23, 1980	15 units
BALL 4	38254	1598	Sept. 23, 1980	20 units

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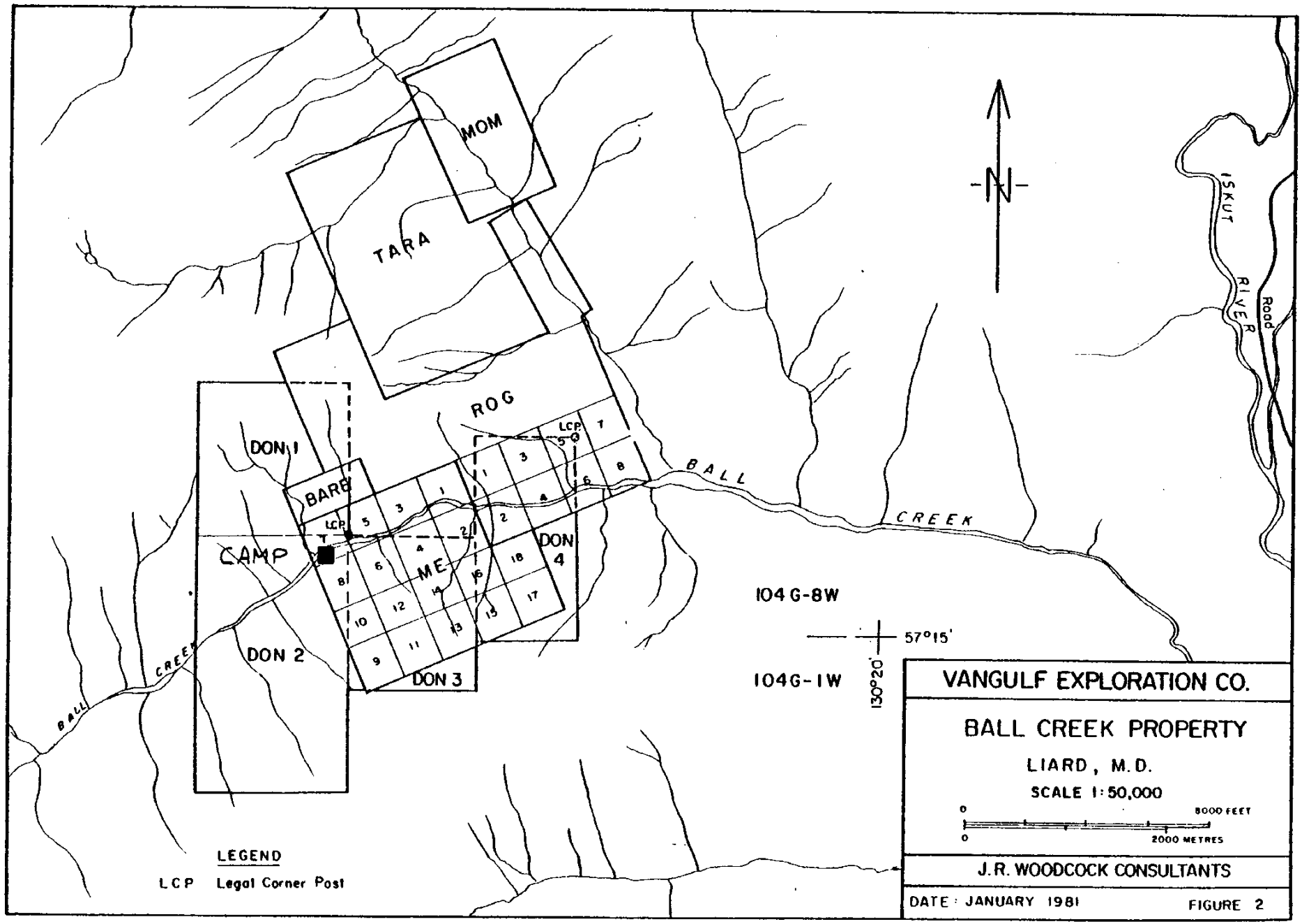
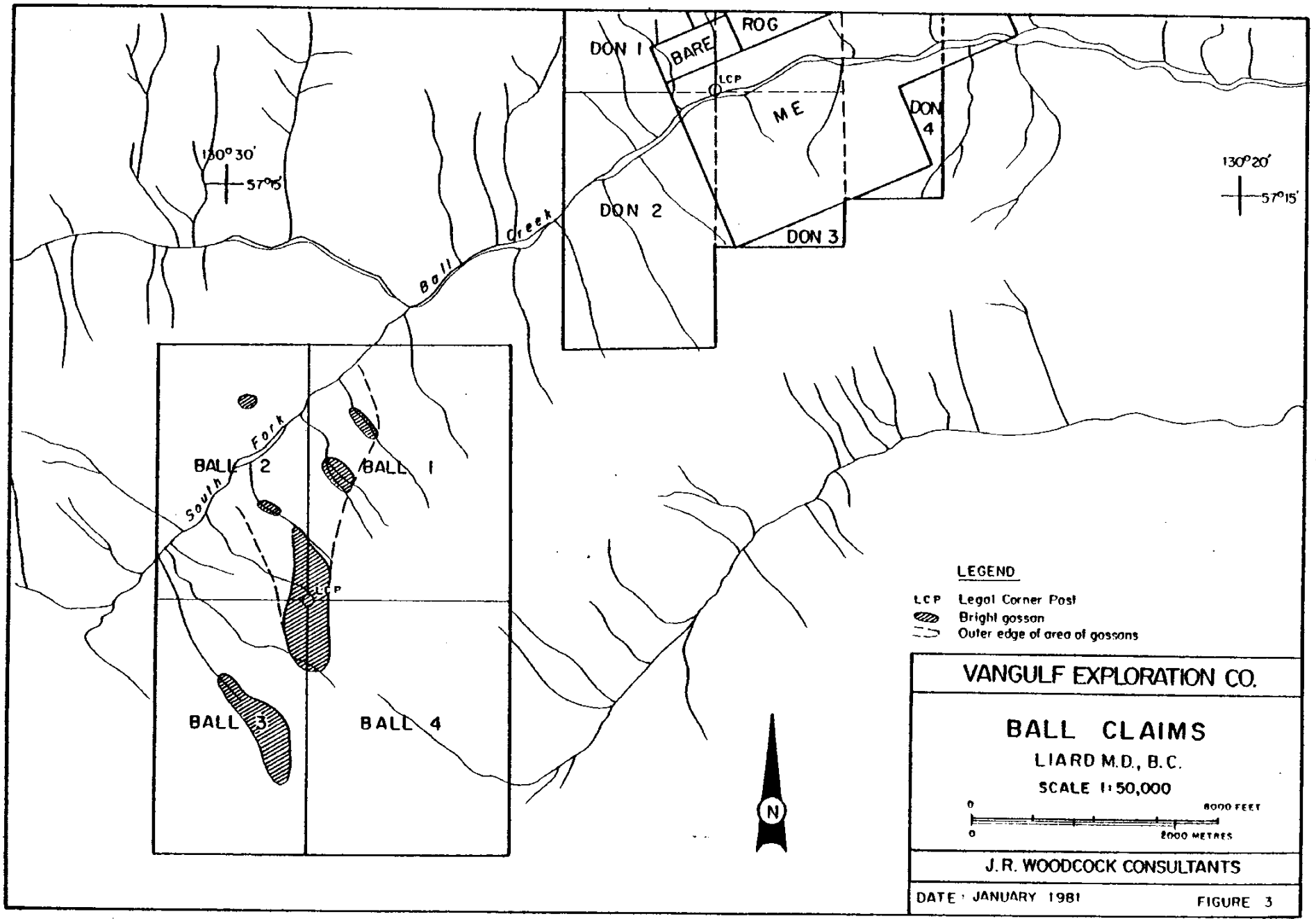

MOM
TARA
ROG
DON 1
BARE
CAMP
ME
DON 2
DON 3
DON 4
LCP
BALL CREEK
ISKUT RIVER Road
104 G-8W
104G-1W
57°15'
130°20'
LEGEND
LCP Legal Corner Post
VANGULF EXPLORATION CO.
BALL CREEK PROPERTY
LIARD, M.D.
SCALE 1:50,000
8000 FEET
2000 METRES
J.R. WOODCOCK CONSULTANTS
DATE: JANUARY 1981
FIGURE 2


DON 1
BARE
ROG
LCP
ME
DON 4
DON 2
DON 3
130°30'
57°15'
130°20'
57°15'
Ball Creek
South Fork
BALL 2
BALL 1
LCP
BALL 3
BALL 4
N
LEGEND
LCP Legal Corner Post
Bright gossan
Outer edge of area of gossans
VANGULF EXPLORATION CO.
BALL CLAIMS
LIARD M.D., B.C.
SCALE 1:50,000
0
8000 FEET
0
2000 METRES
J.R. WOODCOCK CONSULTANTS
DATE: JANUARY 1981
FIGURE 3

REGIONAL GEOLOGY

The Ball Creek property lies only 10 kilometers west of the Bowser Basin within a sequence of Triassic rocks that include basalt, volcaniclastic rocks and related sub-volcanic intrusions. A short distance to the north of the property lies the Mount Ediza volcanic complex late Tertiary to Recent age. This is an area of predominantly north-south trending faults which cut across the regional north-westerly structure. The northeast trending Stikine Arch lies north-west of the property. The Coast Plutonic Belt is 70 kilometers to the west.

In the past, the region has been the focus of considerable exploration activity predominantly for porphyry copper deposits. Several large copper deposits were discovered including the Galore Creek and Schaft Creek deposits. These deposits are hosted by Triassic volcanic rocks, Galore Creek is associated with syenite stocks whereas Schaft Creek is associated with quartz-feldspar porphyry dykes.

The majority of the copper deposits occur on the southeast flank of the Stikine Arch.

GEOLOGY AT BALL CREEK TARGET

Structure

The aerial photographs of this region show numerous faults running in several predominant directions. One of these directions is parallel to Ball Creek, another is parallel to North Fork. Sharp depressions parallel to North Fork express faults at the the Camp Zone. Only those faults pertaining to the Ball Creek and the 1980 exploration work will be discussed.

The Ball Creek pyritic zone is a long linear southwest trending zone which bulges at Ball Creek to form the exploration target. It actually extends southwest from this target as a narrow zone for 3 kilometers. This direction or attitude appears to be a major control in faulting and mineralization along the Ball Creek Zone and also along the Western part of the Cliff Zone.

The Ball Creek gossan target terminates abruptly on its north side at Ball Creek and the Goat Zone terminates even more abruptly on its south side at Ball Creek. It is probable that a significant fault lies under Ball Creek. In fact, suggestions have been made that the Goat Zone is the offset part of Ball Creek Zone.

To the south, the Ball Creek Zone also terminates abruptly against a fault with a sudden change from gossan material to barren, unaltered andesitic volcanic rock. This fault can be readily identified on the aerial photograph and is marked in the field by a number of small ledges which interrupt the steep slopes.

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The aerial photograph also indicates a probable fault trending northeasterly and lying east of the Ball Creek Zone. This appears to branch off from the south bounding fault, trend in a northeasterly direction and curve into the so-called Ball Creek Fault.

The Ball Creek Zone also changes sharply on the west from the highly pyritic and altered rocks to essentially basaltic volcanic rocks. The photos show no linears here. A cause is suggested when discussing breccia pipes.

Small scale faults are also common over the Ball Creek Target (Figure 4). The majority of these faults follow the main structural trend of N 20° E to N 40° E with dips between 40° and 80° southeast. However, many faults especially the smaller ones trend in other directions. Some of these faults have associated fault gouge to maximum thickness of 1 meter. No direction of movement along the faults could be deciphered. Thin carbonate veins generally parallel the faults.

The possibility of large gravity slides occurring along both sides of Ball Creek and affecting the gossan zones has been considered. Even the aerial photographs are suggestive of this, especially to the north of Ball Creek and immediately west of the Goat Gossan Zone. With respect to the Goat Gossan Zone, there is no field evidence to support this suggestion. In fact, the fracture pattern, many of the veins and the dykes which cut this zone are of a persistent attitude (020° to 040°), without any jumbling that one might expect from a gravity slide.

On the Ball Creek gossan however, this gravity slide suggestion is more difficult to refute. The rock types above the first major cliff at drill site No. 2 (up Moly Creek) do have a persistent southwesterly fault structure and fracture structure. Moreover, the late cross-cutting microdiorite dyke, even though having many warps and curves, has not been faulted. However any gravity slide of major size could have affected the first major resistant cliff of Moly Creek or it could have even left this first cliff as a scarp with the gravity fault below. The field observations made in 1980 did not prove or disprove such theory.

Intrusive breccia is common within these rock types as indicated by the porphyry fragments encountered in some of the clastic rocks of the drill core. Much of the clastic rock initially mapped as felsite or acid pyroclastics is actually an unaltered clastic volcanic rock. Just how much of this clastic nature is from the original pyroclastic rock and how much is due to intrusive breccia cannot be ascertained. J. R. Woodcock suspects that much of this alteration zone is related to a large area of intrusive breccias and possibly the complete so-called felsic pyroclastic zone is one very large complex intursive breccia with subsequent alteration to dolomite, etc. The local sharp changes from altered porphyry to relatively unaltered barren porphyry in the field and in the core could be caused by the sharp structural control that a breccia pipe would impart. Also many of the vertical walls of unaltered porphyry that cross Moly Creek and have been interpreted at various times as dyke contacts or as fault contacts between shattered sheared rock and unaltered porphyry, may actually be local contacts of a complex breccia intrusive which has

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been in part controlled by the pre-existing southwesterly structural aspect of the zone. Such a structure could also account for the sharp change between altered rocks and the major area of basic volcanic rocks to the west. The outline of this altered and possible breccia pipe area is shown on the accompanying map.

Rock Types

The geology for much of the Ball Creek target was mapped on scale 1:1000, using stadia control (Figure 4). In addition, hand specimens were taken for each geochemical chip sample and identified, mainly with hand lense. These identifications are plotted on a map (scale 1:5,000) for use in interpreting the geochemical results (Figure 6).

Some brief petrographic examinations and descriptions were made for a number of specimens of the drill core and for some of the surface specimens. These descriptions are included in Appendix I; the data has been used in revising the drill logs.

Andesitic Pyroclastics

The Ball Creek pyritic and altered target is superimposed on volcaniclastic rocks. In the outer parts of the zone, where pyritization is still present but where the clastic nature is not evident and the subsequent breccia and alterations are absent, these rocks are a dark grey colour and have been mapped as andesites. Whether or not these are merely partially altered basaltic rocks that are found elsewhere has not been determined.

The clastic nature of these rocks is evident in the drill core; however, in some cases it is not apparent to whether the inclusion of foreign clasts within the finer-grained matrix can be attributed to the volcaniclastic nature of the rocks or to the subsequent intrusion breccia phenomena. The clasts are generally rounded with indistinctive blurred edges; but in places the borders are more distinct and the clasts are angular. Clasts are predominantly of volcanic rocks including some aphanitic pyroclastic rock, some crystal tuffs, and some porphyritic volcanics. Clasts of intrusive porphyry also occur in places, probably incorporated during intrusion of breccias. Presumably this andesitic rock occurred over much of the Ball Creek target; however, dolomite-diopside alteration and silication have obliterated much of it.

Within the fine-grained pyroclastic rock are some horizons (up to two meters in width) of relatively coarse crystal tuffs. These resemble porphyries with conspicuous white feldspar phenocrysts and some hornblende phenocrysts within a light grey to pale greenish matrix. Thin section examination shows that most of the crystals are fragments and that the rock is an accumulation of fragmental material including the finer-grained matrix (thin section 80-2-357.2).

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Basalts

The rocks occurring west of the Ball Creek target are mapped as basalts, a few thin sections of this slightly altered rock confirm this identification. These rocks form massive outcrops in the forested area west of the Ball Creek target.

The rock that occurs uphill south of the Ball Creek target and separated from it by a fault, is also a basic volcanic rock and most of it could be included within the basalt category.

In hand specimen the basalt is almost black with occasional tints of green. It is an aphanitic rock with an occasional phenocryst of white feldspar and hornblende. Pyrite content is merely a trace.

Siltstones and Mudstones

East of the target area in Alder Creek there are good exposures of mudstones with prominant banding and slump structures. These exposures are probably separated from the volcanic rocks of the Ball Creek target by a major fault.

The drill holes encountered short sections (generally less than 1 meter) of fine-grained aphanitic rock that is laminated or banded with colours of greenish greys to dark brownish greys. These lack foreign clasts and pyrite content is merely a trace. The layers have sharp contacts with the underlying and overlying units. These have also been mapped as sedimentary mudstones and siltstones; however, they could be merely reworked fine-grained tuffaceous material interlayed with the usual pyroclastics.

Feldspar Porphyry Intrusives

In the surface mapping and core logging, the feldspar porphyry intrusions has been separated into a "barren" feldspar porphyry and an "altered" feldspar porphyry. Small masses and dykes are found throughout the area and throughout the drill core and a large outcrop area occurs in the uppermost branches of Moly Creek. Within the porphyries are foreign clasts of brownish to almost black volcanic rock. Such clasts are generally from 2 - 5 cm. in width and are fairly rounded, probably due to absorption and alteration.

The barren or relatively unaltered feldspar porphyry will be described first. This intrusive invariably has numerous large (up to 1 cm.) plagioclase phenocrysts, a large number of black hornblende phenocrysts, and scattered large (up to 2 cm.) phenocrysts of zoned K-feldspar. The distribution of the K-feldspar phenocrysts is not even and varies greatly within any one outcrop. Williams, in his petrographic work, has mentioned that some of these are sanidine. The plagioclase phenocrysts, which are

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in the form of laths, do in places display a flow texture. No quartz phenocrysts occur in these rocks.

In thin section examination, one notes that the fresh appearing plagioclase phenocrysts generally are altered partially to carbonate patches and scattered sericite. The fresh appearing hornblende crystals are generally altered, in varying degrees, to carbonate, chlorite, etc.

The matrix of the porphyry is generally fine-grained phaneritic and varies in colour from light grey to almost white, with occasional brownish tints. Thin section examinations reveal three types of matrix in the unaltered or barren feldspar porphyries and the altered feldspar porphyries. These include plagioclase, K-feldspar, and K-feldspar plus quartz with a ratio of about 60% K-feldspar. There does seem to be some correlation of the K-feldspar matrices with the zones logged as altered feldspar porphyry. The relatively fresh or barren feldspar porphyries all have a plagioclase matrix.

In the zones mapped as "altered feldspar porphyries", the plagioclase phenocrysts have considerable sericite alteration accompanied by carbonate, kaolinite, and occasionally prehnite. Prehnite, when observed, (section 80-1-351.6 and section 80-2-45.1) occurs as a central complete alteration of the plagioclase phenocrysts with the surrounding or outer zone intensely sericitized. In such rocks, the hornblende phenocrysts are completely altered; however, the orthoclase phenocrysts are unaltered. The altered feldspar porphyry is cut by quartz veinlets; however, quartz veinlets also occur in the barren porphyry in the upper reaches of Moly Creek.

It does appear that these two types of feldspar porphyry, although logged separately, were initially the same rock type. Also, there does not seem to be any consistent distribution of the rocks according to their matrix content. In fact, a plot shows quite erratic distribution of orthoclase matrix versus plagioclase matrix.

The blurred altered appearance of rock with orthoclase matrix and other phenomena discussed subsequently indicate that the orthoclase might be secondary.

Andesite Porphyry

In hand specimen this porphyry is similar to the feldspar porphyry with the exception that the phenocryst content is much lower and the matrix is a darker shade of grey. This porphyry also contains abundant white plagioclase phenocrysts, numerous hornblende phenocrysts and a few large orthoclase phenocrysts. One of the main difference is the greater trend towards a trachytic or flow texture of the plagioclase matrix and even the plagioclase phenocrysts in places. This distinct trachytic texture is evident in the thin section examination.

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The largest exposure of this type of porphyry is the resistant knob north of Ball Creek and just south of Knob Creek.

Over the Ball Creek target no outcrops of such porphyry were noted; however, intersections were found in the core. Some of these are dykes that intrude the altered feldspar porphyry.

Microdiorite Dykes

A conspicuous black dyke, generally between 3 and 5 meters thick, crosses the Ball Creek target and cuts all other rock types. This dyke has an overall strike of 115°-AZ and steep dip to the north. It is characterized by rolls and local changes in strike, dip, and thickness. It is a very resistant rock feature and stands up, with cliffs on its downhill side and as walls across some of the canyons.

Thin section examination of this dyke (Specimen G-80-232) shows it to consist of plagioclase laths criss-crossed and intermixed with pyroxene crystals. Some of the larger pyroxene crystals surrounding this mixture could be termed poikilitic phenocrysts. Also scattered large phenocrysts of plagioclase are evident in thin section and in hand specimen.

Alteration is minimal with small amounts of chlorite, sericite, carbonate, and kaolinite. The rock contains a trace of pyrite.

Several smaller parallel dykes of this same rock occur along Ball Creek and a few with northeast strike occur within the gossan target.

Basic Dykes

Along the upper basins of Goat Creek is a black basic aphanitic dyke. Locally several branches are present. Similar dykes were encountered in the lower parts of Hole 80-2. The dyke appears fresh in hand specimen. However, no thin section examination has been made.

In the upper parts of Mid Creek is a small exposure of a basic intrusive. This intrusive, in hand specimen and in field outcrop, appears to be lamprophyre. A similar rock was encountered in the short sections within the diamond drill core where it is a dark colour and has a mottled appearance due to the abundant scattered concentrations of white calcite. Some green to black phenocrysts and some olive green phenocrysts also occur.

Alteration

Alteration noted in and around the Ball Creek target includes the min-

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erals of the upper green schist metamorphic facies, biotite hornfels, dolomite-diopside, lime silication, quartz veining and K-feldspar alteration. Within the gossan or pyritic zone of the Ball Creek target, the alteration types are erratically intermixed, sometimes with very sharp contacts or gradation between types. In other places they locally grade into one another. This sharp contact and the erratic distribution makes mapping zones of various types almost impossible. The alteration types are described in their probable genetic sequence.

Regional Alteration

Outside of the main zone of alteration; volcanic rocks do still contain some alteration products including tremolite-actinolite which replaces the mafic phenocrysts and widespread disseminated sericite within the plagioclase phenocrysts. Epidote also is present as it is throughout the alteration zone. This type of alteration could be of a regional nature although there have been suggestions that it is autometamorphic.

In relatively unaltered porphyry, hornblende phenocrysts are generally altered to chlorite, carbonate and occasionally biotite or muscovite.

Biotite Hornfels

Biotite hornfels is a common but very erratic feature in the Ball Creek target. The erratic nature is primarily due to the subsequent carbonate-diopside alteration which has replaced the biotite. However, part of the erratic nature is caused by late intrusions of breccias which contain fragments of hornfelsed volcanic rock. Biotite hornfels is also found adjacent to a few of the intrusive dykes.

In some of the breccias the matrix appears to be hornfelsed subsequent to the formation of the breccia. This may indicate a volcaniclastic breccia. In other places, fragments of hornfels in addition to fragments of feldspar porphyry, etc. are found within the breccia. This is interpreted as a late intrusive breccia.

The most widespread biotite hornfels is in the areas of andesitic pyroclastic rocks, both on the surface (the south and eastern parts of the target) and within the drill core.

Thin section examination shows that most of the hornfelsed sections have small amounts of chlorite, carbonate and diopside in addition to the widespread fine-grained secondary biotite.

Dolomite-Diopside Alteration

Widespread dolomite alteration, generally accompanied by some diopside

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produces a greyish rock that resembles felsic volcanics. This grey rock is so widespread in the pyritic zone that it was initially field mapped as an acid pyroclastic pile. In the previous work at the Camp Zone it has been called "felsitization".

The carbonate is readily identified in thin section. In hand specimen, it does not effervesce vigorously; moreover the target area does not have anomalous manganese. Therefore, it is tentatively identified as dolomite.

This carbonate-diopside alteration forms grey veinlets which cut the brown hornfels or the dark andesitic rocks. In places, these expand to large patches that contain remnants of biotite hornfels.

The dolomite occurs as patches in the matrix and in plagioclase phenocrysts and as small veinlets. It is also occurs with many quartz veinlets. In addition to the diopside, which is generally present in such sections, scattered epidote with associated pyrite is present and sericite flakes $\pm$ clay occurs in the plagioclase.

Silication

In much of the core in the lower parts of both drill holes, the amount of silication in the dolomitized host rock is so intense that much of the rock has been converted to a lime silicate mixture. This rock is various shades of green because of the presence of diopside and epidote. It also has brownish patches due to the presence of garnet. It has more than the normal amounts of iron sulfides, most of which is pyrrhotite. Short zones containing up to 50% pyrrhotite are a common feature; the pyrrhotite occurs as irregular concentrations or as disseminations throughout the silicated rock. Chalcopyrite is commonly present in small amounts with the pyrrhotite. Occasional short sections (up to 20 cm.) of dark brown hornfels are present as remnants within the silicated rock.

The host rock for such silication is breccia. This was mapped as pyroclastic; however, much of it could be intrusive breccia and this intense alteration could be related to a breccia pipe.

Thin section examination shows that the alteration is predominated by carbonate and diopside with lesser amounts of garnet, epidote, zoisite and iron sulfide. The epidote is found predominantly along veinlets with pyrite.

This alteration was logged in the drill core; however, it was not mapped on the surface. In Hole 80-1, silicated rock is first encountered at a depth of 152 meters and for the remainder of the hole such silicated horizons are interspersed with zones of porphyry, andesitic pyroclastics or pyroclastics with the dolomite-diopside alteration. In Hole 80-2, the silicated rock first appears at a depth of 111 meters. The silication encountered in this hole is more intense than that of

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Hole 80-1 and below 168 meters most of the clastic rocks are intensely silicated. Reason for this appearance and increase in intensity of the silication with depth in the drill holes is not apparent.

Sericitization

In some places of intense hydrothermal alteration, generally in areas of intermixed porphyries and volcanics, the numerous quartz veinlets are accompanied by abundant sericite alteration. Plagioclase phenocrysts are altered to K-feldspar and sericite and K-feldspar can be found along the quartz veinlets. Quartz can be also irregularly dispersed as small lenses within the altered rock. Most of the mafic minerals such as hornblende are completely altered to sericite or, in less intensely altered zones, to carbonate, chlorite and sericite.

This type of alteration appears to be more intense than that of the carbonate-diopside and it may have replaced the carbonate-diopside type of alteration. However, it could also be a separate alteration superimposed on areas of fractured and intermixed volcanics and feldspar porphyries.

This alteration is most evident on the surface along Moly Creek where it is bounded on the south by cliffs of relatively unaltered porphyry. In addition, there are large blocks of unaltered porphyry within the zone of alteration.

The contacts between the unaltered and altered porphyries are extremely sharp. Such sharp changes imply some sort of structural control rather than a pervasive dispersion from the center. Such structural control could be provided by faulting or by the contact of a breccia pipe which itself could have been controlled by a pre-existing fault.

Adjacent to the small area of intense alteration on Moly Creek are areas of carbonate stockwork developed in the altered volcanics. Such local concentrations of carbonate veinlets were also encountered in Hole 80-1.

Quartz Veinlets

In addition to the quartz veinlets with which the sericite is associated in the intense alteration zones, quartz veinlets are a common feature throughout much of the Ball Creek target and have been mapped on the surface in nearly every rock type. The large outcrop of relatively unaltered porphyry at the head of Moly Creek has numerous quartz veinlets.

The core of the Hole 80-1 contains persistent quartz veinlets throughout its length and includes several zones of well developed quartz stockwork. Hole 80-2 contained noticeably fewer quartz veinlets and only two short zones of intense quartz veining.

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Generally the quartz veinlets have a preferred orientation with a strike between north 20° east and north 40° east and a nearly vertical dip. Within the well developed quartz stockworks, the veinlets are oriented in all directions.

Numerous translucent quartz veinlets predominate with lesser numbers of whitish quartz veinlets. Pyrite commonly occurs with these veinlets and molybdenite has been detected in some of them in very small amounts. White carbonate is present in many of the veinlets and galena and sphalerite occur in a few.

K-feldspar Alteration

Mr. S. A. Williams in his examination of rocks from various parts of the Ball Creek property noted two types of intrusive porphyry, one of which has a plagioclase matrix and the other a K-feldspar matrix. He also observed that some of the plagioclase phenocrysts are partially replaced by K-feldspar. He suggested that possibly all of the K-feldspar of this matrix is secondary replacement plagioclase.

J. R. Woodcock in his thin section examination has made similar observations; however, in some of the places the K-feldspar of the matrix is at sharp contact with plagioclase phenocrysts and appears to be magmatic with very little replacement of the plagioclase. In addition to the plagioclase matrix and the K-feldspar matrix, some of the sections exhibit a quartz-K-feldspar matrix in which the quartz forms about one-third of the matrix. In places, the K-feldspar alteration does occur along some of the quartz veinlets and in many of these sections there is considerable alteration of the plagioclase phenocrysts to K-feldspar.

One section of a breccia containing porphyry and volcanic clasts was examined. The porphyry has a K-feldsaar matrix and the volcaniclast is completely formed of K-feldspar, probably a replacement. In addition, the matrix between the two differing clasts is composed of quartz plus K-feldspar. It seems almost certain that the breccia was part of an intrusive phenomenan and that the alteration has replaced the breccia matrix and part of the fragments.

Thus there could be a magmatic stage of K-feldspar which has formed a predominantly orthoclase matrix and which has partly replaced the plagioclase phenocrysts of the porphyry. In addition, there could also be a later stage of K-feldspar alteration which was controlled by the intrusive breccia and altered this breccia.

Mineralization

Pyrite

Since pyrite is the most abundant and widespread form of mineralization

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found over the target estimates of pyrite (plus some pyrrhotite) content were noted during the mapping of the target. Iron sulfide content was judged to be either nil to trace, low (2%), moderate (2%-4%), or high (>4%). Such estimates are inaccurate; however, the relative amounts can be useful in establishing trends.

The pyrite is disseminated or in veinlets where it is associated with epidote, chlorite, or pyrrhotite. Epidote-pyrite and chlorite-pyrite veinlets are found throughout 80-1 and 80-2 with a slight decrease in number towards the bottom of each hole. Within the silicated zones of 80-1 and 80-2, pyrrhotite is always present with pyrite and in the more intensely silicated zones is always more abundant.

On surface the amount of pyrite within the pyritic zone varied considerably with no gradual zoning toward some center (See Figure 7). The irregular pattern to the amount of pyrite is also reflected in the varying pyrite content of different rock types. Feldspar porphyries, unless altered, have noticeably less pyrite than adjacent volcanics. Altered volcanic rocks also contain considerable more pyrite than adjacent andesitic, unaltered volcanics.

Although there is no gradual zoning to the pyrite on surface, there are definite boundaries to the pyritic zone. To the north and south the pyritic zone is bounded by major faults. To the west most of the pyritic zone abuts against barren basalts. However, a narrow sliver of pyritized volcanics extends westward along the southern boundary fault.

To the east the boundary is somewhat indistinct as it is largely lost under talus and forest cover. However, examination of the narrow zone of outcrop along the southern bank of Ball Creek indicates that the pyritic zone extends at least to Bear Creek * and that it abuts against a northeasterly trending fault.

Within 80-1, the pyrite content is variable but remains somewhat uniform throughout the hole with no noticeable increase or decrease in pyritic content. This pattern is also reflected in the sulfur geochemistry (Figure20).

The amount of pyrite in the upper part of hole 80-2 is quite high; but below 250 meters depth it decreases noticeably. This is reflected in the sulfur geochemistry (Figure29).

Copper

Greenish copper stain is common along fractures over the Ball Creek target, although always widely scattered and in small amounts. Most abundant copper stain was noted in the limonite outcrops above and east of drill site 80-1 and along Moly Creek above drill site 80-2.

Disseminated chalcopyrite was only seen on surface along Moly Creek.

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* For ease of reference, the drainages south of Ball Creek have been named (from east to west): Alder, Bear, Moly, Mid, Goat (see sample number map, figure 5).

Chalcopyrite with galena and sphalerite in carbonate veins was noted in many places.

Small amounts of chalcopyrite with the pyrrhotite and pyrite are common in the silicated zones of the drill holes.

Multi-mineral Carbonate Veins

Carbonate veins containing considerable galena and sphalerite with lesser chalcopyrite are commonly found over the target and in the drill core. Geochemical analyses of such veins also indicate some molybdenite.

In addition to the carbonate veins, very small amounts of disseminated sphalerite occur in altered sections of the drill core. Such mineralization is very localized. Galena also occurs in a few quartz veins.

Molybdenite

Very small amounts of molybdenite were noted in quartz veins, in outcrops in the central part of Moly Creek and, in lesser amounts, south of drill site 80-1.

The drill core, especially 80-1 contains more mineralized veinlets, but still few in number and widely scattered.

GEOCHEMISTRY

Surface

Rock geochemical coverage over the Ball Creek target was extended with the collection of 140 additional samples. These samples were analyzed for Mo, Cu, Pb, Zn, Mn and F. Selected samples were also analyzed for Sn and W. The results for each element except Sn and W are given on separate maps with additional maps indicating sample numbers, pyrite estimates and rock types (Figures 5 to 13). The base map for these results is a 1:5000 topographical map produced by Integrated Resources Photography Ltd. from aerial photographs.

The surface sampling shows that the Ball Creek target is sharply surrounded by background metal values. Within the target, metal values are background or anomalous, with no good zonal patterns. The high or anomalous values occur either isolated or in small clusters throughout the target area. Two such clusters include the rusty outcrops immediately south of drill site 80-1 and the main alteration zone in the central part of Moly Creek. Both of these areas have high values in copper and molybdenum and are separated by an area of somewhat lower or

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background values.

Copper values form the most consistent anomaly over the target with a noticeably larger portion of anomalous values than the other metals display. These anomalous values range up to 2050 ppm copper.

Molybdenum and fluorite follow the same general patterns of interspersed anomalous values and background values within the pyritic target, bounded sharply by background values outside of the Ball Creek target.

Many porphyry molybdenum deposits have anomalously low manganese over or within the mineralized and altered zones. Many of the samples over the Ball Creek target returned anomalously low manganese values; but, these low values are also interspersed with samples which have background values.

Lead and zinc values reflect the late stage mineralized carbonate veins rather than the main stages of alteration and mineralization that introduced copper and molybdenum. For these two metals. distribution is even more erratic within the target area.

A total of 67 surface samples were analyzed for tin and tungsten. Tin values were all $\leq$ 1 ppm. Most of the tungsten values are $<$ 10 ppm; however, a few somewhat anomalous tungsten values are clustered along the upper parts of Goat Creek (samples G-80-253, 254, 255, 257).

Drill Core Geochemistry

Generally 3-meter lengths of core were split for analysis out of every 12 meters of core. In places. the sample sections were shifted in an attempt to restrict each sample to one rock type. Samples of the split core were geochemically analyzed for the same elements as the surface samples plus sulfur. In addition, samples with high copper and molybdenum geochemical values were assayed for copper, gold. and silver. Geochemical results are presented on the drill hole profiles (scale 1:1000) in Figures 14 to 31.

From these profiles one can draw a number of conclusions:

1. Molybdenum values are generally higher in Hole 80-1 than in Hole 80-2. There is no trend or increase down Hole 80-1. However, there is a slight indication of somewhat higher values in the lower parts of Hole 80-2, but this is not definite enough to be significant; moreover, the values in the lower part of the hole return to background.

   Hole 80-1 shows no correlation between the density of quartz veining and the molybdenum values.

   In the lower part of Hole 80-2 there is a slight increase in the number of quartz veinlets in places, but still not as abundant as

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in Hole 80-1. Scattered anomalous molybdenum values are associated with a few of these quartz veinlet concentrations.

2. Copper values are also higher in general in Hole 80-1 than in Hole 80-2. They are anomalous throughout with most values greater than 200 ppm.

3. Manganese values seem to be very persistent throughout both holes with values all approximately the same magnitufe and with no trend.

4. Fluorine values seem to be of the same general magnitude in both holes with no obvious trends.

5. Lead background values are very low. There are some erratic highs throughout Hole 80-1 with values up to 425 ppm and a few erratic highs near the top of Hole 80-2. These are probably related to the carbonate veins.

6. The zinc values very closely follow the lead values.

7. Sulfur values throughout Hole 80-1 and throughout the upper two-thirds of Hole 80-2 are of the same magnitude with no obvious trends. In the lower third of Hole 80-2, there is a decrease in sulfur content corresponding to the decrease in pyrite content. Apparently the scattered pockets of pyrrhotite in the bottom of hole 80-2 have not been sufficient to bring up the sulfur content.

8. Tin and tungsten were analyzed for 11 selected samples from Hole 80-1 and 80-2. Tungsten values range from 1 to 4 ppm and tin values from 1 to 10 ppm with most values of tin < 1 ppm.

9. Samples with high copper values were selected to be assayed for copper, gold, and silver. A table of these analytical results follows:

TABLE VI

Assay Results

Sample No.	Cu (%)	Ag. (oz./t)	Au. (oz./t)
B-1-7	0.18	0.16	---
8	0.07	0.10	---
13	0.01	0.01	---
18	0.06	0.01	---
20	0.11	0.03	---
24	0.08	0.56	---
27	0.07	0.18	---
35	0.12	0.14	---
38	0.11	0.26	---
39	0.06	0.12	---
40	0.11	0.12	---
B-2-2	0.13	0.10	<0.003
7	0.07	0.05	<0.003
8	0.07	0.34	<0.003
13	0.10	0.16	0.020
25	0.07	0.05	<0.003
32	0.11	0.01	<0.003

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It is apparent that the samples are not sufficiently high in precious metals to be economically important.

INVESTIGATIONS NORTH OF BALL CREEK

Dennis Gorc spent three days investigating the Goat Zone and the numerous bright gossans found along White Creek and Knob Creek.*

The area of examination extends approximately two kilometers along the Ball Creek and approximately 1.5 kilometers northward to the watershed of Knob Creek.

In conjunction with this investigation, scattered rock specimens and samples were collected for study and rock geochemistry. The sample number and geochemical results for each metal are plotted on separate maps (Figures 32 to 40).

A colour anomaly map (Figure 33) is also included to show extent and intensities of the gossans. The map is compiled from observations from helicopters and from high vantage points.

Feldspar Porphyry Intrusions

The geology of this reconnaissance area is dominated by three resistant intrusive plugs, each approximately 0.5 kilometer in diameter. These plugs form sharp topographic knobs, generally with the southern contact obscured by talus and overburden, but with the northern contacts well exposed.

The two northern intrusive plugs (the Knob Creek and the West stocks) are composed of barren feldspar porphyry with fairly uniform texture and composition. The rocks appear to be relatively fresh and unaltered, displaying good white feldspar phenocrysts and hornblende phenocrysts and occasionally a pinkish K-feldspar phenocryst.

No perceptible changes occur in the porphyry at the contact of the intrusive.

Thin section examination of a specimen from the very prominent Knob Creek stock shows a plagioclase porphyry in which the plagioclase matrix has a trachytic texture. The hornblende phenocrysts are actually altered to calcite, actinolite-tremolite. Small patches of calcite occur in the matrix.

Dykes of similar porphyry occur to the south along Ball Creek where they cut the andesitic volcanics. A small body of feldspar porphyry also crops out along the east side of the Goat Zone. This body, however, is cut by abundant fractures and small faults which are generally subparallel to Ball Creek. Along many of these small scale faults gouge

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*White Creek and Knob Creek have been named to facilitate reference in this report.

has formed and the original texture of the rock has been obliterated. In addition, many of the fractures have been filled with carbonate veins. The adjacent porphyry also contains dispersed carbonate in the matrix. Additional similar porphyry bodies occur within the Goat Zone.

Diorite and some diorite-porphyry forms the southern-most knob (north of Ball Creek). This is generally a uniform fine-to-medium grained phaneritic rock with some small white feldspar phenocrysts. The rock is dark grey and fresh and contains only traces of pyrite. Along the northern contact, there is evidence of faulting with intense fracturing and abundant carbonate introduction. Similar faulting with slickensides and abundant carbonate induction also occurs near the eastern contact of this intrusive. This rock is similar in hand specimen to the rock of the late "micro-diorite" dyke that cuts across the Ball Creek Zone.

Volcanic Sequence

The volcanic rock in the area can be divided into andesitic volcanics, bleached and pyritic volcanics, and volcanics with dolomite-diopside alteration. The andesitic volcanics are predominantly dark grey pyroclastics containing a fine-grained matrix. Pyrite content is negligible and the outcrops are not iron stained. Traces of epidote are common and black clasts which react strongly to the acid are present.

A bed of dark grey limestone occurs in the volcanic sequence; it has been mapped along White Creek and along the edge of the cliffs one kilometer west of White Creek.

The pyritic volcanics underlie most of the large bright gossans and the bleached zones of the area. High pyrite content occurs or has occurred in these rocks; locally much of the pyrite has been oxidized and bleached leaving rock cavities lined with jarosite. In other places much of this rock is bleached to a white soft residual material. It appears that bleaching is somewhat related to the southern sunny exposures with less bleaching and more pyrite in the shaded areas.

Much of the bleached pyritic rock is exposed adjacent to the Knob Creek stock, on its west and north sides. The stock itself is barren and may be younger than the pyritization of the volcanics.

Goat Zone

At the Goat Zone numerous dykes and other small bodies of feldspar porphyry are intermixed with highly pyritic and often intensely bleached volcanics.

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The porphyries in this zone are generally irregularly altered to carbonate and sericite. This alteration is most prevalent in the central part of the zone as outlined, where the alteration is so intense that the identity of the rock has been obliterated. The outer part of the gossan zone has less pyrite and less alteration and the lower part of the gossan zone (just above Ball Creek) has somewhat less alteration but considerably more mineralization in the form of quartz veins, quartz stockwork and carbonate veins.

In addition to the fractures and small faults, noted above, a set of persistent vertical fractures strikes N 20° E to N 40° E. These fractures contain quartz-carbonate veins (with galena and sphalerite) as well as a few dykes. In addition, some are faults with small scale movement. Zones of abundant sub-parallel bluish to translucent quartz veinlets are also parallel to these structures. Other small zones of well developed stockwork are present.

Small amounts of molybdenite mineralization occur in a number of the quartz veins. Selected samples (G 80-338, 339, 340, 343, 346, 347) are high graded samples to test for molybdenum. Results are anomalous but not of economic significance. A number of samples (G 80-334, 344, 348, 352) were selected from the base metal quartz-carbonate veins.

In addition, to the lead and zinc, these veins are anomalous in copper. Copper stain both in the form of brown copper oxides and green carbonates is common in various parts of the Goat Zone.

Geochemistry

A perusal of the geochemical results from the sparse rock chip sampling done to the north of Ball Creek along the Goat Zone Gossan and other neighbouring gossans indicates no conclusive trends. A few observations on the geochemical data are as follows:

1. Higher values for copper and somewhat higher values for zinc occur within the Goat Alteration Zone compared to values from adjacent volcanics, porphyries and other bleached pyritized areas.

2. Sporadic high molybdenum values are also noted on the Goat Zone. Such values are for the most part related to selected samples of quartz veining.

3. Copper values within the diorite porphyry are noticeable higher than in the feldspar porphyry plug to the north.

4. Manganese values within the intrusive plugs are higher than corresponding values within the volcanic rocks. The lower values within the volcanic sequence may be due to the bleaching and alteration which has affected the rocks and removed some manganese.

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THE SOUTH FORK BALL CREEK TARGET

The South Fork Ball Creek target is a largely brilliantly conspicuous gossan zone, lying only 7 kilometers southwest of the Don Claims. Because of its close proximity, it was staked with the intention of doing some preliminary mapping and rock geochemistry (Figure 3). Between August 21 and August 24, 1980, the Ball Claims including 70 units were staked as agent for John R. Woodcock. These claims were recorded on September 23, 1980.

Donald H. Mann and J. R. Woodcock spent one day in examining these claims and taking a few rock samples. The traverse started on top of the mountain near the south end of the gossan area and traversed northerly to the Ball Creek at the northeast end of the gossan area.

In general the conspicuous gossan zone occupies an area south of Ball Creek that is about 4 kilometers long extending in a north to northeasterly direction. Near its southern part it appears to surround a dark grey barren area, which could readily be interpreted, from a distance, as a porphyry plug. This dark area, however, is composed of volcaniclastic and lava flows which lie on the gossan zone and dip gently to the north. These volcanic rocks, much of which is relatively fresh unconsolidated debris, contain abundant petrified logs and stumps and in places many of these stumps appear to be oriented upright. One gathers the impression that this is a fairly young forest which has been surrounded and petrified by these gently dipping lava flows.

These gently dipping lavas have been mapped as lower Jurassic by Jack Souther. However. the appearance, including both the gentle dip, the unconsolidated nature of part of the material and the abundance of the feldspar phenocrysts, resemble some of the Tertiary volcanic rocks of other places in British Columbia.

Alteration which has accompanied the pyritization or the oxidation of the pyrite has bleached much of the rock and in places, remnant or relic plagioclase phenocrysts make the rock appear to be an altered feldspar porphyry, somewhat similar to those found on the Ball Creek target. However, such rocks were observed throughout the traverse and the conclusion was that these are altered volcanic rocks.

The pyrite within the volcanic rocks is all disseminated. No fracture pyrite was noted anywhere and the only other type of mineralization found was one piece of float of massive barite.

The porphyritic volcanic rocks are found in the canyons of the side streams south of Ball Creek, in the northernmost part of the gossan area. Lower down Ball Creek at the junction of South Fork with the main part of Ball Creek, the creeks flow through a small sharp canyon. This is anomalous to the surrounding topography. Stereoscopic examination of the aerial photographs indicates that this could be a canyon cut into a small bench or basin of volcanics which fill Ball Creek valley in this area and are much younger than the Triassic volcanic rocks of the surrounding area.

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Twelve rock chip samples were collected along the traverse and analyzed for copper, molybdenum, lead, zinc, manganese, and fluorine. No interesting values or significant trends were observed.

In conclusion, J. R. Woodcock suspects that this could be a solfataric area associated with a Tertiary volcanic center and that the rocks could be much younger than indicated on the regional Survey maps. This interpretation however, is based only on observations made along one traverse over part of the zone and therefore it is only merely a tentative suggestion.

Nothing of interest was found to recommend further work.

CONCLUSIONS

1. A number of large pyritic alteration zones form conspicuous gossans along the Ball Creek drainages. These include the Camp, Goat, and Cliff Zones explored previously; the Ball Creek Zone explored in 1980 and the South Fork Zone. The Ball Creek alteration zone is probably the most interesting of the many alteration zones. Certainly it is much more interesting than the Goat Zone north of the creek and the Cliff Zone.

2. Rock types are thus similar to those found in "alkalic" type of copper deposits common throughout British Columbia, associated with syenite to diorite intrusions in the basic Triassic volcanic terrains. The Camp Zone with its mineralization resembles the erratic diorite type of copper prospects that have been explored within the Quesnel Trough. Moreover, the large zoned K-feldspar phenocrysts are somewhat reminiscent of the porphyries found at Galore Creek.

3. The Ball Creek alteration and mineralized zones occur in a sequence of basic Triassic volcanics which have been intruded by many small bodies of feldspar porphyry. The porphyries contain phenocrysts of plagioclase, hornblende and scattered large zoned phenocrysts of K-feldspar. No quartz phenocrysts are present. The matrix is generally plagioclase with a fine-grained phaneritic texture. The matrix can also be composed of K-feldspar and occasionally it is composed of quartz-K-feldspar. The quartz-orthoclase mixture could be secondary.

4. Alteration at Ball Creek includes a regional type of tremolite-actinolite accompanied by scattered sericite flakes within the plagioclase. Within the target area, brown biotite hornfels is erratically distributed and generally has altered the more basic volcanic rocks. Widespread dolomite alteration, generally accompanied by diopside, converts the clastic rocks to a felsite-appearing pyroclastic. Larger zones of almost completely silicated clastic rock occur in the lower parts of the two drill holes. Widespread quartz veinlets occur within the altered zone and also within the relatively unaltered barren porphyries. Locally intense sericitization is associated with quartz veinlets in the altered zones. Some K-feldspar alteration also accompanies the quartz veining within the very small local

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sericitized zones.

5. Hence some of the clastic volcanic rocks have secondary biotite in the matrix thus indicating that there has been some contact metamorphism of a volcaniclastic rock. In some of the breccia, however, fragments of porphyry and fragments of hornfels occur; thus breccia pipes are suspected. These have mobilized parts of the porphyry stock and its adjacent hornfels zone.

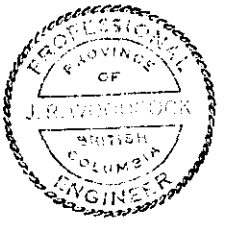
6. The erratic distribution of the alteration and mineralization; the irregular mixing of altered porphyry and volcanic rock noted in the surface mapping; the sudden or very sharp changes from intensely altered to relatively fresh porphyries and the sharp contact between some of the relatively unaltered porphyry within highly altered mixtures of volcanic and porphyry rocks, also suggest that the altered and mineralized zone is largely co-extensive with an area that contains a number of intrusive breccia pipes and that much of the area originally mapped as a felsic pyroclastic pile is a breccia pipe intensely altered to dolomite and lime silicate minerals and some sericite.

7. Mineralization includes abundant pyritization co-extensive with the altered clastic rocks; abundant pyrrhotite accompanied by minor chalcopyrite in the silicated zones; chalcopyrite dispersed throughout some of the biotite hornfels and the andesitic rocks; minor molybdenite in some of the quartz veinlets; and galena-sphalerite in the many large carbonate veins that cross the Ball Creek Zone and the adjacent alteration sones.

8. The surface rock geochemistry has pinpointed and delimited the altered and mineralized target area; however, values within the target are so erratically mixed (including background and anomalous values) that no good trends or vectors can be established to point to an underlying heat center or stock. The geochemical analyses of the drill core has also not established any trend or increase in metals down the holes. However, there is a higher content of metals in Hole 80-1 than in Hole 80-2.

9. The strong structural control of the alteration and mineralization by possible breccia pipes, which in themselves were controlled by numerous pre-existing faults, could preclude the formation of any trends or concentric zones that one likes to find with stock controlled porphyry deposits.

February 2, 1981



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REFERENCES

Bryant, D. G., 1979; Ball Creek Prospects, British Columbia: Letter to G. R. C. Exploration Company.

Cameron, J. W., 1980; Inter-office Memorandum: G. R. C. Exploration Company.

Durfield, R., McInnis, M. D., 1975; Ball Creek Property, Liard Mining Division. N. T. S. 105-G-8. 129° 25' W, 57° 15' N: Great Plains Development Company of Canada Ltd.

Durfield, R., McInnis, M. D., 1975; Diamond Drilling Report on the Group 2 Mineral Claims, Ball Creek Area, B. C., N. T. S. 104-G-8, 9/75: Great Plains Development Company of Canada Ltd.

Geological Survey of Canada, 1957; Map 9 - Stikine River Area - Cassiar District, British Columbia: Geological Survey of Canada.

McInnis, M. D.; Geochemical Report on the TARA Group Ball Creek - Iskut River Area 130° 25' W, 57° 17' N, Liard Mining Division. N. T. S. 104 G/E: Great Plains Development Company of Canada Ltd.

McInnis, M. D., 1972; Project Termination Report, Ball Creek Property, B. C., N. T. S. 104-G-8: Great Plains Development Company of Canada, Ltd.

McInnis, M. D., Visagie, R., 1973; Geology and Geophysical Report on Ball Group 1 and Ball Group 2, B. C. Liard Mining Division, 104-G-8: Great Plains Development Company of Canada Ltd.

Souther, J. G., 1972; Telegraph Creek Map Area British Columbia: G. S. C. Paper 71-44.

Termuende, R. W., 1971; Geological and Geochemical Report, ME and ROG Mineral Claims, 20 miles south of Kinaskan Lake, B. C. 129° 25' W, 57° 15' 30" N., June 1, 1971 - July 30, 1971: Great Plains Development Company of Canada Ltd.

Visagie, R., 1973; Year End Report Ball Creek Property, B. C.: Great Plains Development Company of Canada Ltd.

Visagie, R., 1974; Ball Creek Year End Report, B. C., N. T. S. 104-G-8: Great Plains Development Company of Canada Ltd.

Woodcock, J. R., 1980; Ball Creek Prospect: Report for G. R. C. Exploration Company.

APPENDIX I

PETROGRAPHIC WORK

APPENDIX I

PETROGRAPHIC WORK

Specimen 80-1-26.2

The hand specimen shows an altered porphyry cut by numerous quartz veinlets.

Thin section shows a porphyry in which the matrix is K-feldspar. Phenocrysts are mainly altered plagioclase in which the alteration is largely kaolinite and scattered sericite with numerous small patches of carbonate.

In sharp relief are numerous sphene crystals, some of which occur in clusters. These are part of the original matrix and do not occur in the altered plagioclase phenocrysts. Scattered epidote crystals occur throughout the matrix.

The section is cut by numerous quartz veinlets and in one place the fine-grained quartz wanders off into the matrix and becomes mixed with relatively coarse perthitic orthoclase.

Specimen 80-1-23.7

In hand specimen this appears to be the same as specimen 80-1-26.2. It is an unaltered porphyry cut by numerous quartz veinlets.

Thin section examination shows that the matrix is largely interlocking crystals of K-feldspar. However, there are some minute grains of quartz in places.

The quartz veinlets which cut this section are irregular in that the crystals occasionally project out into the matrix. In some places, the quartz has escaped from the vein to the matrix which has been altered to the quartz-orthoclase mixture with coarser than normal grain size.

Plagioclase phenocrysts are slightly altered to sericite; hornblende phenocrysts are highly altered to actinolite. There is some prehnite alteration in some of the plagioclase phenocrysts. There are some

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clusters of diopside-epidote generally in the vicinity of some introduced quartz. Carbonate is largely restricted to veinlets with a minor amount as alteration patches within some of the plagioclase phenocrysts. These patches are generally related to a fracture.

Specimen 80-1-36.3

In hand specimen this is a darker more blurred rock than the other porphyries from the upper part of the hole. Dark green mineral material occurs, especially along some of the fractures. One main quartz veinlet cuts through the rock and bleaching occurs adjacent to this veinlet.

Thin section examination shows that the matrix is largely orthoclase and that quartz in smaller crystals is quite abundant in places. Thus this rock appears to be gradational from that with the orthoclase matrix to that with the quartz orthoclase matrix although it is closer to the orthoclase type.

The hornblende phenocrysts are largely altered to a mosaic of fine-grained somewhat greenish biotite accompanied in places by carbonate. Some crystals are altered to actinolite. The plagioclase phenocrysts have moderate and uniform alteration to scattered sericite flakes.

Irregular and discontinuous quartz veinlets cut the rock. These are squeezed or discontinued where they cut across large plagioclase phenocrysts. Pyrite and carbonate also occur along the quartz veinlets and abundant epidote occurs at the intersections of some of the quartz veinlets. Abundant prehnite occurs along one of the quartz veinlets where it is associated with some epidote. This low birefringent mineral projects into and replaces plagioclase phenocrysts.

Carbonate alteration occurs within the matrix, generally adjacent to the quartz carbonate veinlets.

A mineral with low birefringence and two good cleavages at right angles and low negative relief is probably a zeolite.

Specimen 80-1-98.8

In hand specimen this appears to be a light grey highly altered and blurred feldspar porphyry.

In thin section one notes that the porphyry is a little bit different. The matrix consists of quartz and feldspar. The feldspar is probably orthoclase and the numerous little laths that display twinning do actually have carlsbad twinning. The variation in texture of the matrix indicates probably some recrystallization. In places, small patches give an impression of pre-existing plagioclase crystals;

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however, there are practically no embayments of replacement in the plagioclase phenocrysts.

Plagioclase phenocrysts are uniformally and moderately altered to sericite with some patches of carbonate. Hornblende crystals have been completely altered to epidote actinolite, carbonate, etc., except for one place where a cluster of small relatively fresh crystals are still intact.

Discontinuous veinlets include quartz, pyrite, carbonate.

Specimen 80-1-137.5

Hand specimen shows a contact between the feldspar porphyry which contains a large proportion of mafic phenocrysts and the felsic looking volcanic rock.

Thin section examination shows that the porphyry includes plagioclase and hornblende phenocrysts and fragments of the same type of mineral. Phenocrysts are unusually fresh; some of the plagioclase phenocrysts has scattered sericite flakes. Apatite and sphene crystals also form phenocrysts.

An indefinite zone which might be considered some sort of a vein includes pyrite, diopside and some epidote.

The matrix of the porphyry is blurred and dirty. There is some quartz and K-feldspar in places but there is also some sericitized plagioclase. There does, in places, appear to be remnants of the sericitized plagioclase within the matrix and possibly there has been a replacement of larger plagioclase crystals.

The volcanic portion is hornfelsed. Small biotite crystals are scattered in places and clusters of small epidote crystals occur throughout. More abundant are the small diopside clusters.

A carbonate veinlet cuts the section. It does have some pyrite along it and it has clusters of radiating highly birefringent crystals which may be muscovite.

Specimen 80-1-139.4

In hand specimen this resembles 80-1-36.3. It is an altered porphyry cut by the quartz veinlet and by numerous pyrite epidote veinlets.

The thin section reveals such a mess of veinlets that very little of the original rock is left unaltered. The plagioclase phenocrysts are not highly sericitized; however, they have a dirty brown dusting of clay. The matrix also is so clouded with clay and fine sericite that

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grain boundaries cannot be distinguished. Most of it appears to be K-feldspar.

Specimen 80-1-235

This is the blurred altered feldspar porphyry cut by minor quartz veinlets. The hornblende phenocrysts are altered to a greenish brown mineral.

In thin section, the matrix is coarser grained than usual and consists of quartz (40%) and orthoclase (60%). This relatively coarse clear mixture of quartz and orthoclase is confined to the vicinity of the quartz veinlet. In places, the feldspar of the matrix has fine sericite and clay replacement.

The sericitized alteration of the plagioclase phenocrysts is low; minor carbonate accompanies it. In some places the sericite alteration of the plagioclase phenocrysts is moderate.

Quartz veinlets cut the section and in one veinlet abundant sericite occurs in the matrix adjacent to one side of the quartz veinlet. Carbonate occurs throughout the section in small late veinlets and in patches. Many of these patches have some fine-grained micaeous material with them, possibly chlorite or actinolite; however, the section is very thin and the birefringence somewhat low. Abundant small sphene crystals also occur in these clusters which are pseudomorphs of hornblende phenocrysts.

Specimen 80-1-288

In hand specimen this porphyry has a darker colour than usual with a dark grey matrix and fuzzy white phenocrysts and also a few larger zoned phenocrysts which may be K-feldspar.

Thin section shows that the rock is about 40% phenocrysts and that the matrix is interlocking quartz and K-feldspar crystals. This matrix is coarser grained than that of the other porphyries examined. The matrix contains about one-third quartz and two-thirds K-feldspar.

The phenocrysts are mainly plagioclase and completely replaced hornblende. One very large phenocryst is K-feldspar which exhibits oscillatory zoning. The crystal is relatively unaltered. However, it is cut by numerous carbonate veinlets, a hairline pyrite veinlet and one carbonate-quartz veinlet.

The plagioclase phenocrysts have sericite flakes scattered throughout and also small patches of carbonate. Hornblende crystals have been completely replaced by carbonate or actinolite.

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Veinlets of quartz-carbonate cut the section. In places, these have patches of pyrite and also some chlorite.

Specimen 80-1-291.1

In hand specimen this is a blurred rock which is supposed to be a porphyry; however, it closely resembles the altered volcanic rock of 80-2-41.7.

Thin section examination shows such a blurred mess that it is impossible to do anything with it. Most likely it was volcanic rock rather than a porphyry. It is notable that considerable diopside occurs within the rock, especially along the veins.

Specimen 80-1-351.6

Hand specimen shows a basic volcanic rock fragment in crowded feldspar porphyry. The porphyry resembles 80-1-288.

The thin section shows that the porphyry is about two-thirds phenocrysts and these are about 3/4 large plagioclase phenocrysts and about 1/4 smaller hornblende phenocrysts. The hornblende is unusually fresh except in a few places where it is replaced by clusters of actinolite.

The plagioclase is moderately sericitized and in crystals where the sericite is unusually coarse-grained there may be some prehnite.

There is one quartz phenocryst with a reaction rim around it. Further work is needed on this and on the matrix.

The matrix is mainly feldspar, some of which is plagioclase laths.

Specimen 80-2-11

The hand specimen shows that this brownish hornfels rock is cut by pyrite veinlets and that these pyrite veinlets have a selvage is over 1/2" wide in places. The rock was logged as dark brown pyroclastic.

The thin section shows it to be equi-gramular and very fine-grained hornfelsed volcanic. Fine-grained biotite is abundantly scattered throughout. Small carbonate patches are also scattered throughout the rock; however, sericite, if present, is low. Some of the feldspar crystals do seem to have some kaolinite alteration.

The section is cut by veinlets which contain some iron sulfides. In one of the veinlets abundant actinolite-tremolite (?) occurs along

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the sides and projecting into the sulfides. Along strike this veinlet takes a sharp bend. At the junction is a large epidote grain. The remainder of the somewhat discontinuous veinlet is largely carbonate with some epidote and minor sulfides. Other veinlets which cross the section are just composed of carbonate.

Also scattered throughout the section are small pockets of chlorite which displays Berlin blue.

In the bleached selvage area the biotite is absent and carbonate is abundant. Some cloudy patches occur above some highly birefringent minerals which could be either a sphene and associated leuocoxene or possibly even some epidote.

Specimen 80-2-14.7

This hand specimen shows a rock which appears to have porphyry fragments throughout most of the specimen; however. one end of the section is fine-grained volcanic. It also appears to be a volcanic fragment in with the porphyry fragments and this should have been cut by the thin section.

Thin section examination shows a definite porphyry which is the usual intrusive feldspar porphyry. Also one end of the section is the fine-grained volcanic.

The porphyry contains phenocrysts of plagioclase, pseudomorphed hornblende and a few K-feldspar crystals. The matrix is almost monomineralic consisting of orthoclase and, in places, this orthoclase does replace the outer parts of some of the plagioclase phenocrysts. The index of refraction for the K-feldspar phenocrysts is slightly higher than that of the matrix K-feldspar.

The plagioclase phenocrysts have fairly uniform sericite distributed throughout, some of this is quite coarse. The hornblende phenocrysts have been completely retraced by carbonate and chlorite or muscovite. Apatite crystals are scarce throughout the rock.

The so-called volcanic fragment appear to be completely altered to orthoclase plus carbonate. Some sericite alteration of the feldspar may be remnants of plagioclase.

In the zone between the volcanic fragments and the porphyry fragments, the rock has considerable quartz and pyrite thus it appears that the cementing material in this breccia is relatively coarse-grained matrix quartz mixed with some orthoclase. The area also contains patches of carbonate which may be later or part of the general cementing material.

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Specimen 80-2-20-2

This is described as a dark brown pyroclastic. Thin section examination shows that this has been a porphyritic rock containing an extremely fine-grained matrix which is probably largely feldspar. Phenocrysts which originally consisted of plagioclase and possibly hornblende are now blurred and altered. The plagioclase phenocrysts lack a sharp outline and, along with the matrix, are altered to some kaolinite and very minor fine-grained sericite. The few hornblende phenocrysts have been completely altered to carbonate, some chlorite and some fine-grained low birefringent mineral. Abundant unaltered apatite phenocrysts are also present.

Carbonate alteration occurs throughout the rock and appears to be one of the main alteration products. Some K-feldspar alteration occurs along a quartz veinlet.

Veinlets of quartz-carbonate-pyrite and very thin veinlets of carbonate cut the rock. Some pyrite crystals are scattered throughout.

Specimen 80-2-28.6

This is a pyroclastic of basic volcanic in which the fragments are quite obvious in the hand specimen and are indicated by textural changes in the thin section. In places, some of the rock is largely plagioclase crystals in an almost ophitic texture. In places, some soda-rich mafic minerals, probably riebeckite, occur and augite crystals are scattered throughout.

Very small secondary crystals or a coloured mineral which is greenish to brownish occurs in places. This could be a variety of secondary biotite. Much of the plagioclase has a clay dusting and some fine yellow birefringent flakes which could be extremely fine-grained sericite.

Magnetite occurs as clusters of small grains (with some pyrite grains)--probably pseudomorphs of mafic phenocrysts. It also occurs (along with pyrite) as disseminated crystals in the ophitic rock.

Specimen 80-2-36.1

This is described as an altered pyroclastic and in hand specimen it has a blurred grey appearance. Thin section examination shows that this altered rock has been highly altered to carbonate. Some concentrations of sericite (?) alteration occur in places.

The rock contains many altered phenocrysts and is probably an altered feldspar porphyry.

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Specimen 80-2-41.7

The hand specimen description mentions an intrusive clastic in pyroclastic. The small slab shows a mottled grey rock in which dark green clots and lines occur within the lighter greenish-grey matrix and this is cut by discontinuous sulfide veinlets. Along some of these small sulfide veinlets a white mineral occurs which may be vein filling or alteration.

In thin section the rock is largely plagioclase crystals and a colourless mafic crystal within a finer-grained feldspar matrix. The plagioclase is very dirty being altered to sericite and possibly clay minerals. The colourless mafic mineral may be augite. Epidote occurs throughout the section in large patches and in small aggregates. Some of the more abundant large patches are associated with the veins.

The main veinlets within the section consist of coarse epidote and pyrite. In some places along strike these change to thin veinlets of orthoclase. Many of the heavy pyrite veinlets have an alteration selvage along the veins in which the dark brownish dirty dusting of the plagioclase has cleared up and the alteration is largely sericite within the plagioclases. There appears to be more an elimination of the dirty brown clay (?) of the rock rather than the addition of any new sericite.

Hairline veinlets of carbonate cut some of the pyritic veinlets and patches of carbonate are associated with some of the patches of epidote.

The hornblende and biotite phenocrysts have gone to diopside and epidote; carbonate is scarce.

Specimen 80-2-45.1

The slab shows a slightly blurred porphyry in which the white feldspar phenocrysts stand out sharply but the mafic minerals are altered to a greenish tint.

Thin section examination shows that the plagioclase phenocrysts have a fairly sharp outline and are altered, in varying degrees, to sericite, from almost negligible to fairly intense. The central parts of a few large plagioclase phenocrysts are completely altered to a coarse birefringent prehnite which also seems to completely replace smaller phenocrysts.

The matrix of this porphyry consists of fine-grained laths of plagioclase rather than the interlocking crystals of orthoclase that have been noted for other sections (e.g. 80-2-26.2).

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Specimen 80-2-45.1

Hornblende phenocrysts are largely replaced by tremolite-actinolite along with some chlorite. Clusters of diopside crystals occur in many places and in some places these replace part of pre-existing hornblende crystals, most of which had been replaced by actinolite. In one crystal the diopside occurs only at one end where it is partly mixed with the actinolite. These clusters of diopside crystals are quite common and in most places large crystals of epidote are associated with them.

One veinlet which occurs along the side of the section is composed of carbonate and prehnite.

Note that this section and many of the other sections are extremely thin and therefore the birefringent colours are relatively low.

Specimen 80-2-69.1

This rather blurred porphyry also has an orthoclase matrix. The thin section is extremely thin and this accounts for a lack of sharpness in many of the placioclase phenocrysts and the abnormally apparent low birefringence.

The rock has more than the normal amount of K-feldspar phenocrysts. The plagioclase phenocrysts are altered to sericite and carbonate whereas the K-feldspar phenocrysts only have carbonate alteration. In a few plagioclase phenocrysts there is some prehnite. The hornblende phenocrysts have been completely replaced by tremolite-actinolite plus minor chlorite and carbonate.

Discontinuous quartz veinlets cut the rock. Radiating clusters of sericite are interspersed along the veinlets and also along the contacts in places.

Specimen 80-2-90.4

In hand specimen this is a relatively coarse-grained possibly volcanic clastic rock cut by a light grey alteration zone or veinlet.

In thin section the rock is characterized by abundant large hornblende phenocrysts and some of these are partly altered to biotite. Others are altered to carbonate and chlorite and some may be altered to carbonate and tremolite.

The rock was probably originally a basalt.

The veins contain carbonate, quartz and pyrite.

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Specimen 80-2-132.4

In hand specimen this looks like a slightly mottled rock with a greenish-grey colour and it has been logged as a silicated rock.

Thin section examination shows that much of this rock is a good porphyry with relatively fresh plagioclase phenocrysts in places. However, the good porphyry at one end of the section appears to grade into an almost non-porphyritic or clastic rock at the other end of the section. One gets the impression that one end is porphyry and the other end is comminuted porphyry.

Alteration includes diopside alteration of the hornblende phenocrysts, which probably provides the green colouration and minor sericite flakes throughout most of the plagioclase phenocrysts. Carbonate alteration occurs extensively in the matrix.

Specimen 80-2-132.6

This is a fragmental rock with very dark patches and possibly alot of pyrrhotite alteration throughout much of it.

Thin section examination shows unusual rock type for this area in that the rock appears to be a porphyry in which the coarse plagioclase crystals are surrounded by coarse-grained quartz. The quartz, the pyrrhotite, and possibly even the carbonate appear to be interstitial patches.

Clusters of needle-like crystals appear in places and in many places these seem to be embedded in the quartz giving it a reticulated appearance.

Diopside and epidote crystals are scattered throughout.

In thin section one notes also that the central part of the rock, with which the veinlet is associated, is finer grained. The central black part of the veinlet is iron sulfide and this has a border of an unusual mineral that contains kind of a comb structure or parallel crystals which are perpendicular to the vein.

Specimen 80-2-177.3

In hand specimen this looks like a porphyry from a basic dyke. The white feldspar phenocrysts are very sharp. The hornblende phenocrysts are somewhat blurred and the matrix is dark grey. It is probably the same rock as 80-2-297.1.

Thin section specimen is so similar to 80-2-297.1 that separate description is not warranted. The thin section has been ground extremely thin and the colours are off considerably.

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Specimen 80-2-188.8

This porphyry in hand specimen is quite white with abundant feldspar phenocrysts and smaller mafic phenocrysts.

In thin section it is about two-thirds phenocrysts including large crystals of plagioclase, orthoclase, and altered hornblende. Smaller phenocrysts form a second population in grain size and include plagioclase and pyroxene. The hornblende phenocrysts are partially or completely altered to tremolite-actinolite and carbonate whereas the pyroxene phenocrysts are relatively fresh. Large sphene crystals also form phenocrysts in places. The plagioclase phenocrysts, some of which have oscillatory zoning, are slightly to highly altered to sericite plus a brown clay dusting. Those that display oscillatory zoning have relatively little alteration. The K-feldspar phenocrysts are relatively unaltered.

The matrix consists of small laths of plagioclase, many of which have some fuzzy twinning. The index is considerably lower than that of the plagioclase phenocrysts and slightly higher than that of the orthoclase phenocrysts. I suspect that a fairly sodic plagioclase is involved.

Specimen 80-2-275

Hand specimen shows this to be a dark purplish-brown volcanic or dyke rock containing scattered white feldspar phenocrysts.

Thin section examination shows that the matrix is coarser grained than one would suspect. It consists of abundant long plagioclase laths intermixed with hornblende crystals in almost ophitic texture. The hornblende forms about 60% of the matrix.

The large plagioclase phenocrysts appear to have been rimmed and altered along fractures to a clear plagioclase mineral, probably albite and then subsequently the original material which was not changed to albite has been altered fairly intensely to sericite and carbonate.

This is an unusual rock in respect to its texture. It is very basic and probably a lava. I would suggest the name porphyritic basalt.

Specimen 80-2-357.2

Hand specimen shows an unusual rock with quite a variation in grain size of phenocrysts. One might consider this a porphyry with a seriate texture. The small equi-dimensional white feldspar phenocrysts stand out sharply and some of these have completely altered (grey) centers.

In thin section, one notes the variation in size of the phenocrysts.

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Many of the plagioclase phenocrysts are euhedral; however, many of them are rounded and some of them are merely fragments with one side broken and the other side euhedral. The hornblende phenocrysts are somewhat smaller but also display some fragmental sides. These are generally altered in contrast to the colorless fresh augite crystals, which also have some broken sides.

The matrix also gives one an impression of feldspar debris rather than a igneous matrix. It is quite variable in grain size.

I would name this a feldspar crystal tuff. Some of the large crystals and crystal fragments appear to be K-feldspar.

Alteration is mainly some sericitization evenly distributed throughout the plagioclase. The carbonate is relatively scarce; however, it does occur as one veinlet.

Specimen 80-2-297.1

The slab shows a porphyry with dark grey matrix and white feldspar phenocrysts as well as a number of black hornblende phenocrysts. This is obviously a different rock than the light coloured feldspar porphyries and one suspects it is a dyke rock.

Thin section examination shows an abundance of plagioclase and hornblende phenocrysts within a matrix of finer grained plagioclase laths. Hornblende crystals vary in size from large phenocrysts down to crystals the size of some of the matrix plagioclase.

The plagioclase crystals are variably altered and, in places, intense sericitization occurs in parts of phenocrysts. Prehnite (?) also occurs in the central alteration parts of some crystals.

Most of the hornblende is fresh and unaltered. Some crystals however are almost completely altered to carbonate plus tremolite-actinolite.

Carbonate occurs as scattered patches throughout the rock and also as veinlets along with some pyrite.

Three large K-feldspar crystals occur as a cluster.

The rock is about 1/2 phenocrysts and at least 2/3 of this is comprised of large plagioclase crystals. Possibly 1/3 is smaller hornblende phenocrysts. The matrix is largely plagioclase laths and possibly 1/4 hornblende.

One edge of the section is a different rock type, possibly an altered inclusion. It is quite granular and coarser grained than the matrix of the porphyry. It consists of about 2/3 hornblende and 1/3 feldspar.

I would suggest the name andesite porphyry for this rock.

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Surface Specimen G80-232

This is a hand specimen from the prominent late microdiorite dyke.

In thin section it is different than the other porphyries in that it is largely a criss-cross of plagioclase laths intermixed with some pyroxene crystals. Pyroxene also occurs as discontinuous phenocrysts intergrown with these plagioclase laths. Larger plagioclase crystals form definite phenocrysts.

Sericite flakes with some carbonate alter the central parts of many of the matrix plagioclase crystals and also are scattered throughout the larger plagioclase phenocrysts.

A fibrous alteration mineral, probably chlorite, seems to fill in some interstices and is probably an alteration of the previous mafic minerals.

Carbonate also occurs in a few scattered small veinlets and patches and is probably an alteration of the pyroxene. Considerable kaolinite appears to be scattered throughout, but identification was not certain.

Some of the chlorite patches are replacements of biotite crystals as they do have remnant biotite patches. Others are more closely associated with pyroxene and are probably alteration of the pyroxene.

Surface Specimen G80-423

This was taken near the main alteration zone along Moly Creek. In thin section one notes the K-feldspar matrix and phenocrysts of plagioclase. It appears that much of these plagioclase phenocrysts has been altered to K-feldspar and any remnants are quite intensely altered to sericite. The mafic phenocrysts, possibly hornblende, are completely replaced by chlorite, carbonate, etc.

A mosaic of quartz occurs as veinlets, irregular lenses and pockets and, near their edges, some of these are intergrown with K-feldspar. One would suggest that it is a highly altered rock and that probably most of the K-feldspar is also secondary.

Surface Specimen G80-425

This is from the intense alteration zone along Moly Creek.

In thin section one notes considerable orthoclase alteration of the plagioclase crystals and in places the twinned plagioclase appears to be altered to orthoclase with some of the remnant twins completely replaced by sericite and thus the twinning is maintained by differential alteration to orthoclase and to sericite. Orthoclase again forms the

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matrix; however. part of this section does contain introduced silica and one might even call it a silicified section.

This is a highly altered rock converted to orthoclase and probably subsequently cut by quartz veinlets with adjacent silicification. The sericite alteration of the remnant plagioclase is, in places, complete.

Surface Specimen G80-426

This is also from the zone of intense alteration along Moly Creek.

This is also a highly altered rock; however, compared to G80-223, the plagioclase phenocrysts are less altered to orthoclase. There is coarse sericitization of some of the plagioclase phenocrysts.

The matrix is again K-feldspar. The section is cut by quartz veinlets, lenses, etc.; however there does not seem to be any good mixture of the quartz and the K-feldspar.

All of the mafic minerals have been completely eliminated and replaced by sericite, etc. Carbonate alteration in these intensely altered rocks is not very abundant and may have been eliminated by subsequent quartz and sericite.

APPENDIX II

DRILL LOGS - HOLE 80-1

J. R. WOODCOCK CONSULTANTS LTD.

PROPERTY: Ball Creek
CLAIM No.:
COORDINATES:
ELEVATION: 725.5m (2380 feet)

HOLE No.: 80-1
BEARING: 113°
DIP: 68° S. E.
LENGTH: 401.4 m (1317')
DIAMETER: NQ

DRILLED BY: Lyons Diamond Drilling
STARTED: Aug. 1, 1980
TERMINATED: Aug. 23, 1980
LOGGED BY: D. Gorc

Abbreviations
Moly - Molybdenite

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
0	5.2m			Overburden and boulders				
5.2	95% →			Andesitic Pyroclastic - dark grey in colour; over 50% plagioclase crystals greater than 1 mm; clasts of foreign rock also present; these clasts are light coloured, seemingly altered, up to 2 cm across; finer grained phases are black; cut by numerous quartz and quartz-carbonate veinlets; small concentrations of epidote associated with pyrite especially where pyrite is adjacent to quartz veinlets; chlorite?? present along some pyrite veinlets; some slight greyish bleaching alongside many veinlets (1 cm wide) especially pyrite-chlorite veinlets; in addition to bleached zones there are thin zones (to 60 cm) of greyish-green alteration which have a sericitized like appearance but are quite hard; these alteration zones are associated with and often bounded by quartz veins; the alteration within the zones is generally complete and such zones are almost always sharply bounded by essentially unaltered rock. Unit is quite magnetic with finely disseminated magnetite (?) which probably lends to dark colour of unit; in places				
Cont'd →				there is flesh coloured alteration.	B-1-1	6.7m	7.5m	

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Hole No. 80-1 Logged By D. Gorc Date Aug. 4, 7, 1980 Sheet No. 3

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd. 23.1		16.0m-20.7m		pyrite both disseminated and in fractures generally				
		50%		associated with small amounts of epidote;				
		20.7-23.1m		13.7m - 26.0m - largely light grey in colour with	B-1-4	15.2	15.5m	
		90%		a few patchy zones dark brown; fine textured small concentrations of epidote still common both disseminated and along fractures; quartz, quartz-carbonate and pyrite veinlets present but quartz veins predominate; a few blackish crystals in some veins; some moly in vein @ 15.4 m; pyrite content moderate (+) to high disseminated and along fractures; bleaching to near white (1 cm. zones) common along many veinlets; light grey colour due to carbonate-diopside alteration.				
			16.2m	16.0-23.1m - core is badly broken up, much core is lost,				
			18.3m	much of core quite dark brown in colour and has appearance of perhaps being hornfelized; thin zones of greyish to whitish bleaching (to 1 cm wide) adjacent to veinlets; abundant hairline pyrite veinlets; epidote commonly seen				
			20.6m	with pyrite; scattered, disseminated plebs of epidote not abundant, more abundant along fractures; quartz veinlets predominately white coloured; some zones of bleaching thicker than usual to 10 cm across, zones of bleaching associated with quartz veinlets.				
23.1		95%	23.9m	Altered Feldspar Porphyry 23.1-30.8m seemingly only	B-1-5	24	27m	
Cont'd.				slightly altered; matrix pale brown to light grey brown;				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 9, 1980 Sheet No. 4

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				abundant whitish feldspar phenocrysts to 1.5 cm. hornblende phenocrysts also present but less numerous; feldspar phenocrysts seem slightly smaller than usual; small amounts of epidote noted again associated with pyrite but amounts far reduced from previous units; bleaching along veinlets noted; pyrite content is low (+) to moderate (+) and is disseminated along fractures; note that more blue qtz. veinlets appearing; core not broken up, excellent recovery; a few pyrite-chlorite veinlets but few in number; pyrite 24.7m zones of bleaching and alteration alongside veinlets thickening up to 30 cm thick but generally much thinner; in such zones the original texture is completely obliterated; adjacent to				
			26.2m	some veinlets there are thin zones of pinkish alteration (carbonate?); moly in quartz veinlets @ 25.5m, 26.2m; fault gouge? @ 29.6 m; chcalopyrite in some veinlets.				
		30.8-34.7m 95%	34.1m 36.3m	30.8 - 59.7m Unit gradually becomes increasingly altered until 34.7 m; unit becomes completely altered; By 34.7m	B-1-7	45	48m	
		34.7-48.3m 65%		much of unit is quite soft and often broken up; most of unit medium greyish in colour but more intensely altered				
		38.3-50.9m 75%		sections have darkish green cast; pyrite primarily disseminated, low +; appear to be thin zones (to 5cm) of silification adjacent to some quartz veins; white quartz veins predominate but a few blue quartz veinlets seen;				
Cont'd.				moly seen in many veinlets (ex. 31.0 to 31.4m, 33.6m to				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 9, 1980 Sheet No. 5

FOOTAGE FROM	TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	FROM	TO	ASSAY
Cont'd.	59.7			34.4m, 37.2m; a few carbonate-quartz veinlets; only a few pyrite veinlets (to 5 cm); small amounts of epidote but noticeably reduced from previous units; some sections of core badly broken up; some moly. along fracture @ 42.1m; By 41.3m unit becomes more intact, less broken up; small amount of chalcopyrite @ 45.2m; small amounts of moly. from 45.8 to 46.2m, disseminated and along veinlets.				
			48.5m	47.4m, 48.5m - small amounts of pinkish calcite along veins; moly along quartz veins 53.0 to 53.3m; 57.0 m intensity of alteration diminishes slightly but still completely altered; 59.0 - 59.3m, small amounts of disseminated moly ? galena?; 59.3 - 59.6m - small amounts of disseminated galena, pyrite and chalcopyrite associated with carbonate-quartz filled fractures.	B-1-8	57.0	59.5m	
59.7	65.8	30%	64.1m	Altered Pyroclastic - greyish in colour; alteration is carbonate-diopside alteration; colour varies from grey-green to medium grey; occasionally concentrations of epidote but not common; py. content low (+) with a few sections with moderate pyrite; pyrite disseminated and along fractures; galena in quartz vein @ 64.1 m; more galena @ 63.7m.				
65.8		65.8-71.9m						
Cont'd.		15%		Feldspar Porphyry (barren), unaltered; extremely poor				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 9, 1980 Sheet No. 6

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	71.9			recovery only small fragments remaining; abundant white and lesser pink feldspar phenocrysts; hornblende phenocrysts noted; small concentrations of epidote noted usually with pyrite; quartz veinlets present predominantly blue quartz; pyrite content low (+), mainly along fractures; hairline pyrite veinlets can be abundant over short sections of 3-4 cm.				
71.9	84.1	71.9-84.1m 0%		Tricone - no core recovery.				
84.1	88.9	>95% for remainder of hole	84.2m	Lamprophyre, dark coloured with speckled and mottled appearance; matrix is dark green with small (.5cm to 1cm) phenocrysts coloured light olive green (feldspar?); there are also very dark green to black phenocrysts; in addition there are small (.5cm) concentrations of white calcite scattered throughout; light green concentrations of epidote also noted; pyrite content only trace; not magnetic, 88.2 to 88.9 m texture becomes much finer grained and becomes medium grey with small black phenocrysts and smaller calcite concentrations; contact is sharp on either side; no alteration along veinlets; no quartz veinlets; a few calcite veinlets; rock not broken up.	B-1-9	85	88m	
88.9 Cont'd.			94.2	Andesite Porphyry - sharp upper contact; matrix medium	B-1-10	92.0	95.0m	

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Hole No. 80-1 Logged By D. Gorc Date Aug. 9, 1980 Sheet No. 7

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	95.3			grey fine textured with abundant white feldspar and very few pink feldspar (orthoclase)phenocrysts; less numerous but still abundant hornblende phenocrysts; epidote common but only in small amounts and widely scattered; pyrite disseminated and along fractures, at times with epidote; at times seems to replace rims of feldspar phenocrysts; only a few pyrite veinlets noted; essentially unaltered with only occasional white bleaching adjacent to some fractures or veinlets; few veinlets of any kind; pyrite content is low (+); a few horizons have thin 1cm. zones of greyish green alteration but these are few in number; moly? @ 90.3m, 91.2m; veins @ 25° to 30° to core, many hornblende phenocrysts altered to chlorite.				
95.3	96.9		95.8m	Grey Siltstone Very dark green grey to dark brownish green matrix; very fine-grained; relatively soft; sharp upper and lower contacts; lower contact @ 10°; reaction to acid (carbonate); slightly magnetic, unaltered but some slight bleaching adjacent to some veinlets.	B-1-11	96.0	96.7m	
96.9			98.8m	Feldspar Porphyry (Barren) matrix medium brown to medium brown grey with abundant white feldspar phenocrysts to 1 cn; quite numerous but less abundant hornblende phenocrysts occasionally hornblende phenocrysts become more abundant over 60-70 cm. sections which gives rock darker colour; small concentrations of epidote noted but not	B-1-12	105.0	108.0m	
Cont'd.								

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Hole No. 80-1 Logged By D. Gorc Date Aug. 10, 1980 Sheet No. 8

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	114.5			abundant; pyrite primarily disseminated varying from low (+) to moderate (+) average of low (+) only occasionally magnetic; veins @ 30° core angle unit for the most part unaltered but a few thin zones of altered rock do occur (ex. 98.8 m); 102.0m, 102.9 m quartz veins with moly, veins @ 20° to 30° core angle; 103.4 - 103.8m - first major zone of alteration; adjacent to 1 cm thick quartz-carbonate vein with minor galena and pyrite; zone is dirty brownish grey and not completely altered since many feldspar phenocrysts still intact; small amounts of pinkish flesh coloured calcite noted. 105.9m - 1 cm. thick pyrite vein with 20 cm. wide zone of slight alteration on either side of the vein. 106.5m - large pinkish orthoclase phenocrysts begin appearing, not many but quite noticeable since so large (up to 2 cm); also starting to get some very slight bleaching adjacent to some veinlets but such alteration is extremely minimal; unit is essentially unaltered. moly in quartz veins @ 108.0, 109.5, 110, 110.8 to 111.7m (2 very flat veins @ 0° - 5°) 113.2m, 114.1m. 113.0m - chlorite and epidote diminished.	B-1-13	109.8	110.3m	
114.5			117.8m	Andesite Porphyry - matrix dark to medium grey with abundant white feldspar phenocrysts; more hornblende	B-1-14	117m	120m	
Cont'd.				phenocrysts than above; also slightly more magnetic than				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	121.0			above; also the unit does not have orthoclase phenocrysts as does the above porphyry; unit is characterized by 3-4 cm rounded clasts of much darker non-porphyritic material; unit is not cut by any veinlets; very sharp upper and lower contacts				
121.0	137.5		123.5m	Feldspar Porphyry (barren); identical to porphyry above Andesite Porphyry except perhaps a few more hornblende phenocrysts and no large orthoclase phenocrysts noted; matrix light grey to medium grey with abundant white feldspar phenocrysts to 1 cm; only occasionally magnetic; pyrite; content is low (+) and disseminated, very fresh unaltered rock with only a few thin zones of alteration adjacent to veinlets; 125.6 m - 5 cm wide zone of slight alteration adjacent to veinlet; 129.2m, a few thin zones	B-1-15	129m	130m	
			129.9m	(to 3 cm) of light greenish alteration; at 129.0m more carbonate veins begin appearing; occasionally rounded darkish non-porphyritic clasts seen; such clasts sometimes contain a higher pyrite content than the surrounding rock.				
			137.5	135.6 - 136.6m 1 cm wide - carbonate vein @ 5° to 10° with a 4 cm. zone of alteration adjacent to veinlet; small amounts of epidote still seen along veinlets generally with pyrite; lower contact very sharp.				
137.5			139.4	Altered Feldspar Porphyry - Intrusive Breccia- Intermixed	B-1-16	141.1m	144m	
Cont'd.								

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Hole No. 80-1 Logged By D. Gorc Date Aug. 10, 1980 Sheet No. 10

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	149.8		139.4	silicate volcanics plus porphyry - contains well developed quartz stockwork; seemingly very intensely altered but alteration is somewhat variable with short sections to 20 cm. showing little alteration; unit is pale greenish to light greyish; important to note that many foreign clasts of silicated volcanics are incorporated in the rock; such clasts are predominately light green (diopside?), 1 cm - 2 cm patches of bronzy brown garnet were noted in clasts; a few small patches of dark brown Hornfels also noted in clasts; quartz veinlets are predominately translucent bluish quartz with no preferred orientation; pyrite-epidote veinlets common but not as abundant as the quartz veinlets; moly in quartz veinlets at 138.6m and 139.4m; scattered black magnetite crystals but few in number; only occasional reaction to magnet;				
			140.2	pyrite content low (+) to moderate (+) with an average of moderate; pyrite is disseminated and along fractures.				
			144.9	140.2 m - thin gypsum veinlets noted; difficult to distinguish from thin quartz veinlets by sight and not that abundant. 145.9m bluish quartz veinlets becoming less abundant; white carbonate and quartz and white quartz veinlets becoming more common.				
				146.4m - moly in quartz veinlet.	B-1-17	147.7	149.3m	
				147.7 - 149.3 m - moly seen in quartz seven quartz veinlets in this section.				
Cont'd.								

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Hole No. 80-1 Logged By D. Gorc Date Aug. 10, 1980 Sheet No. 11

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
149.8	152.3		151.1	Feldspar Porphyry (Barren) - very sharp upper contact @ 15° core angle; matrix very light grey almost dirty whitish along certain horizons; quite hard; abundant white feldspar phenocrysts a few of which have a pinkish cast; no hornblende phenocrysts seen but seemingly small amounts of altered mafics; a few scattered concentrations of epidote; a few pyrite-epidote veinlets; blue quartz veinlets reduced in number from above but still numerous; a few carbonate and a few gypsum veinlets seen; no alteration seen along veinlets; some slight alteration for 3-4 cm along upper contact; some moly @ 150.7m, 151.4m; unit is not magnetic.				
152.3	155.6		153.0	Silicated Volcanic - unit as whole is quite intensely	B-1-18	153	156m	
			153.8	silicated; pale to dark diopside greens predominate with patches of cream coloured to almost pinkish; small amounts of epidote noted generally with pyrite; patchy concentrations of bronzy brown garnet noted but not abundant; only a few pyrite-epidote veinlets; most veining @ 25° core angle; pyrite content low to moderate (+), average of low (+); abundant porphyry and volcanic clasts; unit could be classed as breccia conglomerate; thin whitish reaction rims around many clasts; moly in quartz veins @ 153.7, 155.1m; unit is slightly magnetic.				
155.6				Feldspar Porphyry (barren) - whitish fine-grained matrix;				

Cont'd.

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	157.7			abundant white feldspar phenocrysts.				
157.7	174.1			Silicated Volcanic - pyroclastic with abundant porphyry and volcanic clasts; could almost be classed as conglomerate; epidote content increased slightly again pale to dark greens predominate with small patchy bronzy brown concentrations of garnet, identical to the previous silicated unit (152.3-155.6m) moly in quartz vein @ 156.5m; 156.0m 10 cm wide carbonate-anhydrite vein @ 25° core angle; 162.1m Small blackish concentrations of magnetite. 163.6m - 169.1m - seemingly more intense silicating increased small blackish concentrations of magnetite; 169.1m - unit returns to previous characteristics; unit is hard; pyrite content is low (+); some greyish metallic mineral in some quartz veinlets; a few gypsum veinlets; some gypsum veinlets have a very thin bleached (white) zone adjacent (1mm.); 173.4m - 5cm. wide quartz vein @ 20°; small amounts of pyrite included.	B-1-19	165m	168m	
174.1			175.1	Andesitic Pyroclastics and Crystal Tuffs				
			179.9	Interbedded andesitic dark brown pyroclastic and light greenish grey crystal tuff; tuff is charcaterized by very small (1-3mm.) white crystals (feldspar?) much of pyroclastic has dark brown colour suggesting a hornfel	B-1-20	177m	180m	
Cont'd.				but some of dark colour may be due to chlorite; slightly				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	180.9			more pyrite than usual in pyroclastic; a few 3-4cm clasts of crystal tuff within pyroclastic; epidote-pyrite veinlets present but not abundant; a few patches of bronzy brown garnet; pyrite and pyrite-magnetite veinlets common but not abundant; some moly in quartz vein @ 176.6m; 179.7m - bluish quartz vein offset by pyrite-epidote veinlet.				
180.9	191.4			Altered Pyroclastic - pyroclastic affected by quite intense dolomite-diopside alteration; short sections of silicated rock; mixture of light to dark green and light to medium grey; magnetite noted but noticeable decrease in content from previous unit; a few pyrite-epidote concentrations, a few small patches of bronzy brown garnet still present; greenish tinges due probably to diopside; pyrite predominantly along fractures and seems low on outer surface, upon splitting; however, short sections have moderate to moderate (+) pyrite. Chalcopyrite in quartz vein @ 186.8m; moly in quartz @ 188.1 m, 189.0m.				
191.4			191.4	Transition Zone - Silicated Pyroclastic and Altered Pyro-				
			192.5	clastic				
				Unit has been strongly affected by dolomite-diopside alteration and more intensive silication; Unit consists predominantly of silicated rock with numerous (10-20cm)				
Cont'd.				sections of greyish rock, affected only by dolomite diop-				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 11, 1980 Sheet No. 14

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				side alteration; silicated rock is predominantly dark green and seemingly contains abundant diopside; only small amounts of bronzy brown garnet; very small amounts of pyrrhotite; only minor chlorite; small amounts of pyrite-epidote still present; locally very small concentrations of galena and sphalerite; abundant light coloured porphyry clasts (blurred phenocrysts); clasts are volcanic? or intrusive?; most are likely volcanic; lesser fine-grained pyroclastic clasts and even fewer sedimentary clasts; clasts especially abundant from 192.8-194.0m; Number of clasts diminishes by 222.0m; numerous dark brown hornfel clasts to 3 cm across from 192.0 to 193.6m	B-1-21	189m	192m	
			197.6	pyrite content still only low (+), predominantly along fractures; pyrite-epidote veinlets still present but not abundant; predominate orientation to veins in 25° core angle; 197.20m - major structure 197.2-197.7m consists of coarse grained quartz carbonate; small amounts of pyrite and dark bronzy brown mineral (sphalerite?) 197.7m - 201.2m - intense dolomite-diopside alteration; medium grey; few clasts. Note: @ 199.9m and 202.0m note that white carbonate veinlets cut quartz veinlets; carbonate veins seem later; previously noted that gypsum veinlets cut all types of veinlets; gypsum veinlets generally not continuous.	B-1-22	201m	204m	
Cont'd.				201.2m-10cm. wide carbonate-quartz vein @ 30. core angle.				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 12, 1980 Sheet No. 15

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				201.4-201.9m - several veinlets with small amounts of chalcopyrite-sphalerite-pyrite. Unit is only slighty magnetic.				
			205.6	202.3m - some moly in quartz vein and adjacent to				
			208.0	203.5m - silication still not intense and is instead patchy				
				203.5-209.0m - more than usual bluish quartz veinlets; moly in quartz veins @ 206.0m, 207.0m, 209.0m				
				204.4 - chalcopyrite plus sphalerite in (8cm thick) whitish quartz vein				
				Note: 209.0m for last 25 m. there seems to be more thick (5cm - 10cm) thick quartz veins than previously; epidote - pyrite veinlets present but few in number				
				210.8m - some moly in quartz vein	B-1-23	213m	216m	
				212.2m - small amounts of chalcopyrite in carbonate vein; adjacent is quartz vein with small amounts of moly.				
				212.7m - small concentrations of pyrite-galena-sphalerite, some slight pinkish colouration adjacent; some moly?? at 222.6m.				
				220.0m - epidote-pyrite veinlet cutting quartz vein; nearby carbonate vein cutting quartz vein.				
				216.5-216.8m - concentrations of galena and pyrite in carbonate veins and fracture in fillings; one concentration 2 cm. wide;				
				215.8m - moly in quartz vein				
Cont'd.				220.3 - galena-pyrite and less chalcopyrite along fracture				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	228.4			and in quartz vein; some moly? in quartz vein. Moly in quartz veins @ 221.7m, 222.1m, 224m	B-1-24	223m	226m	
				224.0m - 228.4m - quartz veining increases, nearly stockwork; a few dark brown hornfel clasts.				
				222.0m - pyrite-epidote veinlets still present, sharp lower lower contact				
228.4	232.9		229.9	Lamprophyre - could perhaps be altered diorite dyke	B-1-25	229m	230m	
			232.9	original texture intact but rock is quite soft and cut by light green to dark green veinlets (sericite?); matrix is coarse textured - predominantly dark green in colour but occasionally a few shades of brownish green mixed in; unit is also speckled with black; unit is quite magnetic; a few carbonate veins but no quartz veins; no pyrite-epidote veinlets; only trace pyrite. By 231.7m is textured considerably finer; By 232.9m texture is very fine.				
232.9			233.9	Andesitic Pyroclastic and Silicated Pyroclastic				
				similar in appearance to unit before above diorite dyke not as intensely altered; many remnants of essentially unaltered rock sandwiched between altered rock; rock predominantly light to medium grey with altered sections having intermixed light to dark greens occasionally with small patches slightly pinkish; only a few pyrite-epidote				
Cont'd.				veinlets; very minor amounts of chlorite; a few small				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 12, 1980 Sheet No. 17

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	237.3			concentrations of bronzy brown garnet; only occasionally magnetic; small amounts of chalcopyrite in quartz vein @ 235.7m; fault gouge ? @ 233.4m				
			235	234.8 - 235.2m - altered light grey feldspar porphyry, moly in quartz veins @ 233.1m, 233.3m				
237.3	249			Altered Feldspar Porphyry - predominantly pale shades of green mixed with lesser light to medium grey; original texture still decipherable but very blurred and indistinct; rock seems softer than usual; no bronzy garnet noted; epidote-pyrite veinlets almost non-existent; no chlorite seen; a few gypsum veinlets; pyrite content low (+) to moderate (-) predominantly along fractures; contains a few short horizons of breccia to 20 cm; some hornfel clasts @ 248.7m; core is occasionally magnetic, moly in quartz veins @ 237.1m, 237.6m 238.5m, 241.6m, 241.9m, 243.4, 244.0m, to 241.2m, 247.8m.? Note: No longer see chalcopyrite, galena, sphalerite, in calcite veins.				
249			250.9	Altered Pyroclastic - predominantly shades of pale green with lesser greys; whitish porphyritic clasts also common; clasts have indistinct texture likely crystal tuff or volcanic porphyry; greenish colouration likely due to diopside; 250.9m- pinkish cast to some carbonate-quartz	B-1-27	249m	252m	
Cont'd.								

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Hole No. 80-1 Logged By D. Gorc Date Aug. 13, 1980 Sheet No. 18

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	252.4			veins. 251.9m - small amounts of galena.				
252.4			253.9	Altered Feldspar Porphyry (lesser Feldspar Porphyry) (barren) - predominantly altered porphyry but alteration not that intense; original texture largely intact although generally somewhat blurred and fuzzy; matrix is fine-grained and predominantly medium to light grey occasionally with a slight brownish tinge; abundant				
			258	white feldspar phenocrysts to 1 cm., much less mafic minerals; hornblende generally chloritized; outstanding characteristics of unit are the many irregular carbonate filled fractures cutting the unit; fracture infilling predominantly calcite but some infillings are quartz-carbonate; carbonate veins very jagged and irregular suggesting that rock has been broken up slightly; galena in some carbonate veins and along hairline fractures; small amounts of epidote noted with pyrite; pyrite content increased to moderate (-) predominantly disseminated; a few 2-3cm. sections of high (-) pyrite; unit only occasionally magnetic; unit is generally quite hard but becomes noticeably softer by 254.7m; greenish sericite along some fractures, ex. 259.6m galena @ 257.7m, 258.0m, 258.5m, 258.6m, 259.3m, 259.6m.	B-1-28	257m	258m	
				259.6m - alteration intensifies, essentially completely altered with only a few relatively unaltered remnants; as	B-1-29	261m	264m	
Cont'd.								

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Hole No. 80-1 Logged By D. Gorc Date Aug. 13, 1980 Sheet No. 19

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	265.3			a whole noticeably softer than previously; seeming also affected by patchy 3-4 cm. wide zones of silification; jagged carbonate veins found above continue; also bluish quartz and white carbonate veins present; epidote-pyrite veinlets again appearing but not abundant.				
265.3				Altered Pyroclastic - medium grey in colour with some horizons having brownish tinge; rock affected by dolomite-diopside alteration; first part of unit still cut by many jagged carbonate veins; a few short horizons (10-20cm) of crystal tuff or porphyritic volcanic noted (ex. 270.4m-270.7m)				
				270.8-271.2m - small amounts of chalcopyrite and galena				
				Note: 270.0m - many veinlets especially bluish quartz veinlets almost parallel to core angle; core angle for quartz veins 0° to 20°; core angle for carbonate veins 20° - 50°, mostly 30°-45°; white quartz and carbonate veins cut bluish quartz veins.	B-1-30	273m	276m	
				271.9m- noticeable decrease in number of carbonate veins; unit no longer has broken up appearance but still quite' fractured; quartz veining increasing slightly.				
				272.1m - small amount of galena-pyrite-sphalerite. Moly in quartz veins @ 273.0, 276.2m.				
			280.2	Small amounts of light pinkish brown colouration adjacent				
Cont'd.				to a few veinlets; thin (1cm - 2cm) zones of dark greenish				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 13, 1980 Sheet No. 20

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	283.7			alteration adjacent to some veinlets.				
				278.1m- several hornfel fragments ex. 281.1m				
				279.6m- transparent turquoise green mineral (fluorite?) in carbonate vein; epidote-pyrite still present but not abundant; unit still slightly magnetic.				
				Some moly in quartz veins 280.6, 280.8m.				
				282.1m - 283.7m - major structure?; core very fractured; abundant calcite-filled fractures; gouge-like appearance.				
283.7	289.2		288.0	Feldspar Porphyry (Barren), light grey to light grey with brownish tinge matrix; fine-grained matrix; abundant white feldspar; phenocrysts to 1 cm; fairly abundant black hornblende phenocrysts; disseminated crystals of magnetite common; unaltered; pyrite content low (+) to moderate (-).	B-1-31	285m	288m	
				Note: quartz veining diminishing?				
				285.5m - 5 cm wide - dark greenish hornfel clast??				
				288.6 - 289.2m - very fractured; abundant white calcite veins.				
289.2			291.1	Andesitic Pyroclastics - medium to dark greens predominate				
			291.7	with significant amounts of grey and dark brown locally;				
			292.2	dark green may be due to chlorite?; thin horizons of crystal tuff present but only a few of such; epidote-pyrite concentrations present; pyrite content is moderate (-); small amounts of chalcopyrite along a few fractures	B-1-32	297m	300m	
Cont'd.			300.6	ex. 292.6m; unit shows evidence of being slightly silicated				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 13, 1980 Sheet No. 21

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	311.4		303.9	over short horizons; moly in quartz veins @ 289.9m, 295m, 303.9m? 296.5m-296.9m - thick carbonate-quartz vein @ 20° core angle contains minor pyrite and some chlorite 299.1-299.9m - moly? in quartz veins in this section 299.6m - carbonate vein cuts quartz vein; carbonate vein at 35°; quartz vein @ 15° - 20° Core is occasional magnetic; noticeable numbers of clasts but edges of clasts very indistinct; not many porphyritic clasts but some noted.	B-1-33	309m	312m	
			310.0	309.9m - silication becomes more noticeable; lighter greens begin to predominate, localized small concentrations of granet; short sections (10-20cm) of well developed quartz stockwork; quartz of bluish translucent type. moly in quartz veins 307.9, 309.2m.				
311.4	318.2		317	Silicated Clastics - darker green than usual for silicated rocks but less dark than above unit; small amounts of intermixed light to dark brown; silicated but not intensely so; little garnet or pyrrhotite noted; fairly abundant clasts of porphyry with very small white phenocrysts (volcanic porphyry?). 313.0 carbonate veining diminishing and quartz veining especially bluish quartz veining is more abundant. Moly in quartz veins 317.4, 318.4, 318.6.				

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Hole No. 80-1 Logged By D. Gorc Date Aug. 23, 1980 Sheet No. 22

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
318.2	322.4		320.2	Feldspar Porphyry (barren) - fine-grained medium grey matrix with abundant white, feldspar phenocrysts; also a few large (to 2cm.) orthoclase phenocrysts; hornblende phenocrysts present. Rock is very fresh and even hornblende phenocrysts are unaltered; occasional slight alignment of feldspar phenocrysts; along fractures and veinlets some whitish bleaching alongside but very minor; a few bluish quartz veins present; pyrite content is low to low (+) locally; very minor amounts of epidote; small amounts of chlorite noted; moly in quartz vein @ 321.7m.	B-1-34	319.2	322.2	
322.4			322.9	Altered Pyroclastic - affected by dolomite diopside alteration; medium to dark greens predominate with significant sections containing noticeable amounts of medium brown; unit cut by numerous small fractures and has appearance of being somewhat shattered; radiating crystals on many fracture surfaces; more abundant clasts including porphyry at least to 324.0m; pyrite content is moderate (-) to moderate (+); pyrite-epidote perhaps getting more abundant; bluish quartz veining definitely diminishing most quartz veinlets of white quartz variety; sections of core have definite brecciated appearance (ex. 325.2-333.3m)	B-1-35	333m	336m	
					B-1-36	345m	348m	
Cont'd.								

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Hole No. 80-1 Logged By D. Gorc Date Aug. 25, 1980 Sheet No. 23

FOOTAGE FROM	TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	FROM	TO	ASSAY
Cont'd.	334.6		325.5	Some moly? along some fracture planes ex. 325.5m moly				
			334.3	in quartz veins 323.4m?, 325.3m				
334.6	343.8		338.8	Andesitic Pyroclastics - dark greenish to dark brownish matrix; a few very short zones slightly silicated containing small amounts of garnet (ex. 338.8m); small amounts of epidote + chlorite; breccia appearance; contains a few porphyry clasts; a few gypsum veins noted; often has spotty textured matrix.				
343.8	345.9			Feldspar Porphyry (barren), medium grey fine-grained matrix with abundant white feldspar phenocrysts and lesser hornblende phenocrysts; a few foreign clasts (volcanics?); unit has slightly shattered appearance; numerous thin carbonate filled fractures; core easy to break apart; sharp upper and lower contacts; pyrite content is low (-), core only occasionally magnetic; small amounts of epidote-pyrite; small amounts of chlorite.				
345.9			347.8	Andesitic Pyroclastic - dark greens predominate with lesser light browns; medium to light green also noted locally; a few sections (5 cm to 10 cm) have a mottled appearance, pyrite-epidote still present but in very small amounts; a few bluish quartz veinlets; moly in	B-1-36	345m	348m	
Cont'd.								

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Hole No. 80-1 Logged By D. Gorc Date Aug. 25, 1980 Sheet No. 24

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	348.6			quartz vein @ 346.4m.				
348.6	357.5		351.6	Feldspar Porphyry (barren) - light to medium grey	B-1-37	353m	357m	
				fine-grained matrix with abundant white feldspar and lesser				
				hornblende phenocrysts; a few pinkish (orthoclase)				
				phenocrysts; a few foreign clasts of porphyritic volcanic?;				
				few veinlets of any kind; small amounts of pyrite and				
				epidote; unaltered quite fresh appearing rock, slight				
				alignment to feldspar phenocrysts.				
357.5			358.8	Transition Zone - Andesitic Pyroclastics and Silicated	B-1-37	353m	357m	
			361.7	Clastics - predominantly light green with lesser dark				
			363.2	green; patches of dark brown common; fairly abundant	B-1-38	369m	372m	
			360.7	number of clasts some > 5 cm; clasts of fine-grained				
			362.7	pyroclastic and porphyritic volcanic (lighter colour)				
				present; quartz veining quite strong with many hairline				
				veinlets; epidote-pyrite-magnetite				
			378.7	Concentrations common often to 2 cm. across; sometimes				
				short sections (to 5cm) have mottled appearance; pyrite				
				content is low (+) to moderate (-) with average of low				
				(+); in altered sections some bronzy brown garnet present,				
				altered sections also contain much more sulphide.				
				367.7-357.8m - high (+) pyrite				
				368.4-368.7m - high (+) pyrite				
Cont'd.				A few short sections of crystal tuff or volcanic porphyry	B-1-39	381m	384m	

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Hole No. 80-1 Logged By D. Gorc Date Aug. 25, 1980 Sheet No. 25

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	359.6			(ex. 360.2m-360.8m); small amountsoof chlorite; a few short sections (10-30cm) appear to be hornfelized dark brown (ex. 371.3-371.7, 378.3-379.9)	B-1-40	393m	396m	
				Moly in quartz veins @ 378.2m?, 379.4m, 380.0m				
395.6			396	Silicated Clastics - quite intensely silicated with				
			400.7	light pale green predominating; occasionally slightly pinkish cast along certain horizons, diopside seems to be predominant constituent with small amounts of brown garnet also noted; no pyrrhotite noted; moly in quartz veins @ 392.5, 393.4, 400.7	B-1-41	400m	401m	
				End of Hole 80-1 401.4m (1317')				

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PROPERTY Ball Creek

HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 7, 1980 SHEET No. 1

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION	INTENSITY OF	PYRITE	
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	BANDS cm/m	ALTERATION (1 to 10)	(Low to High)	COMMENTS
0	5.2	overburden	/	/	/	/	/	/	
5.2	9.8	Andesitic Pyroclastic	/	21.3	/	41.3	3	Mod. (+)	zones of greyish (dolomite-diopside?) alteration to 60 cm. separated by seemingly unaltered rock; also thinner zones of greyish bleaching (to 2cm) adjacent to some veinlets; pyrite predominantly along thin hairline fractures
9.8	13.1	Feldspar Porphyry (barren)	/	4.8	/	6.0	.1	Low (-)	Minimal alteration; only a few thin zones of intense greyish alteration; most of core very broken up; pyrite primarily, disseminated; very patchy greyish alteration;
13.1	23.7	Andesitic Pyroclastic	0.6	10.4	/	33.0	2	Mod(+)to High	13.1-13.7m - only a very small amount of light greenish bleaching adjacent to some veinlets 13.7-16.0 - most of core affected by light grey alteration but patchy and seemingly not that intense. 16.0-23.1 - alteration limited to zone adjacent to veinlets; most zones thin; thickest is 20 cm.
23.1	30.8	Altered Feldspar Porphyry	/	2.3	3.4	10.4	1	Low to Mod.(+)	Seemingly only slightly altered except for thin zones of intense alteration to 30 cm. in which original texture is

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HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 9, 1980 SHEET No. 2

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	BANDS cm/m	(1 to 10)	(Low to High)	
									completely obliterated; altered units
									are whitish and quite hard;
30.0	59.7	Altered	1.1	5.6	0.3	100	8 to 10	Low (+)	30.8-34.7 - intensity of alteration 8
		Feldspar						Mod. (+	34.7-41.3 - intensity of alteration 9
		Porphyry							41.3-57.0 - intensity of alteration 10
									30.8-34.7 - rock is medium greyish and
									quite hard; seeming thin zones (5cm) of
									silification adjacent to some quartz veins.
									34.7-41.3 - unit predominantly dark green
									and somewhat softer; alteration variable with
									some sections slightly less altered in
									which original texture still decipherable.
									41.3m - unit becomes completely altered;
									dark green in colour; somewhat soft.
									57.0 - alteration intensity diminishes
									and is patchy but overall still quite strongly
									altered.
59.7	65.8	Altered	2.5	2.5	.7	100	10<	Low(+)	completely altered greyish (dolomite-diopside
		Feldspar						to	alteration; pyrite content seemingly quite
		Porphyry						Mod.(-)	low except for a few short sections of more
								Pred.	abundant hairline pyrite veinlets.
								Low(+)	
65.8	71.9	Feldspar Porphyry (barren)	2.4	1.6 ?	.5?	?	?	Low (+)	essentially unaltered; so much core is lost

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HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 9, 10, 1980 SHEET No. 3

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION	INTENSITY OF	PYRITE	
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	BANDS cm/m	ALTERATION (1 to 10)	(Low to High)	COMMENTS
								Mod.	that veinlet count almost meaningless
								Pred.	
								Mod.(-)	
71.9	84.1	Tricone	/	/	/	/	/	/	
84.1	88.9	Lamprophyre	5.4	/	/	/	/	tr.	unaltered; some epidote; a few carbonate
									veinlets have some pyrite
88.9	95.3	Andesite	1.3	.9	.5	/	/	Low to	unaltered except for a few very thin (1cm)
		Porphyry						Mod.(-)	zones of bleaching adjacent to some veinlets;
								Pred.	very few thicker zones of alteration;
								Low(+)	only a few carbonate veins
95.3	96.9	Siltstone	7.0	/	/	/	/	tr.	
96.9	114.5	Feldspar	.5	1.3	1.0	4.0	/	Low (+)to	essentially unaltered except for a few short
		Porphyry						Mod.(-)	zones of alteration (ex. 103.4-103.0); some
		barren)						Pre.	very thin zones of greyish bleaching adjacent
								Low(+)	to some veinlets.
114.5	121.0	Andesite	/	/	/	/	/	Mod.(+)	unaltered - noticeably more disseminated
		Porphyry						to High	pyrite than above
								(-)	
121.0	129.0	Feldspar	1.0	0.5	/	/	/	Low(+)	essentially unaltered
		Porphyry							
		(barren)							
129.0	137.5	Feldspar	3.6<	/	/	3.5	/	Low(+)	a few thin zones (3-4cm) of greenish alteration
		Porphyry							(sericite??) adjacent to some veinlets; not
									many altered zones; widely scattered.

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PROPERTY D. Gorc

HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 10, 1980 SHEET No. 4

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
137.5	140.2	Altered Feldspar Porphyry	1.1	.7	43.0	100	8	Mod(+)	zone of well developed quartz stockwork; veinlets mainly of bluish translucent quartz; contains noticeable number of clasts of silicated pyroclastic; such clasts contain garnet; garnet in 1-2cm concentrations with bronzy brown colouration; alteration quite extensive but many short sections to 20 cm. only slightly altered;
140.2	149.8	Altered Feldspar Porphyry	2.0	1.5	12.0	100	10	Low(+)	Quartz veining diminishes; alteration still quite intense with fewer short sections of slight alteration; unit is quite hard; few gypsum veinlets.
149.8	152.3	Feldspar Porphyry (barren)	2.0	/	26.0	/	/	Low (+)	essentially unaltered; some altered mafics; some slight alteration for 3-4cm at top and base of unit; a few gypsum veinlets
152.3	163.6	Silicated Volcanic (155.6-157.7m) Feldspar Porphyry (barren)	2.7	0.4	7.9	100 /	8 /	Low(+) Low(+)	pyroclastics are seemingly quite intensely silicated; only slightly altered porphyry clasts quite common; pale to dark diopside greens dominate colouration; small amounts of bronzy brown garnet present; feldspar porphyry dyke is unaltered
163.6	169.1	Silicated Volcanic	2.7	/	3.5	100	9	Low(+)	increased intensity to silication;
169.1	180.9	Silicated Volcanic	4.3	2.3	3.7	100	9	Low (+)	169.1-174.1 Intensely silicated

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HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 11, 1980 SHEET No. 5

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
		(155.6-157.7m)							only slightly altered porphyry clasts
		Feldspar				/	/	Low(+)	quite common; pale to dark diopside greens
		Porphyry							dominate colouration; small amounts of bronzy
		(barren)							brown garnet present; feldspar porphyry dyke
									is unaltered
163.6	169.1	Silicated	2.7	/	3.5	100	9	Low (+)	increased intensity to silication
		Volcanic							
169.1	180.9	Silicated	4.3	2.3	3.7	100	9	Low (+)	169.1-174.1 - Intensely silicated
		Volcanic							
		(174.1-180.9)				1	1	Low(+)	174.1-180.9 - only short zones of silicated
		Andesitic							rock separated by seemingly unaltered rock;
		Pyroclastics							some garnet in silicated zones.
		and Crystal							
		Tuffs							
180.9	228.4	Altered	3.7	1.7	4.2	100	9	Low(+)	strongly altered with very few unaltered
		Pyroclastic						Mod.	remnants; multicoloured with intermixed
		(191.4-228.4)							dark to light greens and light to medium
		Altered				100	9	Low(+)	grey; widely scattered small concentrations
		Pyroclastic						Mod.	of bronzy brown garnet; greens suggest
		and Silicated							diopside; a few gypsum veinlets; rock is hard;
		Pyroclastic							seemingly entire unit somewhat altered?; dark
228.4	232.9	Lamprophyre	2.0	/	/	100	8	tr.	green; soft; noticeably magnetic
232.9	252.4	Andesitic	4.8	2.7	8.4	100	9	Low(+)	232.9-237.3m - largely altered rock with
		Pyroclastic						Mod.	numerous thin zones of essentially unaltered

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HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 11, 12, 1980 SHEET No. 6

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION	INTENSITY OF	PYRITE	
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	BANDS cm/m	ALTERATION (1 to 10)	(Low to High)	COMMENTS
		and Silicate						Pred.	rock sandwiched between the altered zones.
		Pyroclastic						Low(+)	237.3-249.0 - seemingly not intensely
		(237.3-249.0m)							altered, original texture still decipherable
		Altered Feldspar							although very blurred and indistinct
		Porphyry)				100	5	Low(+) to	249.0-252.4 - quite strongly altered;
		(249.0-252.4m)						Mod.	occasional brownish garnet.
		Altered							
		Pyroclastic							
252.4	259.6	Altered	12.5	1.1	/	13.9	.5	Mod.(-)	most of unit altered but only very slightly
		Feldspar						to Mod.	altered; texture still visible but quite
		Porphyry						(+)	blurred; unit is predominately greyish; short
									zones are more intensely altered; unit is
									quite fractured; abundant calcite filled
									fractures; few quartz veins; noticeably
									softer than most alteration zones; also
									some veinlets of what appears to be greenish
									sericite? alteration may contain more sericite
									than usual.
259.6	283.7	(259.6-265.3)	10.1	2.2	5.0				259.6-265.3m - alteration intensifies
		Altered							with patchy 3.4 cm zones of silicification
		Feldspar Porphyry							adjacent to many veinlets.
		(265.3-283.7m)							265.3-283.7m - quite intensely altered ;
		Altered							greyish colouration; 271.9m - carbonate vein-
		Pyroclastic							ing decreases

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PROPERTY Ball Creek

HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 13, 23, 25, 1980 SHEET No. 7

INTERSECTION Meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
283.7	289.2	Feldspar	7.3	.7	1.1	/	/	Mod.(-)	unaltered
		Porphyry							
		(barren)							
289.2	318.2	Andesitic	6.7	1.1	4.5	/	/	Mod.(-)	essentially unaltered; short zones of
		Pyroclastics							silicated rock beginning @ 309.9m
318.2	322.4	Feldspar	0.6	1.7	7.5	/	/	Low to	essentially unaltered; some very minor
		Porphyry							bleaching along some veinlets
		(barren)							
322.4	343.8	Altered	0.7	3.1	1.9	100	9.5	Mod.(-)	322.4 to 334.6m strongly altered; some sections
		Pyroclastic						Mod.(+)	quite fractured.
		(334.6-343.8m)							334.6
		Andesitic				3	.1	Mod.(-)to	essentially unaltered a few thin altered zones;
		Pyroclastic						Mod.	some minor brown garnet.
343.8	345.9	Feldspar	5.7	.5	/	/	/	Low (-)	Unaltered; some chloritized hornblende
		Porphyry							phenocrysts.
		(barren)							
345.9	348.6	Andesitic	3.7	3.0	4.0	/	/	Low(+)	Perhaps very slight silication in small
		Pyroclastic							irregular patches
348.6	357.5	Feldspar	0.7	/	.2	/	/	Low(-)	unaltered
		Porphyry							
		(barren)							
357.5	401.4	Andesitic	1.1	1.4	4.0	20	3	Low(+)to	intermittent zones of essentially unaltered and
		Pyroclastic						Mod.(+)	altered rock; locally small concentrations of
		and Silicated							brown garnet

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PROPERTY Ball Creek

HOLE No. 80-1 LOGGED BY D. Gorc DATE Aug. 23, 25, 1980 SHEET No. 8

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
		clastics							
		(395.6-401.4m)				100	8	Low(+)to	more intensely silicated; no
		Silicated						Mod.(-)	garnet noted.
		Clastic							

APPENDIX III

DRILL LOGS - HOLE 80-2

J. R. WOODCOCK CONSULTANTS LTD.

PROPERTY Ball Creek
CLAIM No.
COORDINATES
ELEVATION 807.0m (2648')

HOLE No. 80-2
BEARING 170°
DIP 60°S
LENGTH 551.7 m (1810')
DIAMETER NQ to 268.2m (880'); BQ to 551.7m

DRILLED BY Lyons Diamond Drilling
STARTED: Aug. 27, 1980
TERMINATED: Oct. 19, 1980
LOGGED BY: D. Gorc

Abbreviations
po. - pyrrhotite

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
0	5.5m			Overburden - casing				
5.5m	>95% unless noted		4.5m 7.7m 11.0m 14.7m 19.1m 20.2m 26.0m 27.1m 28.6m 36.1m 40.9m 41.7m	Andesitic Pyroclastics - unit variable in colour predominantly dark in colour; darker brown sections; - hornfelsing is localized and variable; fairly abundant foreign clasts; clasts are volcanic and intrusive porphyry?; clasts often have blurred edges; py-epidote veinlets with or without magnetite are very common and often abundant; pyrite content is medium (+) to high (-); small amounts of very thin whitish bleaching (2 cm) adjacent to some veinlets; small rounded concentrations of white quartz??? present; Note: bleaching is later than hornfelizing; in addition to the bleaching short sections are altered to medium greyish colour (dolomite diopside alteration); a few sections of core almost black in colour, core is slightly magnetic; 10.4m alteration zones adjacent to veins getting thicker (1 cm) and more abundant. 11.3-12.0m - thickest zone of greyish alteration so far; contains 2 cm wide carbonate vein with small amounts of galena @ 11.6m.	B-2-1	6.0	9.0m	
	Cont'd.			14.6-14.9 - breccia containing volcanic clasts with high				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 8, 1980 Sheet No. 2

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				(+) pyrite; lower contact sharp at 18°, bounded on each side by greyish bleaching 13.9 to 14.6m and 14.9m to 15.2m.				
				12.7m - moly in quartz vein.				
				15.7m - unit becomes as a whole darker.				
				18.6m - carbonate vein (.5cm) with small amounts of chalcopyrite; start of zone of alteration; not completely altered with fragments of dark brown hornfels occasionally present altered rock medium grey in colour with a slight brownish tinge at times; pyrite content is high; both disseminated; and along fractures; unit as whole is quite hard; epidote often associated with pyrite;	B-2-2	18.6m	21.6m	
				19.0m - 3 cm. wide carbonate vein @ 18° minor sphalerite				
				19.2m - 1 cm. quartz vein between hornfels and thin feldspar porphyry dykelet (19.0 - 19.2m); carbonate vein adjacent to quartz vein.				
				Note: Many veinlets are compound veinlets with alternating layers of carbonate and quartz; so far core has been quite broken up with numerous 1 cm to 3 cm thick carbonate veins a pinkish tinge in some carbonate veins; many of the carbonate veins are vuggy with quartz crystals having grown in the vugs; moly in quartz veins @ 21.4m, 22.8m, 23.0m.				
				22.0-22.6m - strong structure with carbonate-quartz infilling.				
				Zone of alteration ends at 23.5 m.				
	Cont'd.			23.5m - rock returns to appearance before alteration zone;				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				dark coloured pyroclastics with some sections blackish; many veinlets have thin zone of light brown to whitish bleaching along side; pyrite-epidote veinlets present; unit only slightly magnetic; pyrite content moderate (+)				
				24.3 m to 24.8m - core badly broken up. core all in small pieces to 2 cm.				
				23.5 - 26.0 - notice more abundant foreign clasts including a few intrusive porphyry clasts; clasts to (.5cm).				
				26.8 - 27.6 - intensely altered zone; medium grey in colour; high (+) disseminated pyrite; contains altered dyklet @ 26.8m??				
				27.6 - 28.2 - thin zones of greyish alteration to 3 cm adjacent to some veinlets.				
				28.2-32.2 - pyroclastic conglomerate; matrix is dark brown to near black; fine to medium textured; unit is characterized by numerous rounded to sub-angular clasts; clasts to 2 cm; some clasts appear to be partially altered to epidote; epidote-pyrite veinlets are common;				
				28.2 - 31.3 - core almost black with significant amounts of magnetite; core very magnetic; pyrite content seemingly diminished to low (+); no evidence of alteration.				
				31.3 - unit has hornfelsed appearance; pyrite content returns to moderate (+); core only occasionally magnetic; thin zones of alteration begin reappearing; zones very				
	Cont'd.			thin through (< 1cm)				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				32.2m - 44.9m - foreign clasts still present but very much reduced in number; thin zones of greyish alteration to 2 cm. adjacent to many veinlets; pyrite content is moderate (+) rising to high in altered zones; rock predominantly dark brown in colour; core is quite magnetic; texture is fine grained to medium grained; pyrite-chlorite veinlets present; altered zones 32.2m to 33m, 35.4m to 37 m; 32.7m - 3 cm carbonate vein @ 35°; 3 cm alteration zone adjacent. 35.5m - 3 cm carbonate vein @ 35° near start of approximately 2 m. zone of alteration. 37.0-39.0m - patchy irregular alteration; most of core is medium-grey with 10 cm. patches light greenish; such patches contain more abundant epidote; 39.2-41.7m - zone of more abundant clasts of foreign rock.	B-2-4	41m	44m	
	44.9			44.2-44.9m- strongly altered; greenish to light brownish.				
44.9			45.1	Feldspar Porphyry (barren) sharp upper contact @ 50°; matrix medium grey in colour; abundant large white feldspar phenocrysts; abundant small black hornblende phenocrysts; pyrite content is moderate; core only occasionally magnetic;				
	48.4			epidote-pyrite and chlorite-pyrite veinlets are noted;				
48.4				Altered Pyroclastic - rock altered to dolomite-diopside medium grey in colour; extends to edges of clasts, very				
	Cont'd.			blurred and indistinct, most of original texture is lost;				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				epidote-pyrite and chlorite veinlets noted;				
				48.8m and 50.1m - fault gouge.				
	53.3							
53.3	56.1			Andesitic Pyroclastic - dark brown in colour; very brown				
				from 53.3 to 53.8.				
56.1				Andesitic Pyroclastic and Altered Pyroclastic				
				56.1-60.9m - at least partially altered; medium grey pre-				
				dominates; much of original texture is lost; to 57.5m core	B-2-5	55.0m	58.0m	
				is very fractured with abundant irregular white carbonate				
				veins; pyrite-epidote present but diminishing; may perhaps				
				be small patches of silification.				
				60.9-65.6m - contains zones which appear hornfelized;				
				fairly well fractured with numerous carbonate veins some of				
				which are vuggy; epidote-pyrite veinlets present some with				
				magnetite; pyrite content is high (-); a blackish, metal-				
				lic, non-magnetic mineral along some carbonate veins (ex.				
	65.6			64.1m)				
65.6			69.1m	Altered Feldspar Porphyry - light grey to medium grey;	B-2-6	65.6m	68.0m	
			70.4m	completely altered but original texture still visible;	B-2-7	72	75 m	
			67.1m	pyrite content is high (-) in fractures and disseminated;				
			67.7m	a few sections to 1 meter are more intensely altered with				
				original texture obliterated; quartz veining becoming more				
	Cont'd.			abundant; several veins with small amounts of moly; some				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				chalcopyrite seen disseminated throughout rock; not abundant but commonly seen; some moly paint along some fractures; 67.4m light green translucent mineral (fluorite).				
				Moly in quartz veins - 69.2, 71.5, 72.0m				
				From 72.0 to 76.1 approximately 37 veinlets with moly.				
				Moly paint or disseminated moly?? @ 67.1, 67.7, 66.8 m				
				a few carbonate veins have pinkish tinge;				
				Note: no longer see epidote, sphalterite with chalcopyrite and pyrite in veins (ex. 71.8m)				
				Note: many veinlets are compound veinlets with a carbonate vein bounded by silica veinlets with separate sulphide horizons within the silica veinlets; 72.5 to 76.1 m could be classed as quartz stockwork; stockwork very regular				
	76.1m			with all veinlets sub-parallel @ 45° to 50°.				
76.1m			77.0m	Altered Pyroclastic; seemingly intensely altered; predominantly light to medium grey with significant sections having a light brown tinge; important to note that quartz veining is dramatically reduced from that of above unit; abundant quartz veining ends abruptly at intrusive contact; epidote again appearing mainly with pyrite; epidote present only in very small amounts and not nearly as abundant as first part of 80-2; pyrite content is high,				
	Cont'd.			disseminated and along veinlets; veinlets @ 45° to 50°.				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.			78.8	78.0m - notice a few bluish quartz veins with moly; some moly paint along fractures to 80.4m.	B-2-8	78.0	81.0m	
				Note: most of original texture lost but one can often see outlines of former clasts; a few horizons (10-20cm) of near				
	84.0			conglomerate.				
84.0			86.2	Andesitic Pyroclastic - predominantly medium brown in colour with many horizons having hornfelsed appearance; significant amounts (10%??) is altered to medium grey; alteration of dolomite-diopside type; epidote-pyrite present but not common; quartz veinlets but not abundant; occasionally magnetic; pyrite content high (-) to high; disseminated and in fractures. Number of pyrite veinlets reduced but still abundant; moly in quartz vein @ 87.4m.				
			90.4	Some thin zones of alteration along some veinlets (ex. 90.4m); bleached to very light brown to grey.				
			94.1	By 88.6 m alteration zones very much reduced and limited to above thin zones (1cm) adjacent to veinlets and a very few zones of alteration to 1 meter thick; more of rock now has hornfelsed appearance; original feature becomes much more distinct with many foreign clasts; some horizons (to 1 meter) have abundant clasts; aphanitic and porphyritic clasts noted; pyrite veinlets noticeably reduced from first	B-2-9	89m	90.5m	
	Cont'd.							

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				part of unit; pyrite content also noticeably reduced; at best moderate (-).				
				90.5-93.8m - several quartz-carbonate veins with localized alteration adjacent.				
				92.1-20cm wide quartz vein adjacent to silicified zone?				
	95.1		93.7	Some darkish veinlets? @ 93.7.				
95.1			95.4	Altered Pyroclastic - intensely altered by dolomite-diopside alteration; pyrite content is low (+) to moderate (average to low (+)); very few pyrite veinlets; very small amounts of pyrite-epidote; few quartz veins; few clasts seen; most of original texture obliterated.	B-2-10	95.1	97.1	
	99.0m							
99.0m				Andesitic Pyroclastic - predominantly dark to medium brown with lesser much thinner tones altered to medium-grey; a subtle greyish to greyish-green tinge to the unaltered rock; foreign clasts (aphanitic and porphyritic) are common and often abundant along short horizons; clasts subrounded to 2 cm; short horizons may be hornfelsed; pyrite content Low (+); disseminated and along fractures; pyrite veinlets present but not common; epidote-pyrite is present but not common; quartz veins are present but very few in number;				
	Cont'd.			core is slightly magnetic; some minor greyish bleaching				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				alongside some fractures; a few thicker sections to 10 cm				
				are altered to medium grey and contain moderate (+) pyrite;				
	104.4			some silification adjacent to some quartz veinlets?				
104.4m			110.1	Altered Pyroclastic light to medium grey in colour; veining				
				at 30° to 45°;	B-2-11	105	108	
				107.4-109.4m - rock strongly fractured; abundant jagged				
				irregular carbonate veins; some minor amounts of galena, a				
	110.4			few white quartz veins; a few pyrite veinlets				
110.4			113.6	Silicated Pyroclastic - unit is multi-coloured; irregular				
				colouration with light greens; dark browns and medium				
				greys; unit is slightly silicated; also note small amounts				
				of garnet and some pyrrhotite; locally abundant porphyry;				
				occasional small amounts of galena and sphalerite;				
				115.2m - 1 cm thick pyrite-pyrrhotite				
				111.6m - small amounts of sphalerite in vein.				
				113.3-114.5m - pyroclastic breccia conglomerate;	B-2-12	113m	116m	
	116.0			abundant clasts to 3 cm.				
116.0			122.2	Altered Pyroclastic - 116.0 to 122.9m - core very				
				fractured and broken up; cut by abundant, jagged irregular				
				carbonate veins; rock is somewhat softer than usual,				
				rock is predominantly light grey with some localized				
	Cont'd.			tinges of light brown; thin zones (to .5cm) of more in-				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				tensive bleaching adjacent to some veinlets.				
				126.1-126.4 - quartz-carbonate-pyrite vein including				
				5 cm. of massive pyrite - very minor amounts of epidote.				
			132.4	127.1m - rock changes to distinctive very light grey	B-2-13	127.7	128.2	
				colour, rock is quite hard; clasts slightly smaller than	B-2-14	129.8	131	
				usual; no porphyritic clasts noted; clastic nature of				
				rock easily seen on a fresh surface; a few quartz crystals				
				present?; some sections are medium grey with brownish				
				tinge, epidote seen but not that common; pyrite generally				
				low to low (+) with very few pyrite veinlets; instead				
				several thin zones (10-20cm) containing high (+) dissemin-				
				ated pyrite plus pyrrhotite are common; such zones range				
				from 2% to 15% sulphide; sulphide zones (127.7-128.2m 10%				
				pyrite plus pyrrhotite) (131.6 - 131.9 - 2% pyrite plus pyr-				
				rhotite; 132.5-132.6 - 2% pyrite plus pyrrhotite.				
133.6			135.4	Andesitic Pyroclastic - dark brown fine-grained matrix;	B-2-15	138	139	
			136.8	abundant aphanitic and porphyritic clasts; some sections				
			141.9	hornfelsed. a few short sections (to 1m) altered to light				
				grey; note that pyrrhotite often found within altered				
				sections and not in unaltered sections; pyrite content				
				low to low (+) with very few pyrite veinlets.				
				139-145.3m - unit becomes more multicoloured; predominately				
				grey; clasts are larger (some intrusive clasts?); irregular				
	Cont'd.			blotchy colouration; pyrite content about moderate but				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				still few pyrite veinlets; pyrrhotite very common; some chalcopyrite noted but not common (ex. 142.6m); short horizons (to 10 cm.) with high (+) pyrite plus pyrrhotite (ex. 142.3 - 142.4); over short sections unit is finely laminated (Spec 141.9).				
	145.3							
145.3			148.5	Transition Zone - Andesitic Pyroclastics and Silicated Pyroclastics - predominantly dark to medium brown andesitic pyroclastics with short horizons altered to light grey; clasts are abundant (aphanitic and porphyritic); altered sections characterized by concentrations of pyrrhotite.				
				Sulphide content is low (+) to moderate (-).	B-2-16	152.0	155.0	
				154.5m number of clasts and size of clasts seem to be increasing slightly.				
				151.5-157 - Alternating thin zones (to 20 cm) of andesitic and altered pyroclastics.				
				160.0m - pinkish tinge within some carbonate veins.				
				162.6m - unit very dark grey in colour; most of core slightly magnetic; number of clasts still abundant; number and size of clasts again have increased slightly; very small amounts of epidote; small amounts of chlorite.				
				168.0 - number of clasts diminishes greatly	B-2-17	162.0	165.0m	
				168.2-168.6 - altered section - light grey.				
	Cont'd.			168.8-169.5 - altered section - light grey; breccia ap-				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				pearance with abundant angular clasts.				
				168.3-175.3m - very minor andesitic pyroclastic; predominantly silicated Pyroclastic - multicoloured with intermixed light greens and greys; number of clasts greatly diminished from above.				
				168.8-169.5 - breccia with abundant angular clasts.				
				169.4-169.5 - abundant angular clasts.				
				170.3-172.8 - slightly brecciated.				
				171.7-172.3 - abundant pyrrhotite along fractures, large porphyry concentrations @ 171.3m.				
				173.7m - 2 cm of massive pyrrhotite				
	175.3			175.1-175.3 - 25% pyrrhotite				
175.3			177.3	Andesite Porphyry - matrix medium grey, fine-grained; abundant white feldspar phenocrysts to 1 cm.; most phenocrysts are .5cm or less; slight alignment of phenocrysts; unaltered; low pyrite content; upper contact sharp @ 25° core angle; a few dark coloured foreign clasts; core slightly magnetic; no epidote seen; some hornblende phenocrysts chlortized; lower contact sharp @ 80°.	B-2-18	176	179	
	179.5							
179.5			188.8	Silicated Pyroclastics and Less Silicated Crystal Tuffs				
				Multicoloured with intermixed greys and greens; green probably due to diopside; unit differs from other silicated units in that no garnet was noted; numerous short sections	B-2-19	185.0	188.0	
	Cont'd.							

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				to 10 cm. contain 2% pyrrhotite; pyrrhotite much more abundant than pyrite; low (+) to perhaps moderate pyrite plus pyrrhotite				
			192.8	No epidote seen; minor amounts of chlorite veinlets, a				
			202.2	few gypsum veinlets??; contains several horizons of silicated crystals tuff to 30 cm; crystal tuffs are porphyritic with abundant white feldspar and lesser hornblende? phenocrysts; ~~phenocrysts are very small (< .5cm)~~ a few foreign clasts but not many; no epidote seen; no pyrite veinlets a few pyrrhotite veinlets.	B-2-20	198	201	
				By 195.8m - very little andesitic pyroclastic remaining				
				198.5 - 198.7m - 5% pyrrhotite				
				199.1-199.3m - massive pyrrhotite with minor pyrite,				
			204.6m	slightly vuggy.				
				199.3-199.5m - 1% pyrrhotite				
				202m - blackish colouration along fracture.				
				200.3 - 200.5m - massive porphyry with minor carbonate plus pyrite.				
				200.7m = 2 cm pyrrhotite vein - minor chalcopyrite				
				201.3 - 201.6m - 5% pyrrhotite				
				204.4 - 204.6m - massive pyrrhotite vein at 30°	B-2-21	210	213	
				Note: Still seeing occasional black colouration along some fractures				
	Cont'd.			202.8m - matrix becomes finer grained; occasional grey-				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				ish bleaching along some pyrite veinlets.				
			208.0	208.5m - clasts become much more abundant with clasts				
			213.0	subrounded to 4cm with most less than 2 cm; unit becomes				
				paler in colour; matrix more coarsely grained; see a few				
				pyrite veinlets most of which a thin zone of greyish				
				alteration along side; pyrite veinlets becoming more				
				common but po . still the dominant sulphide; notice				
	217.8			minor amounts of epidote and chlorite.				
217.8				Feldspar Porphyry (barren) - light grey fine-grained	B-2-22	219	222	
				matrix with small white feldspar and hornblende pheno-				
				crysts; pyrite content is moderate (-); sharp upper				
				and lower contacts; lower contact @ 90°; few pyrite veinlets; minor epidote; many hornblende phenocrysts				
	222.4			chloritized.				
222.4			223.8	Silicated Pyroclastic - similar to previous sections of				
				silicated pyroclastics; multicoloured with pale greens				
				predominating; abundant clasts to 5 cm; aphanitic and por-				
				phyritic clasts, pyrite plus pyrrhotite content varies				
				but generally moderate (+) with again short sections with				
				high (++) sulphide; a few pyrite veinlets.				
				224.6 - 225.2m - 2% pyrrhotite and pyrite (predominantly				
				pyrrhotite.				
	Cont'd.			226.7 - 227m - 25% pyrrhotite and pyrite				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.	230.4			227.4-227.6 - 25% pyrrhotite and pyrite.				
230.4				Crystal Tuff - sharp contacts with underlying and overlying units; light grey colouration; abundant small feldspar and hornblende phenocrysts; moderate (+) pyrite disseminated and along fractures; few pyrite veinlets a few foreign clasts in first 1 to 2 meters; some thin zones of greyish bleaching along some veinlets; a few	B-2-23	232	235	
	235.1			bluish quartz veinlets; seemingly only slightly silicated.				
235.1			237.3	Andesitic Pyroclastic - predominantly dark brown in colour with small amounts of greyish altered pyroclastic; some horizons have hornfelsed appearance; clasts quite numerous but smaller than usual (to 1cm); clasts aphanitic and porphyritic; no epidote; minor chlorite veinlets; pyrite				
	241.1			content is low (-); core is slightly magnetic.				
241.1				Silicated Pyroclastic - not strongly silicated; multi-				
	241.4			coloured with dark colours predominating; no epidote seen, minor chlorite.				
241.4				Silicated Crystal Tuff - light greens predominant with some sections dark coloured, not strongly silicated;				
				contains some short horizons of crystal tuffs; clasts of	B-2-24	244	247	
	Cont'd.			crystal tuff also present; pyrite content moderate (+)				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				to high (-); small occasional concentrations of brown garnet (ex. 243.1m); 246.1m - some epidote along veinlet. 241.0m - pyrite veinlets becoming slightly more numerous 248.5m - 2 cm quartz vein with 5% pyrrhotite.				
				Note: by 247.0m noting a few more quartz veins but still few in number; some thin zones of greyish bleaching				
	250.0			(< 1cm) adjacent to many veinlets.				
250.0			257.6	Silicated Pyroclastic - much more strongly silicated; unit is much lighter coloured; again multicoloured with light pale greens and greys predominating; wider zones of greyish bleaching adjacent to veinlets; all types of clasts fine grained pyroclastic clasts to porphyritic clasts very minor epidote; some chlorite veinlets	B-2-25	258.0	261.0m	
			260.3	252.4m - silication seeming increases; short sections (to 20 cm) contain 1% - 5% pyrrhotite with occasional magnetite also associated (ex. 257 cm); several massive pyrrhotite veins to (.5cm) also noted; sections of core have slight brownish tinge; some foreign clasts noted; unit as a whole is quite hard; most of core is slightly magnetic; only minor bleaching adjacent to some veinlets; pyrrhotite seems to be predominantly sulphide but pyrite also present; sulphide content low (+) except for short				
	Cont'd.			horizons of high (++); number of fractures more abundant				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				than usual but noticeably reduced in number after 259.0m.				
				259.0m - still see a few quartz veinlets and pyrite or pyrrhotite veinlets but few in number.				
				264.0 - core very broken up; small structure??				
				264.5 - 3 cm zone of pyrrhotite and pyrite with minor chalcopyrite.				
				264.5-266.0 - unit is dark coloured	B-2-26	270	273	
			**	268.2 - end of NQ core, beginning of BQ core				
				268.5-269.2m - small amounts of light brown garnet.				
				268.5 - amount of greenish tint increases; small amounts of brownish garnet to 274.8m; significant widely scattered				
	274.8			concentrations of pyrrhotite.				
274.8			275.0	Basic Dyke - could be lamprophyrye?; matrix is fine	B-2-27	277	278.5	
			276.1	textured; very dark coloured with very dark browns and dark greens; unit quite soft easily cut by knife; sharp upper contact;				
				274.8-275.9m - very dark brown, fine-grained matrix with numerous plebs to .5cm of white calcite;				
				275.9m - unit becomes dark green and more coarsely grained, pyrite content is low (-) to trace.				
				279.3m - unit again becomes fine grained sharp lower con-				
	279.7			tact.				

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FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
279.7			280.6	Silicated Pyroclastic - strongly silicated; core has pre-	B-2-28	282	285m	
			283.3	dominantly shades of pale green (diopside?); small widely scattered concentrations of very pale brown to yellow brown garnet; short sections (to 20 cm) with high (++) pyrrhotite; no epidote seen; abundant clasts present both fine-grained pyroclastic and porphyritic; unit quite hard; light brown alteration, mineral often associated with high pyrrhotite zones;				
				283.4-283.7m - 5% pyrrhotite; black oxidation mineral present on fracture surfaces.				
				283.7 - 284.4m - 1% pyrrhotite				
				285 - 285.6m - 5% pyrrhotite				
			290.4	290.1 - first appearance of medium dark chocolate brown hornfels; much of hornfels altered to light grey; strongest hornfels continues to 291.6m but smaller zone continues to end of unit.	B-2-29	293	296	
	296.9			292.0m - 2 cm pyrrhotite vein @ 75°				
296.9			297.1	Andesite Porphyry - abundant small white feldspar phenocrysts to 1 cm; definite alignment of phenocrysts @ 65°, matrix fine textured medium grey; small black hornblende? phenocrysts; dark coloured fine grained foreign clasts				
	Cont'd.			of volcanic common but not abundant; core is quite				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 12, 1980 Sheet No. 19

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				magnetic; pyrite content is trace to low (-); no pyrite				
				or pyrrhotite veinlets seemingly unaltered;	B-2-30	300	303	
				299.0m - interesting alignment of feldspar phenocrysts				
				around clast.				
				300.0m - occasional larger phenocrysts to 2 cm. begin				
				appearing; locally some hornblende phenocrysts chloritized.				
				Sharp upper and lower contacts; however, contact @ 45°;				
	303.2			1 cm reaction edge on either contact.				
303.2			307.6	Silicated Pyroclastic - intermixed pale green and light	B-2-31	306	309	
			305.0	grey; short zones of brown hornfels to 306.6m; again				
				characterized by many short zones of high (++) pyrrhotite				
				plus pyrite; most of core quite magnetic; foreign clasts				
				to 3 cm quite common; sulphide content (pyrite plus				
				pyrrhotite) averages L(+) but locally high (++)				
				309.5-311m - 5% pyrrhotite plus pyrite (predominantly				
				pyrrhotite).				
				309.9m-3cm horizon of mudstone?? dark brown; extremely				
				fine grained.				
				311.5m - small amounts of pale brown garnet begins appear-				
				ing.				
				316.2-316.9m - 2% pyrrhotite; abundant pyrrhotite veinlets	B-2-32	318	321	
				316.9-317.9m - 1% pyrrhotite				
				318.1m - small amount of epidote?				
	Cont'd.			318.6-319.1m - 5% pyrrhotite; also pale brown garnet.				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 20, 1980 Sheet No. 20

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				319.6m - 6 cm zone of dark brown mudstone.				
				322 - 322.5 - small structure?? - core very fractured and				
	323.2			vuggy; abundant carbonate infilling and 5% pyrrhotite.				
323.2			325.7	Feldspar Porphyry -(barren)- matrix light grey, fine				
				grained with abundant white feldspar phenocrysts; slight				
				alignment to phenocrysts; far fewer hornblende pheno-				
				crysts of which chloritized; Low (+) to moderate (-)				
				pyrite plus pyrrhotite; a few pyrrhotite veinlets; seem-				
				ingly unaltered; a few thin zones of breccia (ex. 325.7m)				
	327			??; sharp upper and lower contacts.				
327			332	Silicated Pyroclastics -intensity of silication varies;	B-2-33	330	333	
			334.9	where intensely silicated light greens and light greys				
			358.3	predominate otherwise darker greys to browns dominate.				
				327-339.9m - not intensely silicated many sections have				
				darkish brown appearance; clasts fairly abundant; only				
				small amounts of pyrrhotite; core is magnetic; locally				
				short horizons are hornfelsed (ex. 334.9m); only widely				
				scattered small concentrations of brown garnet (approx-				
				imately 1 per meter); very minor amounts of epidote; a				
				few chlorite veinlets; sulphides seem to be primarily				
				pyrite with lesser pyrrhotite; sulphide content moderate				
				(-); some veinlets have thin zones of greyish bleaching				
	Cont'd.			along side;				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 20, 1980 Sheet No. 21

FOOTAGE FROM	TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	FROM	TO	ASSAY
Cont'd.				337.9-339.6m - more intensely silicated; predominantly light pale green to light grey; not many thin horizons of high (++) pyrrhotite plus pyrite; very few sulphide veinlets;				
				335.9m - number of clasts increasing				
				337.9-339.6m - much lighter coloured; with moderate				
	339.9			pyrrhotite plus pyrite.				
339.9			341.0	Dark Brown Siltstone to Mudstone - very fine grained; uppermost part of unit contains abundant clasts to .5cm				
				which grades quickly to fine grained siltstone or mudstone				
	341.4			with depth; unaltered; only trace pyrite.				
341.4				Silicated Pyroclastic - matrix fine grained; intermixed	B-2-34	342	345	
				light grey and pale green; abundant foreign clasts (fine-grained pyroclastic and porphyritic); moderate				
				pyrite plus pyrrhotite predominantly pyrrhotite; short				
				horizons of high (++) pyrrhotite plus pyrite with minor				
				chalcopyrite; occasional concentrations of light brown				
				garnet, core quite magnetic; some greyish bleaching along				
	344.5			some veinlets.				
344.5			345.4	Mudstone - dark brown to very dark grey, very fine grained				
				siltstone to mudstone; some horizons finely laminated; a				
	Cont'd.			few thin horizons 1-2cm of altered pyroclastic?				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 20, 1980 Sheet No. 22

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd	345.5			sharp upper and lower contacts @ 75°.				
345.5				Silicated Pyroclastic - identical to 341.4- 344.5m section	B-2-35	354	357	
				356.2 - 356.5m - 10% pyrrhotite plus black magnetite and carbonate.				
				357-357.6m - porphyritic crystal tuff; abundant small (<<.5m) feldspar phenocrysts; lesser and smaller still black phenocrysts (hornblende?) sharp upper contact @ 60°; silicated.				
				359.4-359.8 - 3% pyrrhotite				
				360.9 - light brown garnet concentration; high (++) pyrrhotite.				
				361.9 - light brwon garnet				
				364.3 - vuggy cavities lined with pyrite crystals	B-2-36	366	369	
				367.6-367.8m - chocolate brown hornfels.				
				369.8 - 10 cm of laminated mudstone; dark brown				
				Note: some minor greyish bleaching along a few veinlets; a few pyrite veinlets; some minor amounts of epidote.	B-2-37	377	380	
			377.0	377.0, 377.5, 378.2m - steel blue metallic mineral in quartz veins.				
				381.7m - 3 cm. of finely laminated dark brown mudstone				
			382.1	382-383 - concentrations of light brown garnet and high (++) pyrite plus pyrrhotite				
	383.1							
383.1				Siltstone to Mudstone - dark brwon to very dark brown;				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 20, 1980 Sheet No. 23

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
	384.5			minor epidote.				
384.5			389.3	Basic Dyke? very dark brown; near black; fine grained				
				matrix; numerous but not abundant white feldspar pheno-				
				crysts; slightly magnetic; pyrite content low (+) to				
	389.7			moderate (-) sharp upper contact; indistinct lower contact				
389.7				Silicated Pyroclastic (lesser silicated Crystal Tuff)	B-2-38	393.2	396.2	
				identical to unit 341.4-344.5m;				
				392.1-393.2 - porphyritic crystal tuff; abundant very				
				small white feldspar phenocrysts (<<.5cm), lesser horn-				
				blende phenocrysts some of which are chloritized.				
			395	393.4-396.7 - patchy sections of dark brown hornfels.				
				348.1-398.8 - silicated crystal tuff; abundant very small				
			410.3	white feldspar phenocrysts.				
			414.0	393-425.7 - abundant clasts; several short horizons to				
			421.9m	20 cm of breccia conglomerate containing abundant				
				angular clasts; locally some short horizons of brown				
				hornfels.				
				400.3-400.8m - 3% pyrrhotite plus pyrite; predominantly				
				pyrrhotite.				
				400.8-404.2m - silicated crystal tuff, a few quartz	B-2-39	401	404	
				veinlets with moly?				
				404.2 - beginning to notice more epidote; most clasts <				
	Cont'd.			1 cm; pyrite content is low (+); very few pyrite veinlets;				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 20, 1980 Sheet No. 24

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
				few chlorite veinlets.				
				409.7m - bluish quartz vein; some localized 10-20 cm zones of whitish bleaching associated with high pyrrhotite zones (ex. 417.0, 418.7m) but few in number.	B-2-40	414	417	
			416.6	416.6 - thin 1 mm veinlet of moly				
			421.6	420.7 - 424.5 - silicated crystal tuff;				
			424.1	abundant very small white feldspar phenocrysts to 2m				
			421.9	(most < 1mm); matrix finegrained (light grey to light green); some thin zones of bleaching along some veinlets; epidote present; only very small amounts of brownish garnet; note more quartz veins; pyrite generally low; disseminated and along fractures with a few short (to 20 cm) of high (++) pyrite plus pyrrhotite (ex. 420.8-421.1 - 25% sulphide) some hairline pyrite-chlorite veinlets.				
				422.4m - unit becomes darker shade of green.				
	424.5			423.5m - zone of hornfels; dark brown.				
424.5			429.0	Feldspar Porphyry (barren) - abundant white feldspar	B-2-41	426	429.0m	
			427.4	phenocrysts; light brown to grey fine grained matrix; sharp upper contact; cut by numerous bluish quartz veins; fairly well developed quartz stockwork; some moly in a				
	Cont'd.			few quartz veins; unit essentially unaltered except for				

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Hole No. 80-2 Logged By D. Gorc Date Sept. 20, 1980 Sheet No. 25

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				quartz veins; only occasional wispy pale green alteration				
				along some veinlets (ex. 427.4m); sulphide content is				
				low (+) with significant amounts of pyrrhotite and minor				
				chalcopyrite (ex. 428.7m).				
				moly in quartz veins - 424.5m, 426.8m, 427.1m most of				
				quartz veins @ 45°-50°				
	431.2			430.5-430.8m - three 1 cm pyrrhotite veins.				
431.2				Silicated Pyroclastic and Lesser Silicated Crystal Tuff				
				431.2-437.0m - unit is multicoloured with intermixed light				
				green, dark green, light brown, dark brown and light grey;				
				medium to dark greens are dominant colours; light grey				
				bleaching adjacent to many veinlets; such zones quite				
				thin (1cm to 10 cm) but a few of such zones to 1 meter;				
				some moly? @ 433.1m; quartz veining reduced but still				
				present.				
			437.2	437-481.5m - Silicated pyroclastic; light to dark greens	B-2-42	438	441	
			441.8	predominantly with lesser amounts of light to dark brown;				
				remnants of dark brown unaltered pyroclastic quite common;				
				remnants of dark brown hornfels also noted; short sections				
				to 20 cm contain high (++) pyrrhotite plus pyrite (pre-				
				dominantly pyrrhotite) with minor chalcopyrite; some				
				light brown garnet also noted; a few pyrite-pyrrhotite				
	Cont'd.			veinlets seen in high sulphide zones; occasional very thin				

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Hole No. 80-2 Logged By D. Gorc Date Oct. 10, 1980 Sheet No. 26

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
				zones of greyish bleaching adjacent to some veinlets;				
			455.2	rock as whole is quite hard; average sulphide content is	B-2-43	450	453	
				only Low (+); a few pyrite-chlorite veinlets seen but not				
				abundant; only very minor amounts of epidote seen; foreign				
				clasts numerous but not overly abundant; boundaries to				
				clasts quite blurred, only a few porphyritic clasts.				
				438.7 - moly along quartz veins.				
				451.0 - some moly in quartz vein				
				451.0 - number of clasts noticeably diminish				
				452.8-453.5 - 10% pyrrhotite plus porphyry; minor chalco-				
				pyrite; nearby small amounts of garnet	B-2-44	462	465	
				461.3-461.5 - small stockwork of quartz veins				
				463.0m - until predominantly darker green				
				467.0m - more abundant small concentrations of garnet begin				
				appearing				
			468.9	468.9m - epidote appearing with garnet				
				471.5m - zone of brownish garnet ends.				
				moly in quartz veins 471.3m, 471.7m	B-2-45	474	477	
			474.4	474.2- 474.7m - bleached to dirty white; cream coloured				
				alteration mineral present; small amounts of galena?				
	481.6			479.4 - quartz vein with moly?				
481.6				Feldspar Porphyry (barren) ; sharp contacts; slight chilled	B-2-46	481	483.1	
				zone with smaller phenocrysts on upper contact; contacts				
	Contd.			@ 30°; cut by many quartz veins; almost quartz stockwork;				

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Hole No. 80-2 Logged By D. Gorc Date Oct. 11, 1980 Sheet No. 27

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				a few with moly; some minor whitish bleaching alongside;				
				matrix light grey to light greenish grey; abundant white				
	483.1			feldspar phenocrysts; lesser hornblende phenocrysts;				
483.1				Silicated Pyroclastic - identical to rock before above				
				dyke; very few clasts moly in quartz veins @ 483.3, 483.7				
	486.5			484.2				
486.5			487.7	Feldspar Porphyry (barren) light grey to light brownish	B-2-47	487	490	
			490.2	grey matrix; abundant white feldspar phenocrysts and				
				lesser hornblende phenocrysts; partially altered with				
				many sections having blurred obscure texture; pyrite				
				content is low to low (-); most of core is slightly				
				magnetic; unit cut by many quartz veinlets (bluish and				
				white); a few veinlets contain moly; some sections have				
				fractured appearance; short sections to 1 meter are badly				
				broken up; moly in quartz veins 489.0, 490.5, 491.8, 493.0	B-2-48	498	501	
				494.2-501 - altered feldspar porphyry; medium grey colour;				
				obscure texture; moly in quartz veins 494.8, 495.6, 499.5				
				494.9-495.8 - core badly broken up, much core lost.				
				510.9 - fault - 5 cm of clay	B-2-49	511	514	
			511.5	510.9-515.1 - fault gouge; unit is soft; seemingly				
				altered to kaolinite; multicoloured with dirty white to				
				pale green predominating with lesser dark green; some sec-				
	Cont'd.			tions quite vuggy; sulphide content is low; unit is slightly				

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Hole No. 80-2 Logged By D. Gorc Date Oct. 11, 1980 Sheet No. 28

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				magnetic				
			529.8	515.1 530.1 - Silicated pyroclastics - very few clasts;				
			518.4	strongly silicated with pale to medium greens predominating				
				(diopside?); some horizons have a finer grained matrix				
				than usual; locally such horizons are finely banded; locally				
				a few hornfels remnants are present to 30 cm (ex. 519.2m)				
				but not many of these zones; core is slightly magnetic;				
				sulphide content is low (-) to low; on a few scattered				
				small concentrations of pyrrhotite; no garnet noted.				
				515.1-517.9 - intermixed breccia and quite fine grained				
				silicated pyroclastic; sections of breccia no longer than				
				20 cm; nine such sections; some whitish zones of bleading				
				adjacent to some veinlets; a few concentrations of				
				pyrrhotite.				
			527.4	517.9-530.1 - silicated pyroclastics with lesser silicated	B-2-50	518	521	
				crystal tuffs; pyroclastics finer grained than usual;				
				crystal tuff horizons <2 m; generally such horizons are				
				dark brown with abundant very small phenocrysts of white				
				feldspar (<< .5cm) (ex. 522.7-524.3m; 526.5-528.1m); pyrite				
				content of tuffs is still low but may be slightly higher				
				than surrounding pyroclastics.				
				528.8m - increased number of pyrrhotite blebs				
	530.1			529.9m - some thin banding for 5 cm; some chlorite veinlets.				

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Hole No. 80-2 Logged By D. Corc Date Oct. 11, 1980 Sheet No. 29

FOOTAGE FROM	TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	FROM	TO	ASSAY
530.1				Altered Basic Dyke - 5 cm of fine grained chilled contact				
				zone with few phenocrysts on upper and lower contact; no				
				adjacent reaction in surrounding rock except for 2 cm				
				of bleaching next to lower contact seemingly altered;				
				unit is soft; matrix is medium grey and fine textured;				
				feldspar phenocrysts are light apple green (epidote??),				
				pyrite content is low; no pyrrhotite seen; upper contact				
	531.1			@80°; lower contact @ 55°				
531.1			533.5	Silicated Pyroclastic - matrix very fine grained; could				
			533.9	almost be classed as fine grained tuff; very few large	B-2-51	534	537	
				clasts; however some horizons contain noticeable numbers				
				of very small clasts (<<.5cm); dark to light greens dominate				
				with lesser light to dark brown; sulphide content low;				
				with few sulphide veinlets; core is slightly magnetic.				
				539.2-539.8 - very brecciated containing abundant calcite				
				and quartz infilling (539.4-539.5), 539.6m - 1 cm thick				
	540.4			pyrrhotite veins.				
540.4			540.4	Basic Dyke- very dark brown in colour with peculiar and				
				distinctive small, feathery white crystals; no chill zone				
	541.4			on upper contact; 20 cm chill zone on lower contact.				
541.4				Silicated Pyroclastic - predominately light green to	B-2-52	543	546	
	Cont'd.			medium grey; intermixed colouration; matrix still quite				

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Hole No. 80-2 Logged By D. Gorc Date Oct. 11, 1980 Sheet No. 30

FOOTAGE FROM	FOOTAGE TO	% RECOVERY	Specimen	DESCRIPTION AND REMARKS	SAMPLE NO.	SAMPLE FROM	SAMPLE TO	ASSAY
Cont'd.				fine grained but more numerous clasts; clasts to 1 cm; no				
				garnet or epidote seen; after 543.2m unit is somewhat				
				fractured but not intensely so; slightly more greyish				
	547.3			bleaching in more fractured zones; pyrite content is low.				
547.3				Feldspar Porphyry (barren) - matrix light grey	B-2-53	548	550	
				with abundant large white feldspar phenocrysts; low pyrite;				
				essentially unaltered; core is magnetic; few veinlets of				
				any kind, many hornblende phenocrysts are chloritized.				
				End of Hole 551.7m (1810')				

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PROPERTY Dennis Gorc

HOLE No. 80-2 LOGGED BY D. Gorc DATE Sept. 8, 1980 SHEET No. 1

INTERSECTION, meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
0	5.5m	overburden	/	/	/	/	/	/	
5.5	18.6	Andesitic Pyroclastic	5.5	/	.1	11.9	.1	Mod.(+)	essentially unaltered with small zones of greyish alteration to .7m but generally much thinner; also very thin zones of greyish to light greenish bleaching alongside many veinlets; rock is quite hard; 10.4m-alteration envelopes to veinlets getting thicker (to 1cm.) and more numerous.
18.6	23.5	Andesitic Pyroclastic	8.6	/	2.2	95	8	High	quite intensely altered with many remnants
23.5	28.2	Andesitic Pyroclastic	4.0	/	0.4	25	2	Mod.(+) locally High	again a few zones of greyish alteration to .8 cm. in addition to thin 1 cm. zones of greyish bleaching adjacent to veinlets; altered zones separated by unaltered rock
28.2	32.2	Andesitic Pyroclastic	3.0	/	.5	.5	/	Mod.(+) Low(+) locally	unaltered except for thin (.5cm) greyish bleaching along some veinlets
32.2	44.9	Andesitic Pyroclastic	3.0	/	.4	40	2	Mod.(+) locally High in altered zones	some very thin zones of bleaching (.1cm) adjacent to some veinlets; also a few thicker zones to 10 cm.; a few veinlets have 2 cm. of greyish alteration adjacent.
44.9	48.4	Feldspar Porphyry (barren)	4.5	/	/	/	/	Mod.	unaltered

J. R. WOODCOCK CONSULTANTS LTD. PROPERTY Ball Creek

HOLE No. 80-2 LOGGED BY D. Gorc DATE Sept. 9, 1980 SHEET No. 2

INTERSECTION,			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
484	56.1	Altered	5.3	/	.3	100	5	High	Most of rock altered but alteration seemingly
		Pyroclastic							not intense; much original texture still
		(53.3-56.1m)							decipherable.
		Andesitic				/	/	High	essentially unaltered with minor bleaching
		Pyroclastic							along veinlets
56.1	60.9	Altered	10.2	/	/	100	9	High	complete greyish alteration
		Pyroclastic							(dolomite-diopside?); rock very fractured
									with abundant carbonate veining; epidote
									pyrite still present but in lesser amounts
60.9	65.6	Andesitic	12.9	/	/	?	1	High(-)	seemingly not altered; some thin zones
		Pyroclastic							likely slightly altered; some short horizons
		and							of dark brown hornfles
		Altered							
		Pyroclastic							
65.6	76.1	Altered	6.5	/	11.4	100	9	High(-)	strongly altered, some of original texture
		Feldspar							visible but very blurred; alteration generally
		Porphyry							so intense that original texture obliterated;
									unit is relatively soft; abundant quartz
									veining; sericite?? alteration
76.1	84.0	Altered	9.1	0.3	1.5	100	9	High	strongly altered; greyish (dolomite-diopside??)
		Pyroclastic							alteration
84.0	95.1	Andesitic	6.0	0.4	1.4	10	.1	Mod.(-)	To 88.6m - many thin zones of alteration;
		Pyroclastic							patchy irregular alteration; some thin zones
									(.5cm) of alteration adjacent to some veinlets.

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HOLE No. 80-2 LOGGED BY D. Gorc DATE Spet. 9, 10, 1980 SHEET No. 3

INTERSECTION Meters FROM	TO	ROCK TYPE	CARB. VEINLETS No./m	QUARTZ VEINLETS WHITE No./m	QUARTZ VEINLETS BLUISH No./m	ALTERATION BANDS cm/m	INTENSITY OF ALTERATION (1 to 10)	PYRITE (Low to High)	COMMENTS
									after 88.6m - minimal alteration consisting
									of very thin bleached zones next to some
									veinlets and a few sections to 1 meter with
									partial alteration.
95.1	99.0	Altered	7.7	/	/	100	9	Low (+)	intensely altered by (dolomite-diopside?)
		Pyroclastic							alteration, unit is fairly soft.
99.0	127.1	(99.0-104.4m)	9.2	0.25	/	12.4	.1	Low (+)	99.0-104.4m - seemingly unaltered except for
		Andesitic							some occasional very thin bleaching adjacent
		Pyroclastic							to some veinlets; unit may be ever so slightly
									altered; some silification adjacent to some
									veinlets
		104.4m-110.4)				100	8	Mod.(+)	somewhat silicated small amounts of garnet
		Silicated							and pyrrhotite; multicoloured-greens plus
		Pyroclastic							browns; seemingly not intensely silicated
		110.4-127.1m				100	8		strongly altered.
		Altered							
		Pyroclastic							
127.1	133.6	Altered	2.0	/	/	100	9.5	Low(+)	alteration intensifies; characterized by
		Pyroclastic						locally	many short (10-20cm) zones of high sulphide
								High(+)	(pyrrhotite and pyrite) up to 15% sulphide
133.6	139.3	Andesitic	4.9	0.5	.2	/	/	Low (+)	unaltered with some very minor bleaching along
		Pyroclastic							some veinlets.

J. R. WOODCOCK CONSULTANTS LTD. PROPERTY Ball Creek

HOLE No. 80-2 LOGGED BY D. Gorc DATE Sept. 12, 1980 SHEET No. 4

INTERSECTION, Meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
139.3	145.3	Andesitic Pyroclastic	0.8	0.3	/	/	/	Mod.(-) to Mod.	unaltered with minor bleaching along some veinlets; slightly increased pyrite content; slightly more greyish colouration suggest perhaps slight alteration
145.3	175.3	Andesitic Pyroclastic and Silicated Pyroclastic	2.4	0.3	/	28.3	3	Low(+)to Mod.(-)	To 168.3m - only short zones of silicated rock to .7m; altered zones separated by essentially unaltered rock.
									After 168.3 - essentially completely silicated; abundant diopside-type green; local concentration (to 25%) of pyrrhotite; generally slightly brecciated.
175.3	179.5	Andesite Porphyry	0.2	/	/	/	/	Low (+) Mod.(-)	unaltered
179.5	188.4	Silicated Pyroclastic (lesser silicated crystal tuff)	.2	/	/	100	9	Low (+) locally High(++)	strongly silicated; much of rock has diopside green colour; no garnet noted; many short horizons (to 20cm) of abundant pyrrhotite (10%) and lesser pyrite.
188.4	189.5	Silicated Crystal Tuff	1.6	0.3	/	100	9	Low(+)to Low	strongly silicated; greenish tint to rocks; continued local concentrations of pyrrhotite and lesser pyrite; thin zones of greyish

J. R. WOODCOCK CONSULTANTS LTD. PROPERTY Ball Creek

HOLE No. 80-2 LOGGED BY D. Gorc DATE Sept. 12, 1980 SHEET No. 5

INTERSECTION, Meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
									bleaching adjacent to some veinlets
189.5	217.8	Silicated Pyroclastic (lesser silicated crystal tuff)	0.8	0.5	/	100	9	Mod. (-)	same as 188.4 - 189.5m
217.8	222.4	Feldspar Porphyry (barren)	/	0.2	/	/	/	Mod. (-)	unaltered
222.4	230.4	Silicated Pyroclastic	0.3	0.4	/	/	/	Mod. (+)	strongly silicated; predominantly greenish tints; local pyrrhotite concentration
230.4	235.1	Crystal Tuff	0.6	0.6	0.4	/	/	Mod. (+)	only very slightly silicated;
235.1	241.4	Andesitic Pyroclastic	1.4	0.2	/	/	/	Mod. (+)	essentially unaltered;
241.4	252.4	Silicated Pyroclastic and Silicated Crystal Tuff	2.0	1.0	/	100			strongly silicated, multicoloured with greens main colour; some greyish bleaching adjacent to some veinlets.
252.4	274.8	Silicated Pyroclastic	1.1	0.4	/	100	9	Low (+) locally	silication intensifies; more pale diopside greens; widely scattered small concentrations of

J. R. WOODCOCK CONSULTANTS LTD. PROPERTY Ball Creek

HOLE No. 80-2 LOGGED BY D. Gorc DATE Sept. 12, 1980 SHEET No. 6

INTERSECTION, Meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
								High(++)	brown garnet; many short horizons of abundant pyrrhotite; rock is hard
274.8	279.7	Basic Dyke	4.3	/	/	/	/	Low(-) to tr.	unaltered?; rock quite soft.
279.7	296.9	Silicated Pyroclastic	1.1	0.2	/	100	9	Low(+) locally High(++)	similar to unit 252.4-274.8m lighter brown garnet? found in addition darker brown garnet.
296.9	303.2	Andesite Porphyry	0.6	/	/	/	/	tr. to Low(-)	unaltered; little pyrite; no pyrrhotite?
303.2	323.2	Silicated Pyroclastic	0.4	0.4	/	100	9	Low (+) locally High(++)	strongly silicated; abundant diopside green; widely scattered brown garnet; local concentrations of pyrrhotite; some greyish bleaching along veinlets
323.2	327	Feldspar Porphyry (barren)	/	/	/	/	/	Low(+) to Mod. (-)	unaltered
327.0	339.9	Silicated Pyroclastic	0.8	/	/	100	6	Mod.(-)	note that intensely silicate; many unaltered remnants; local concentrations of brown garnet; few short zones of high (++) sulphide; pyrite predominant sulphide.
339.9	341.4	Mudstone	0.7	/	/	/	/	tr.	unaltered.
341.4	404.2	Silicated Pyroclastic (minor mudstone)	0.6	0.2	/	100	9	Mod.	strongly silicated; some minor greyish bleaching adjacent to some veinlets; garnet and pyrrhotite concentrations common; mudstone unaltered; 389.7m silication becoming patchy with many unaltered

J. R. WOODCOCK CONSULTANTS LTD. PROPERTY Ball Creek

HOLE No. 80-2 LOGGED BY D. Gorc DATE Sept. 20, 1980 SHEET No. 7

INTERSECTION, Meters			CARB. VEINLETS	QUARTZ VEINLETS		ALTER-ATION BANDS	INTENSITY OF ALTERATION	PYRITE	COMMENTS
FROM	TO	ROCK TYPE	No./m	WHITE No./m	BLUISH No./m	cm/m	(1 to 10)	(Low to High)	
404.2	420.7	Silicated	2.9	1.4	0.5	100	9	Low(+)	strongly silicated; noticing more epidote;
		Pyroclastic							some minor bleaching along veinlets.
420.7	424.5	Silicated	1.8	3.2	/	100	9	Low	strongly silicated; only very small amounts
		Crystal						locally	
		Tuff						High	of garnet; a few high pyrrhotite zones; a
									few unaltered remnants after 423.5m.
424.5	431.2	Feldspar	/	0.6	15.0	/	/	Low(+)	essentially unaltered; some wispy thin
		Porphyry							zones of pale green alteration along some
		(barren)							veinlets .
431.2	437.0	Silicated	3.4	1.8	0.2	100	7	Low (+)	Strongly but not intensely silicated; dark
		Crystal Tuff							greens and browns; some light grey bleaching
									to 1 meter; most bleached zones (1cm to 10cm)
437.0	486.5	Silicated	0.5	1.7	1.5	90.0	6	Low (+)	remnants of essentially unaltered pyroclastic
		pyroclastic							quite common; most of unit quite strongly
		and							silicated; small amounts of garnet; a few
		silicated							short horizons of abundant pyrrhotite;
		crystal							
		tuff							
		(481.6-483.1)							feldspar porphyry dyke is unaltered.
		Feldspar							
		Porphyry							
		(barren)							
486.5	494.2	Feldspar	1.9	0.4	3.4	/	/	Low(-)to Low	essentially unaltered; a few short sections
		Porphyry							(to .5m) fractured; such zones could be
		(barren)							slightly altered

J. R. WOODCOCK CONSULTANTS LTD. PROPERTY Ball Creek

HOLE No. 80-2 LOGGED BY D. Gorc DATE Sept. 20, 1980 SHEET No. 8

INTERSECTION FROM	TO	ROCK TYPE	CARB. VEINLETS No./m	QUARTZ VEINLETS WHITE No./m	QUARTZ VEINLETS BLUISH No./m	ALTERATION BANDS cm/m	INTENSITY OF ALTERATION (1 to 10)	PYRITE (Low to High)	COMMENTS
494.2	501	Altered	2.9	0.4	3.4	100	2	Low(-)to	seemingly slightly altered; most of texture
		Feldspar						Low	blurred and obscure; rock is softer than
		Porphyry							usual.
501.0	510.9	Feldspar	5.1	/	3.1	/	/	Low (-)	essentially unaltered
		Porphyry							
		(barren)							
510.9	515.1	Fault	3.0?	/	2.4	100	10	Low (-)	intense clay alteration; very soft.
		Gouge							
515.1	517.9	Intermixed	1.0	21	/	100	9	Low	strongly silicated; no garnet; a few small
		Breccia and							concentrations of pyrrhotite.
		Silicated							
		Pyroclastic							
517.9	530.1	Silicated	1.2	0.2	/	90	7	Low	not strongly silicated; many horizons
		Pyroclastic							unaltered to only slightly silicated.
		and silicated							
		crystal							
		tuff							
530.1	531.1	Basic Dyke	/	/	/	?	?	Low	altered?; soft
531.1	547.3	Silicated	0.9	0.7	/	100	9	Low	strongly silicated; no garnet noted;
		Pyroclastic							somewhat fractured; some minor greyish
									bleaching adjacent to some veinlets;
		Basic Dyke							basic dyke is altered??
		(540.4-541.4m)							
547.3	End of Hole	Feldspar Porphyry (barren)	1.7	0.3	/	/	/	Low	unaltered; some chloritized hornblende phenocrysts

APPENDIX IV

COST SUMMARIES

Summary A includes costs for all phases of 1980 and 1981 work.

Summary D includes costs of staking and examining Ball Claims on South Fork. This is deducted from totals for purposes of assessment work re Ball claim groups 1, 2 and 3

Those items marked with a + sign are used in estimating total applicable costs of $275,290.79.

BALL CREEK - PERSONNEL TIME SUMMARY

January 1980-January 1981

Date	J. R. Woodcock Time (Days)	J. R. Woodcock $	E. McCallum Time (Hours)	E. McCallum $	D. Gorc Time (Days)	D. Gorc $	P. Stanneck Time (Days)	P. Stanneck $	P. Gawthrop Time (Days)	P. Gawthrop $	S. Robinson Time (Days)	S. Robinson $
Aug. 31-Sept. 13					15	2700.00					15	1215.00
Sept. 1-2	1/2											
Sept. 5-13	10 3/4											
Sept. 17-25	1 2/3											
	12 11/12	5166.66										
Invoiced $9081.66												
Sept. 14-27					14						14	
Sept. 28-Oct. 11					11	4500.00					14	2268.00
Sept. 28-Oct. 14	2											
Oct. 15-19	5											
Oct. 20-22	1/2											
	7 1/2	3000.00										
Invoiced $9768.00												
Oct. 12-25					15						15	
Oct. 26-Nov. 8					8 1/2	2430.00					2	1377.00
Invoiced $3807.00												
Nov. 9-22					5	900.00						
Oct. 23-Nov. 29	2 1/2	1000.00										
July-Nov. 3			18 1/2	185.00								
Invoiced $2085.00												
Nov. 23-Dec. 6					10	1800.00						
Dec. 1-26	4 1/4											
Dec. 12	1	2100.00										
Invoiced $3900.00												
Correction Inv. #59-80						1800.00						
Dec. 7-20					8							
Jan. 4-17			9 1/2		10							
18-31			21 1/2	310.00	9	4860.00						
Jan. 1-31	7 3/4	3100.00										
Not yet invoiced $10,070.00		14,366.66	49 1/2	495.00	105 1/2	18,990.00					60	4860.00
Totals page 1		15,604.00	12	120.00	61 1/2	10,921.50	20	2,880.00	65	5,166.00	12	864.00
Total page 1 and 2	74.93	$ 29,970.66		$ 615.00		$29,911.50		$2,880.00		$5,166.00		$5,724.00

Source - Invoices to G.R.C. Resources

BALL CREEK PERSONNEL TIME SUMMARY

January 1980-January 1981

Date	J. R. Woodcock Time Days	J. R. Woodcock $	E. McCallum Time Hours	E. McCallum $	D. Gore Time Days	D. Gore $	P. Stanneck Time Days	P. Stanneck $	P. Gawthrop Time Days	P. Gawthrop $	S. Robinson Time Days	S. Robinson $
Dec. 20-21	1/6											
Jan. 1-Feb. 2	3											
Feb. 3-26	2½											
Feb. 27-Mar. 21	1/6											
Apr. 7 - May 8	1/2											
	6.3⅓	2536.00										
Dec. 19-May 20			12	120.00								
Invoiced $2656.00												
June 22-July 5					5½	841.50	12	1728.00	10	720.00		
May 9-June 10	3/4											
June 11-30	3											
	3 3/4	1500.00										
Invoiced $4789.50												
July 6-19					14				14			
July 20-Aug. 2					14	5040.00			14	2016.00		
July 2	2/3											
July 3-12	9½											
July 14-17	3½											
July 25-29	1⅓											
Aug. 4-11	8											
	23.17	9268.00										
Invoiced $16324.00												
July 6-19							8	1152.00				
Aug. 3-16					14				14			
Aug. 17-30					14	5040.00			13	2430.00	12	864.00
Aug. 12-31	5											
Aug. 18	3/4	2300.00										
Invoiced $11786.00		15,604.00	12	120.00	61½	10,921.50	20	2,880.00	65	5,166.00	12	864.00

Cont'd.

Summary D

Costs for South Fork Mapping and Staking

Date	D. Gorc Time Days	D. Gorc $	P. Gwthrop Time Days	P. Gwthrop $	S. Robinson Time Days	S. Robinson $	J. R. Woodcock Time Days	J. R. Woodcock $	Helicopter $
Aug. 18	1/4	45.00	1/4	18.00					
Aug. 21-22	2	360.00	2	144.00	2	144.00			
Aug. 24			1	72.00	1	72.00			
Sept. 11							1	400.00	
Aug. 21 - Vancouver Is.									750.00
Aug. 21 - Northern Mtn.									470.00
Aug. 22 - Northern Mtn.									566.00
Aug. 24 - Northern Mtn.									566.00
Sept. 11 - Shirley Hel.									470.00 838.44
Total of Summary D		405.00		234.00		216.00		400.00	3660.44

Summary C

COSTS FOR NORTH SIDE MAPPING

Dates	D. Gorc		P. Gawthrop		S. Robinson		J. R. Woodcock		Helicopter
	Time Days	$	Time Days	$	Time Days	$	Time Days	$	$
July 11-16	6	1080.00	6	432.00					
July 11-Vancouver Is.									1080.00
July 16-Vancouver Is.									1188.00
Sept. 24 - Shirley Hel.									739.80
Sept. 25 - Shirley Hel.									641.16
Total of Summary C		1080.00		432.00					3648.96

Summary B

COSTS - RE BALL MAPPING (SOUTH SIDE)

	D. Gorc		P. Gawthrop		S. Robinson		J. R. Woodcock		Helicopter
	Time Days	$	Time Days	$	Time Days	$	Time Days	$	$
July 4, 7, 8, 10, 25, 26, 28, Aug. 5, 8, 27, 29, 30, Sept. 1, 3, 14, 15, 17 24, 26, 30, Oct. 17	21	3780.00							
July 4, 7, 8, 10, Aug. 8, Sept. 6, 7, 10, Oct. 17							9	3600.00	
July 10, 25, 26, 28, Aug. 5, 8			6	432.00					
Aug. 29, 30, Sept. 1, 3, 14, 15, 17, 24, 26, 30, Oct. 17					11	873.00			
July 4 - Frontier									1041.60
July 7 - Vancouver Is.									2102.50
July 10- Vancouver Is.									1404.00
Total of Summary B		3780.00		432.00		873.00		3600.00	4548.10

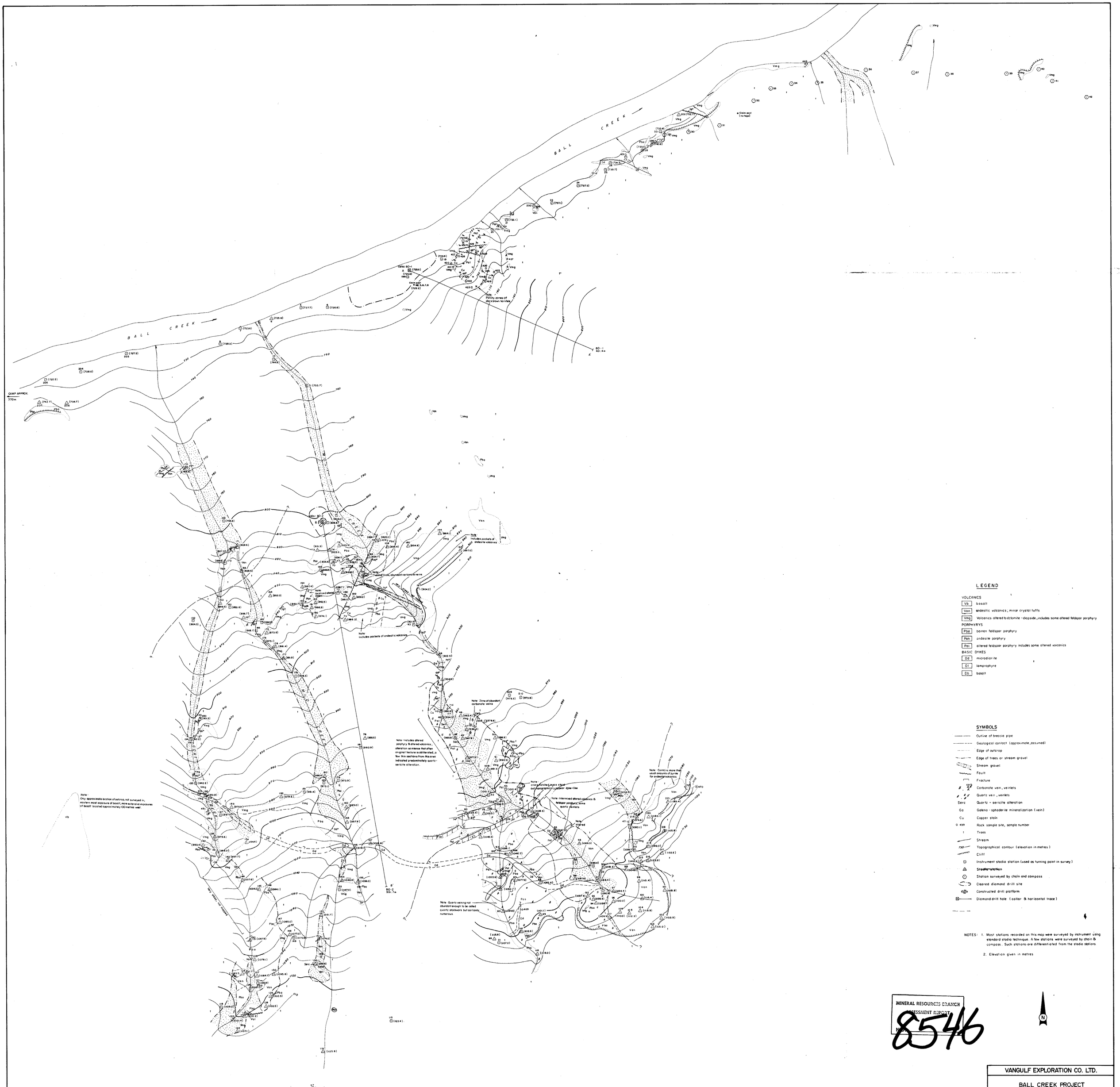
Summary A

TOTAL COSTS - BALL CREEK PROJECT (1980, 19

(Excluding Summary D - Costs for South Fork)

* F. Chong - Draughting Service

Inv. Date	Total $	1 Drilling	2 Fees & Wages	3 Helicopter	4 Food, Meals, Accom.	5 Travel Air	6 Transportation (Gas, Truck)	7 Freight & Haulage	8 Equipment Rentals	9 Supplies (Camp)	10 Chemical Analyses	11 Map Reproduction, etc.	12 Claim Costs	13 Misc.
Not yet invoiced	$1731.36		* 380.00		100.80			1003.00	(17.00)	(21.06)	134.75	101.10		49.77
Jan. 20/81	2715.61		* 420.00	51.42	67.20		382.30	224.63		1396.35	100.15	73.56		
Dec. 17/80	7215.45					810.05			6016.50	12.64	238.00	98.42		39.84
Dec. 4/80	110.80			(603.00)	42.65	95.05	571.82	70.21		55.90	243.01			(364.84)
Dec. 14/80	10334.60				1954.87		188.12	1292.19		6899.42				
Nov. 14/80	1654.16				678.16		976.00						4100.00	
Nov. 14/80	5254.23				134.58	359.50	95.52	86.91	48.00		293.50			136.22
Nov. 3/80	21319.34			18382.76		117.84	610.42			241.10				2017.22
Oct. 22/80	10461.56				4195.97	430.45	1546.40	2397.45	325.00	540.32	908.46			117.51
Oct. 14/80	34014.52			30551.32			1307.60				2155.60			
Sept. 30/80	2531.65			632.88		223.00	29.00		104.00	127.33	68.00		75.00	1272.44
Sept. 11/80	7717.20		* 35.00	468.93	1078.02	553.96	733.00	237.30	117.85	196.48	503.40	72.49	3365.00	355.77
Aug. 14/80	1602.24		* 100.00		91.86		1124.26	8.90	51.00	17.89		94.61		113.72
July 25/80	4089.87				817.99	39.00	133.20	300.00	904.80	1617.58	104.00	168.42		4.88
May 20/80	1226.80		* 185.00								222.10	770.28		49.42
	$ 111,979.39													
Personnel Time Summary (see separate sheet)			74,267.16											
Sources for above - J. R. Woodcock's invoices to G. R. C. Resources			75,387.16	49,434.31	9162.10	2628.85	7697.64 ✓	5620.59	7550.15	11,083.95	4970.97	1378.88	7540.00	3791.95
Helicopter paid by G. R. C.				12,222.50										
Total Drilling paid by G. R. C.		115,879.41												
Less Meals		(4,594.00)			4594.00									
Less Payments made by J. R. Woodcock Cons. for Lyons Drillers		(12,483.79)												
Total Costs		98,801.62	75,387.16	61,656.81	13,756.10 ✓	2628.85 ✓	7697.64 ✓	5620.59	7550.15	11,083.95	4970.97	1378.88	7540.00	3791.95
Less Summary D			(1,255.00)	(3,660.44)										
CHARGES TO BALL 1,2,3 ASSESSMENT		98,801.62	74,132.16 ✓	57,996.37	13,756.10 ✓	2628.85	7697.64	5620.59	7550.15 ✓	11,083.95	4970.97	1378.88	7540.00	3791.95



LEGEND

VOLCANICS

- Vb — basalt
- Van — andesitic volcanics; minor crystal tuffs
- Vmg — Volcanics altered to dolomite - diopside, includes some altered feldspar porphyry

PORPHYRYS

- Pbo — barren feldspar porphyry
- Pan — andesite porphyry
- Pai — altered feldspar porphyry includes some altered volcanics

BASIC DYKES

- Dd — microdiorite
- Dl — lamprophyre
- Db — basalt

SYMBOLS

- Outline of breccia pipe
- Geological contact (approximate, assumed)
- Edge of outcrop
- Edge of trees or stream gravel
- Stream gravel
- Fault
- Fracture
- Carbonate vein, veinlets
- Quartz vein, veinlets
- Serc — Quartz - sericite alteration
- Ga — Galena - sphalerite mineralization (vein)
- Cu — Copper stain
- 0 459 — Rock sample site, sample number
- Trees
- Stream
- 750 — Topographical contour (elevation in metres)
- Cliff
- Instrument stadia station (used as turning point in survey)
- Stadia station
- Station surveyed by chain and compass
- Cleared diamond drill site
- Constructed drill platform
- Diamond drill hole (collar & horizontal trace)

NOTES: 1. Most stations recorded on this map were surveyed by instrument using standard stadia technique. A few stations were surveyed by chain & compass. Such stations are differentiated from the stadia stations.

2. Elevation given in metres

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

GEOLOGY OF BALL CREEK TARGET

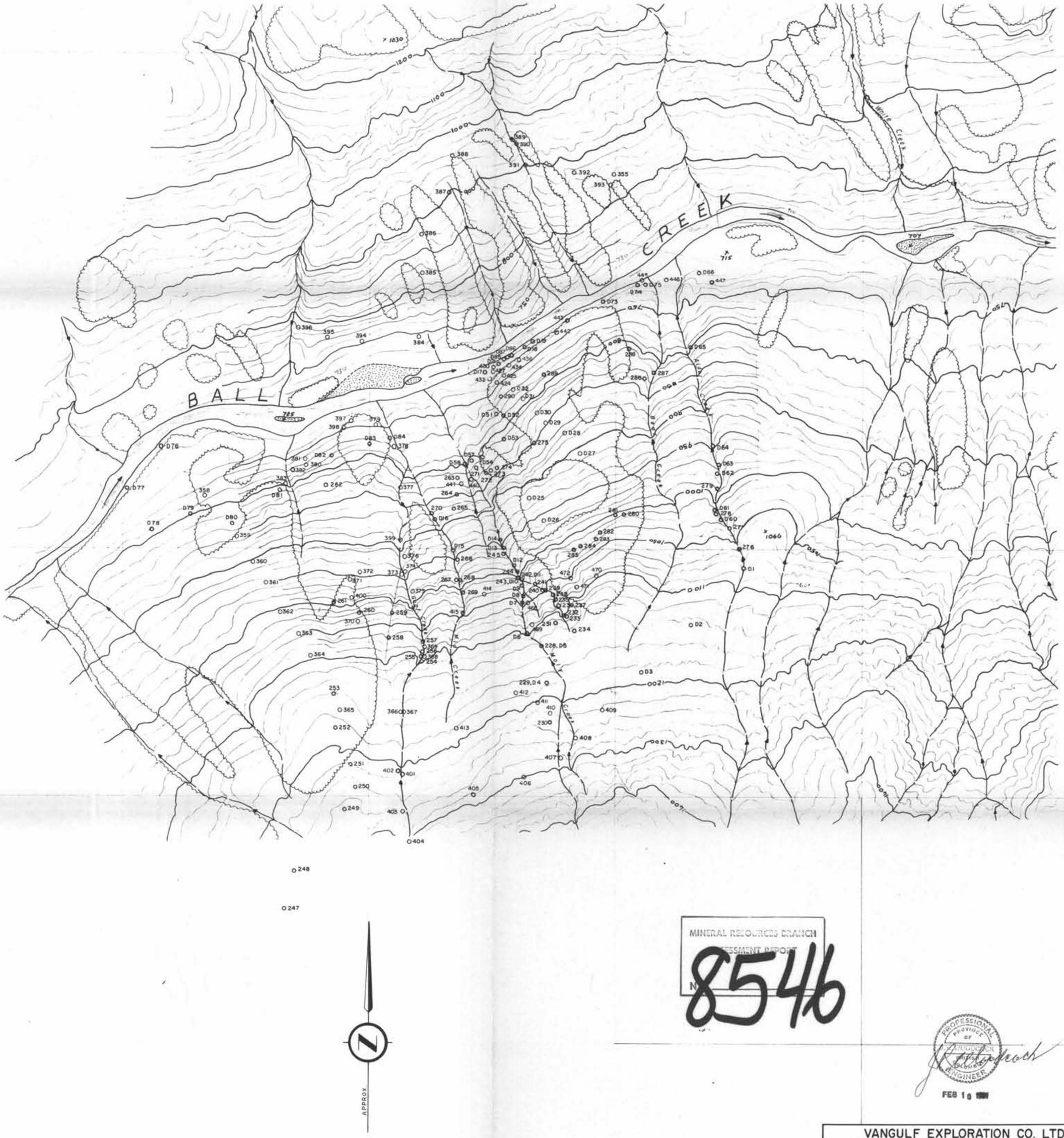
LIARD M.D., B.C.

SCALE 1:1000

0 60 metres

J.R. WOODCOCK CONSULTANTS LTD.

JANUARY 1981 FIGURE NO. 4



NOTE: Base map by Integrated Resources Photography Ltd.
Contour interval 10m., 20m.

There are two series of sample numbers on this map. They are the D80, G80 series. The sample numbers in each series have been abbreviated.
e.g. D80-25 to D25
G80-248 to 248
D1-D24, D33-D87 are samples taken in 1979

VANGULF EXPLORATION CO. LTD.

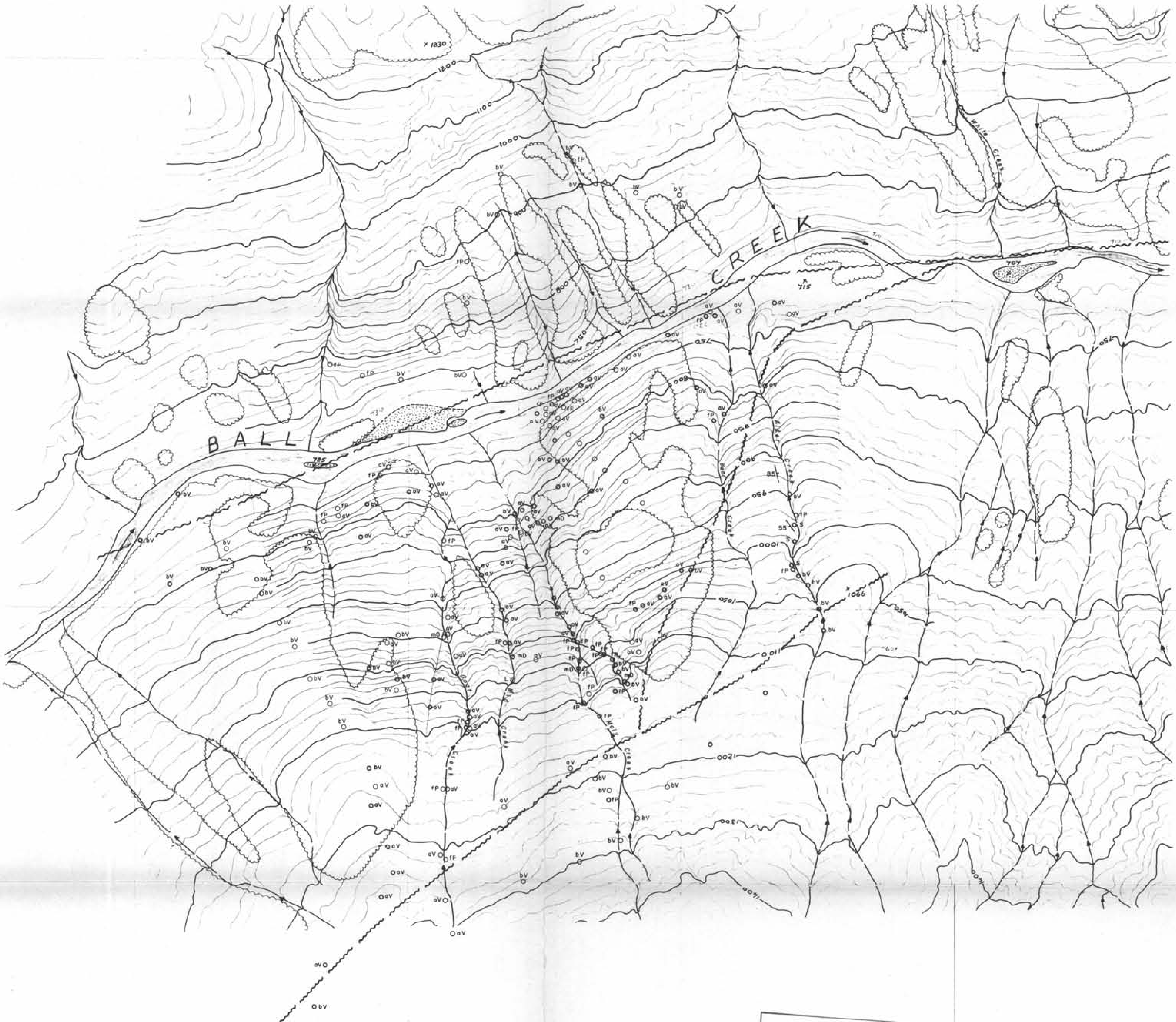
BALL CREEK PROJECT
NTS 104G/8W

SAMPLE NUMBERS

SCALE 1:5000
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 5



APPROX

LEGEND

fP	Feldspar Porphyry
bV	Basic Volcanics (Basalt and pyroclastics)
aV	Altered Volcanics
mD	Microdiorite
L	Lamprophyre
S	Sedimentary rocks

Fault

Linear

o Sample location

NOTE: Base map by Integrated Resources Photography Ltd.
Contour interval 10 m., 20 m.

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT
NTS 104G/8W

ROCK TYPES

SCALE 1:5000

0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 6

LEGEND

H - High
M - Moderate
L - Low
T - Trace
N - Nil

NOTE : Base map by Integrated Resources Photography Ltd.
Contour interval 10m., 20m.

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT
NTS 104G/8W

PYRITE ESTIMATES

SCALE 1:5000
0 100 200 300 400metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 7

LEGEND

- 0 - 3 ppm
- 4 - 6 "
- 7 - 12 "
- 13 - 25 "
- 25 - 50 "
- > 50 "

APPROX

NOTE : Base map by Integrated Resources Photography Ltd.
Contour interval 10m., 20m.

J.R. Woodcock
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA ENGINEER

FEB 10 1981

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT
NTS 104G/8W

Mo GEOCHEMISTRY

SCALE 1:5000

0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 8

APPROX

LEGEND

- 0 - 75 ppm
- 76 - 150 "
- 151 - 300 "
- 301 - 600 "
- 601 - 1200 "
- > 1200 "

NOTE: Base map by Integrated Resources Photography Ltd.
Contour interval 10 m., 20 m.

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT
NTS 104G/8W

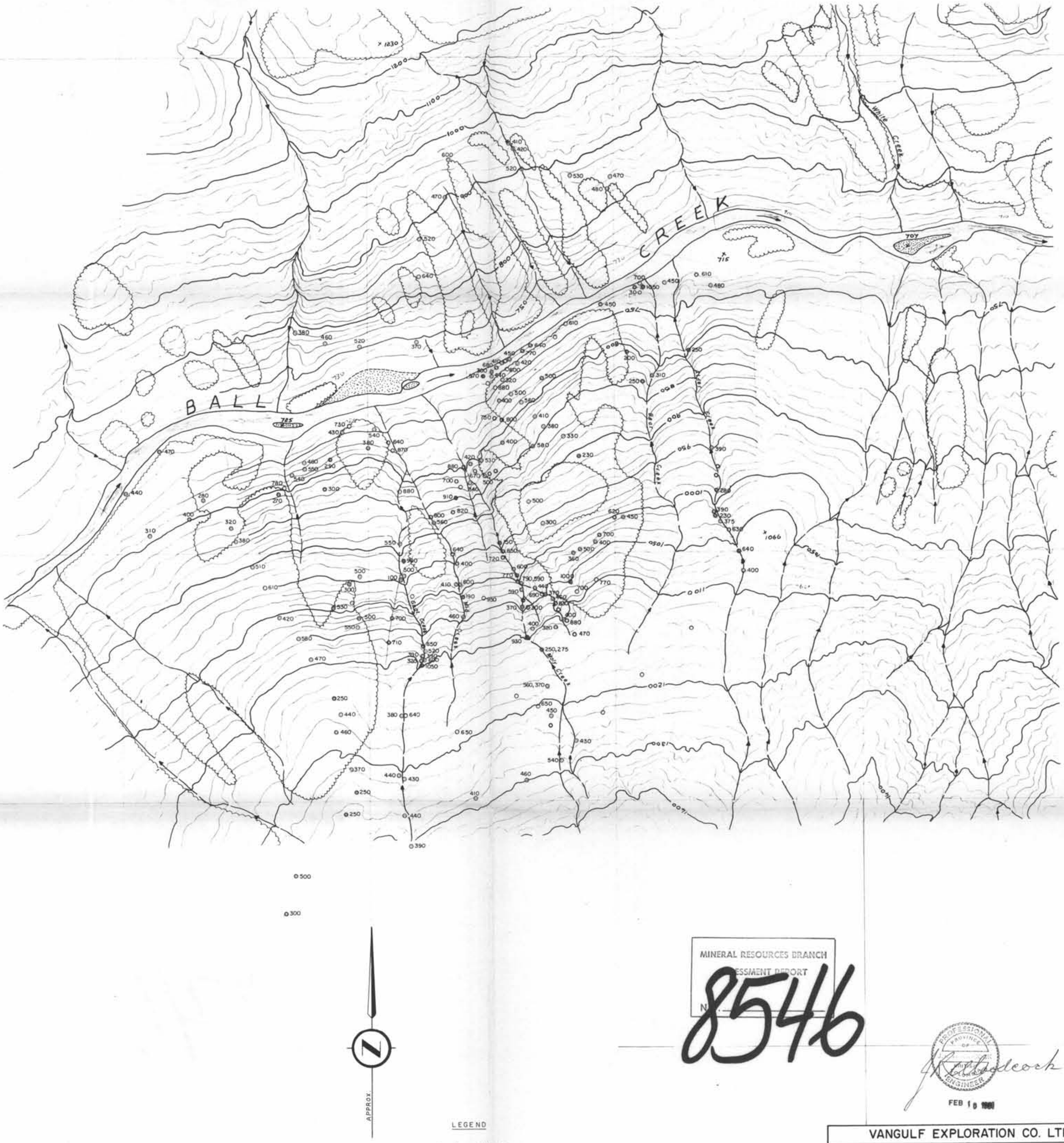
Cu GEOCHEMISTRY

SCALE 1:5000

0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 9



LEGEND

- 0 – 300 ppm
- 301 – 600 "
- 601 – 900 "
- 901 – 1200 "
- >1200 "

NOTE : Base map by Integrated Resources Photography Ltd.
Contour interval 10m., 20m.

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BALL CREEK PROJECT
NTS 104G/8W

F GEOCHEMISTRY

SCALE 1:5000

0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 10

0845

0900

APPROX

LEGEND

o	0	-	500 ppm
o	501	-	1000 "
o	1001	-	1500 "
o	1501	-	2000 "
o	2001	-	2500 "
o		> 2500	"

NOTE : Base map by Integrated Resources Photography Ltd.
Contour interval 10m., 20m.

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J. R. WOODCOCK
BRITISH COLUMBIA ENGINEER

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BALL CREEK PROJECT
NTS 104G/8W

Mn GEOCHEMISTRY

SCALE 1:5000

0 100 200 300 400metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 11

LEGEND

- 0 – 15 ppm
- 16 – 30 "
- 31 – 60 "
- 61 – 120 "
- 121 – 240 "
- > 240 "

NOTE : Base map by Integrated Resources Photography Ltd.
Contour interval 10m., 20m.

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BALL CREEK PROJECT
NTS 104G/8W

Pb GEOCHEMISTRY

SCALE 1:5000

0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

JULY 1980 FIGURE Nº. 12

LEGEND

- 0 - 75 ppm
- 76 - 150 "
- 151 - 300 "
- 301 - 600 "
- 601 - 1200 "
- > 1200 "

NOTE : Base map by Integrated Resources Photography Ltd.
Contour interval 10 m., 20 m

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BALL CREEK PROJECT
NTS 104G/8W

Zn GEOCHEMISTRY

SCALE 1:5000

0 100 200 300 400 metres

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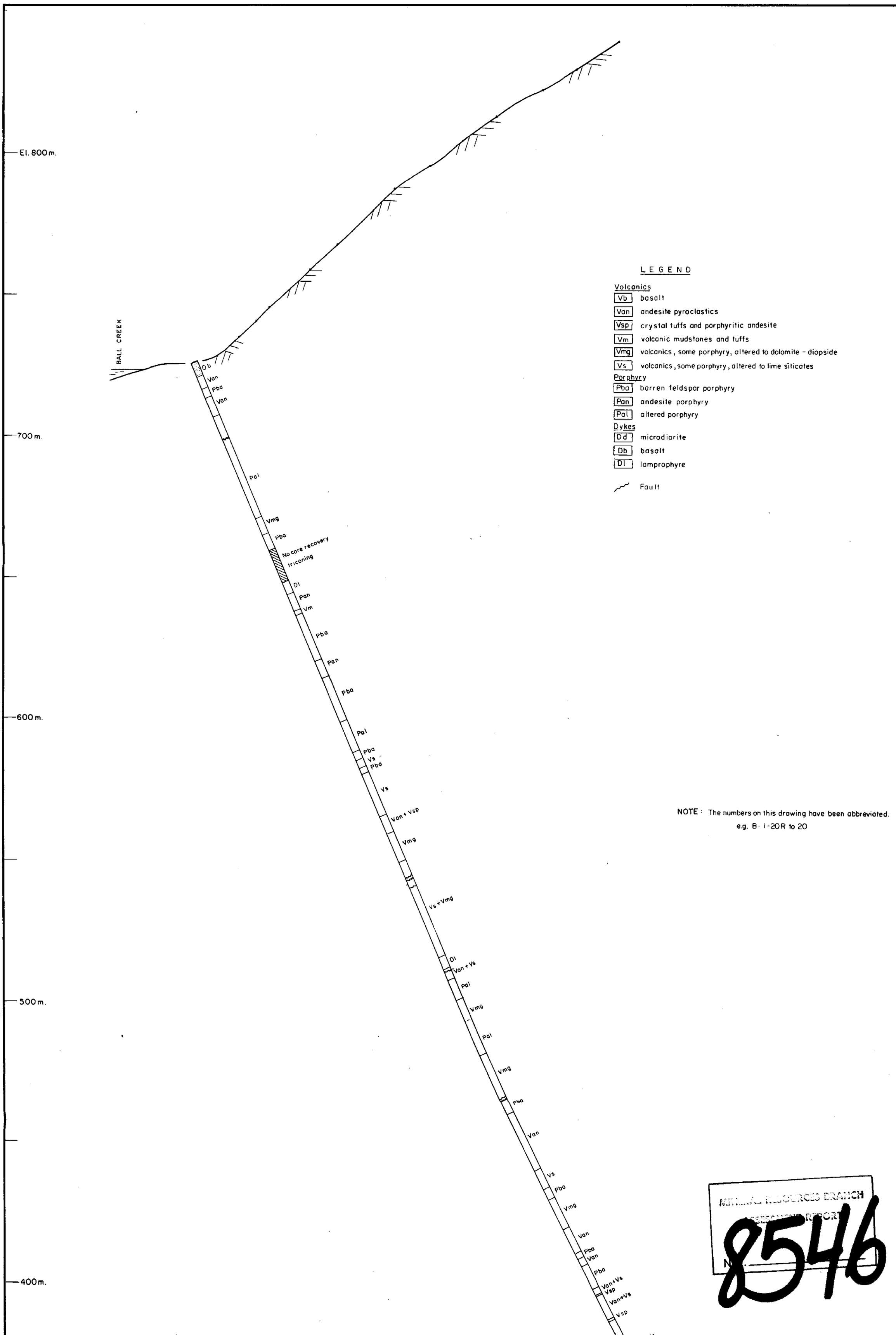
JULY 1980 FIGURE Nº. 13



LEGEND

Volcanics

- Vb basalt
- Van andesite pyroclastics
- Vsp crystal tuffs and porphyritic andesite
- Vm volcanic mudstones and tuffs
- Vmg volcanics, some porphyry, altered to dolomite - diopside
- Vs volcanics, some porphyry, altered to lime silicates

Porphyry

- Pba barren feldspar porphyry
- Pan andesite porphyry
- Pal altered porphyry

Dykes

- Dd microdiorite
- Db basalt
- Dl lamprophyre

Fault

NOTE : The numbers on this drawing have been abbreviated.
e.g. B - 1 - 20R to 20

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

GEOLOGY

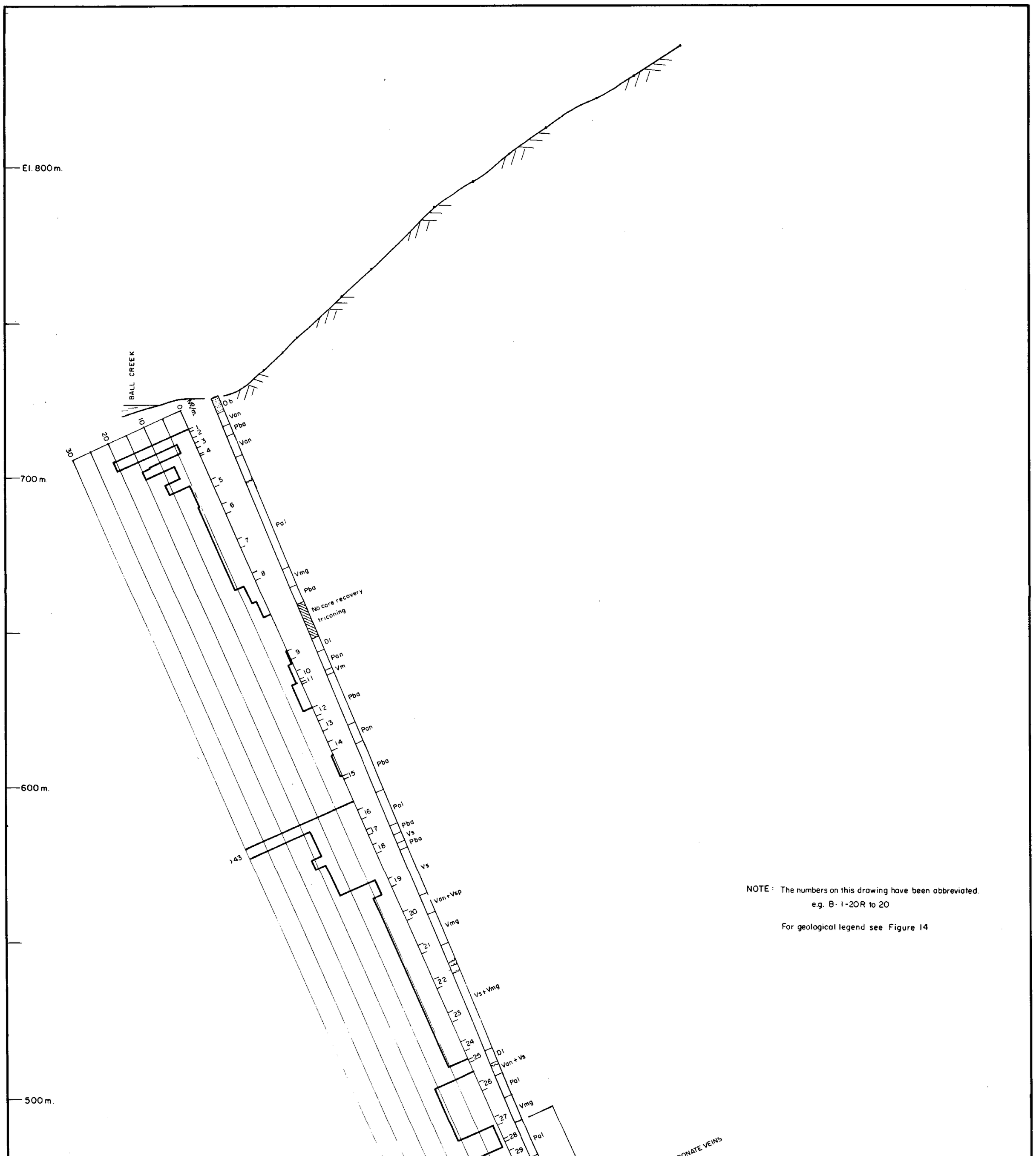
DRILL HOLE 80-1
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 — 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 14



NOTE : The numbers on this drawing have been abbreviated.
e.g. B-1-20R to 20

For geological legend see Figure 14

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VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

QUARTZ VEINLETS

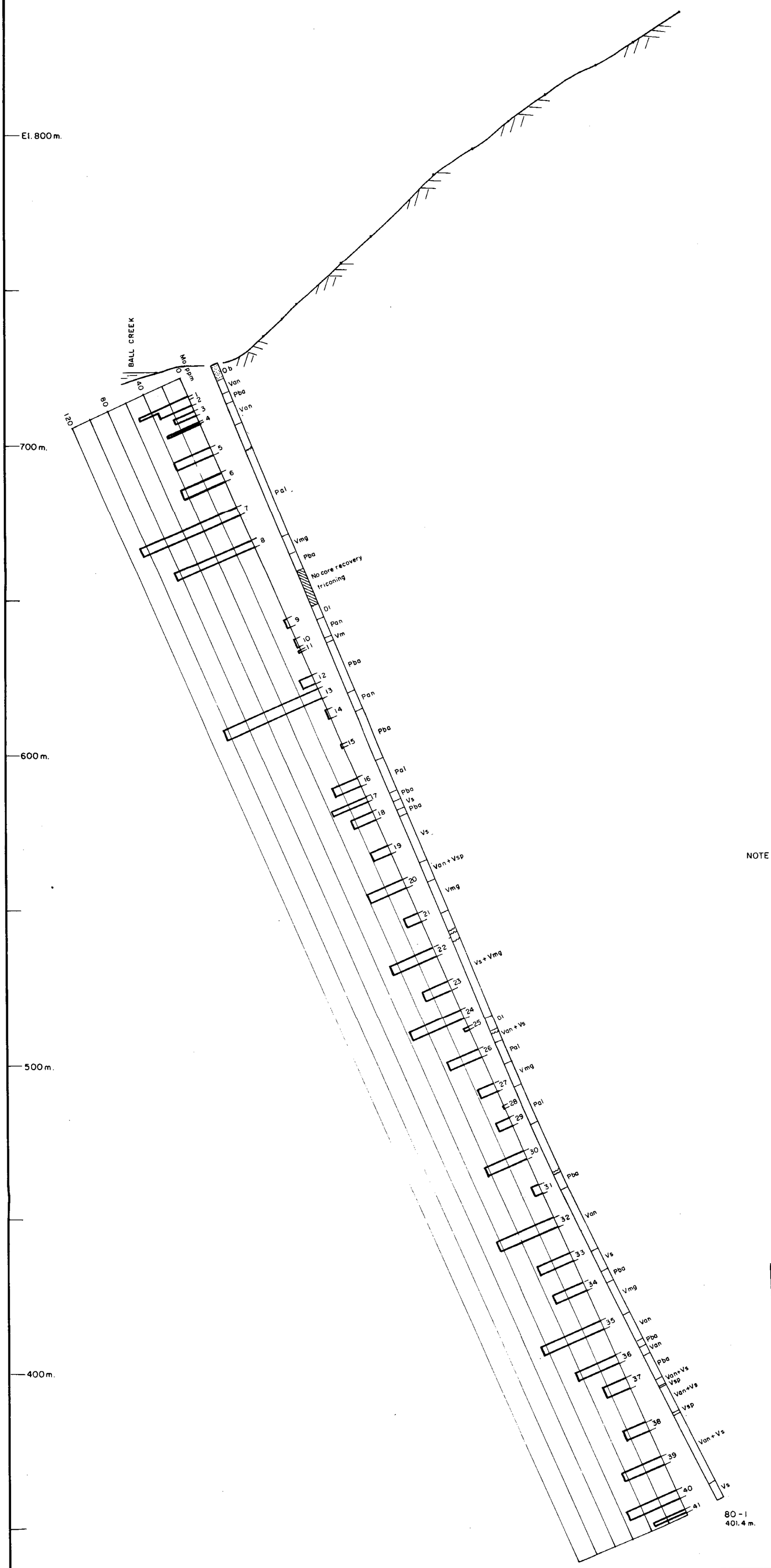
DRILL HOLE 80-1
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 15



NOTE : The numbers on this drawing have been abbreviated.
e.g. B - 1-20R to 20

For geological legend see Figure 14

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BALL CREEK PROJECT

Mo GEOCHEMISTRY

DRILL HOLE 80-1

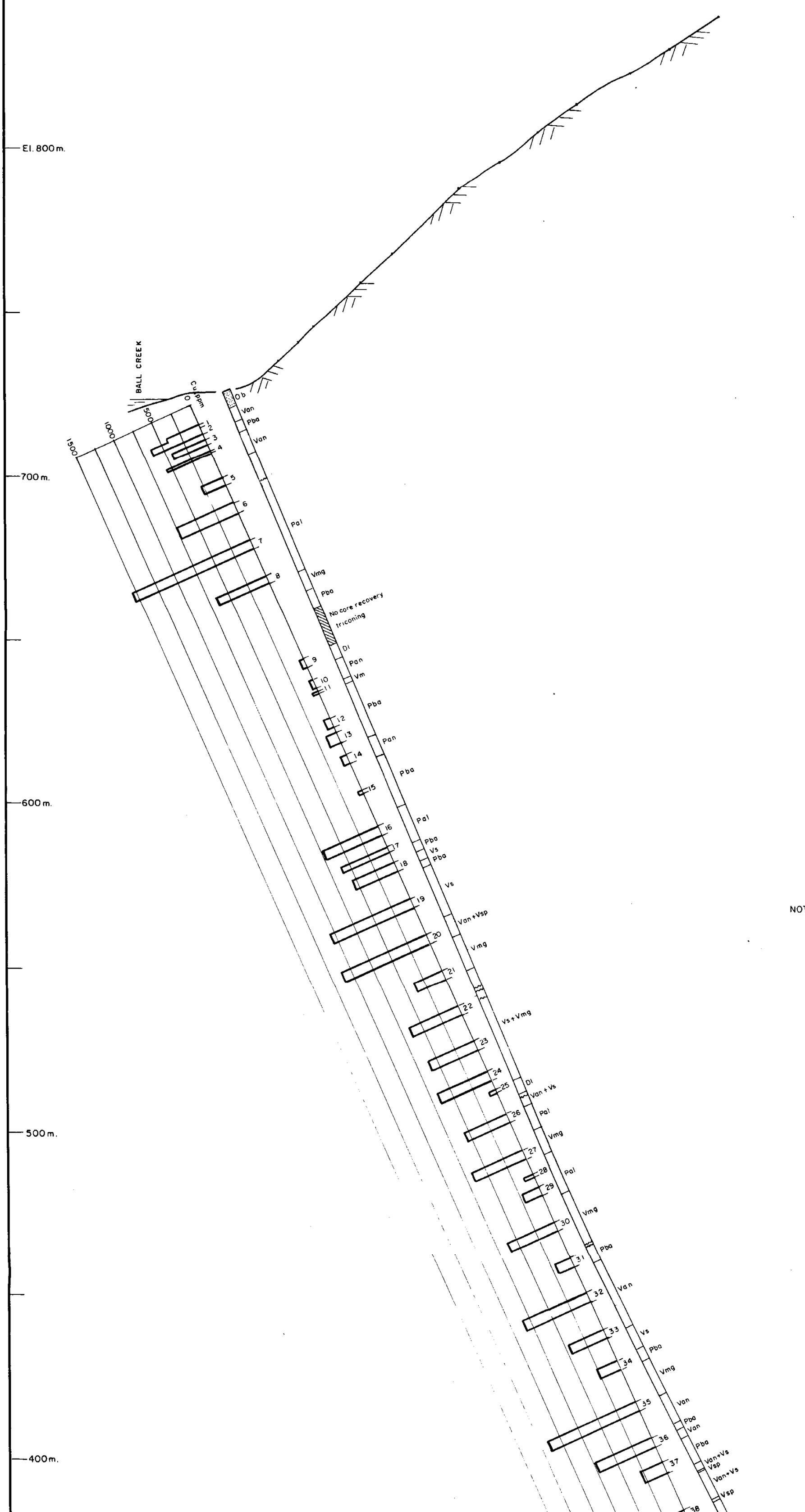
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 — 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 — FIGURE Nº. 16



NOTE : The numbers on this drawing have been abbreviated.
e.g. B 1-20R to 20

For geological legend see Figure 14

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

Cu GEOCHEMISTRY

DRILL HOLE 80-1

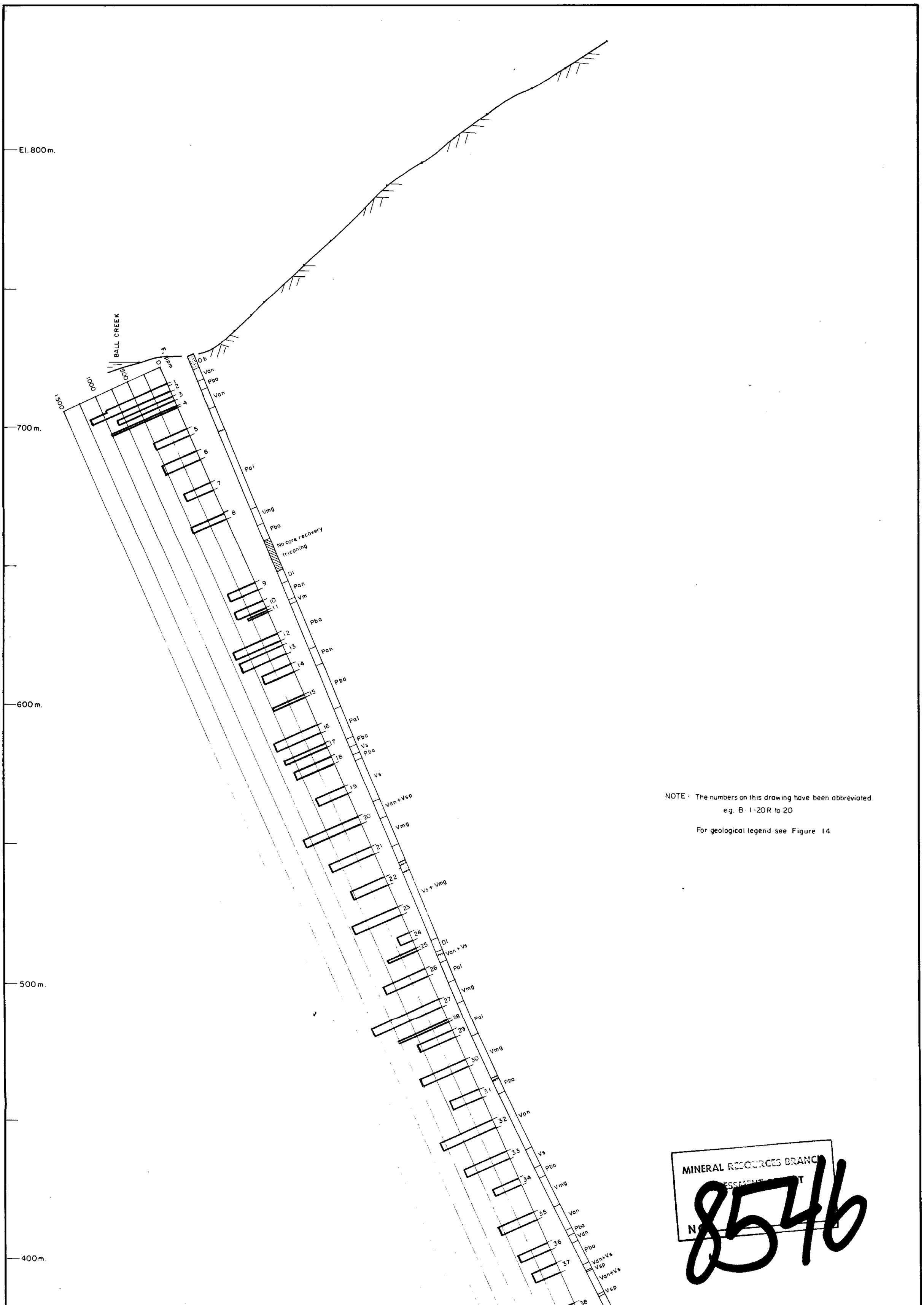
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 17



NOTE : The numbers on this drawing have been abbreviated.
e.g. B-1-20R to 20

For geological legend see Figure 14

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

F GEOCHEMISTRY

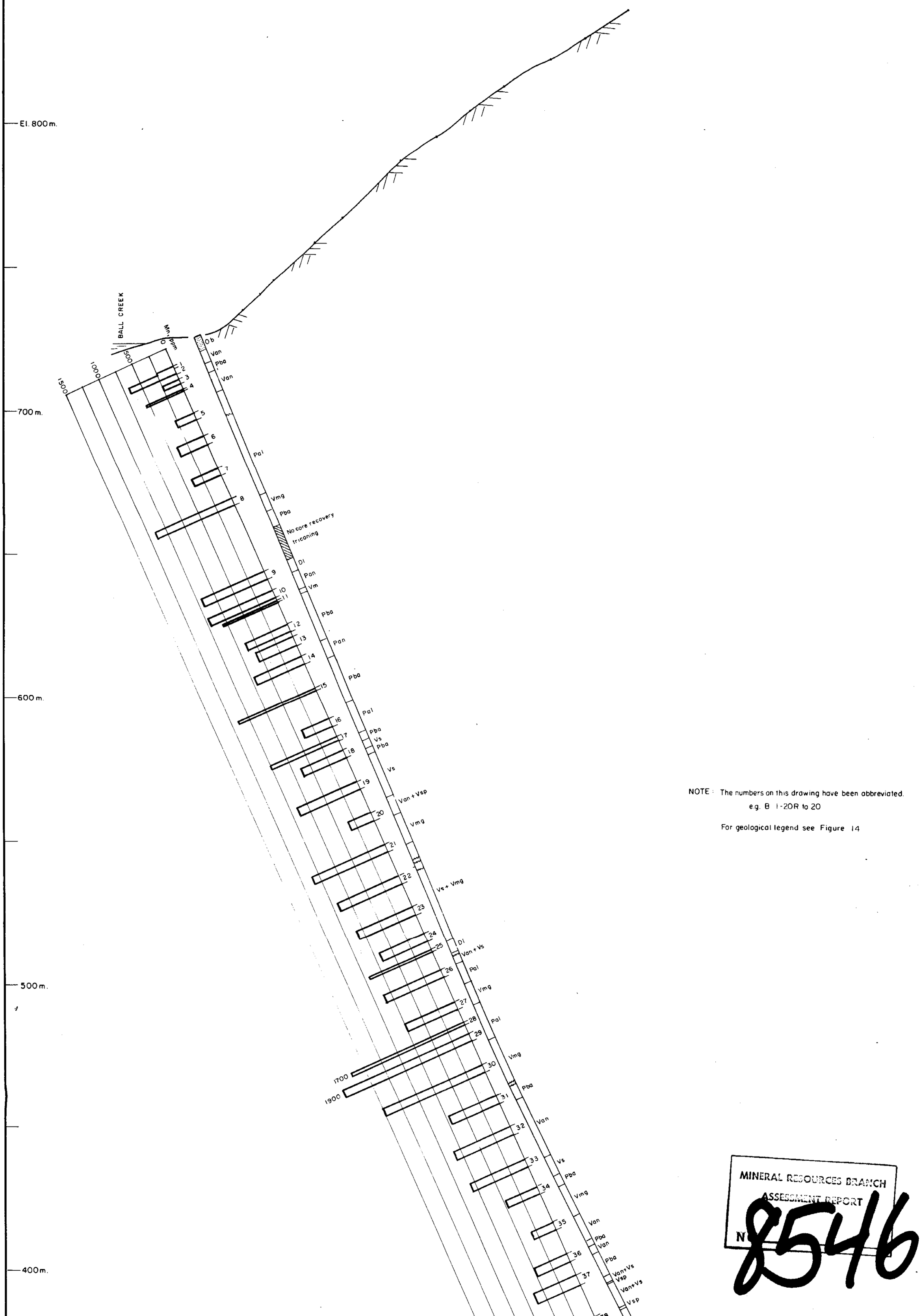
DRILL HOLE 80-1
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 — 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 — FIGURE Nº. 18



NOTE : The numbers on this drawing have been abbreviated.
e.g. B 1-20R to 20

For geological legend see Figure 14

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BALL CREEK PROJECT

Mn GEOCHEMISTRY

DRILL HOLE 80-1

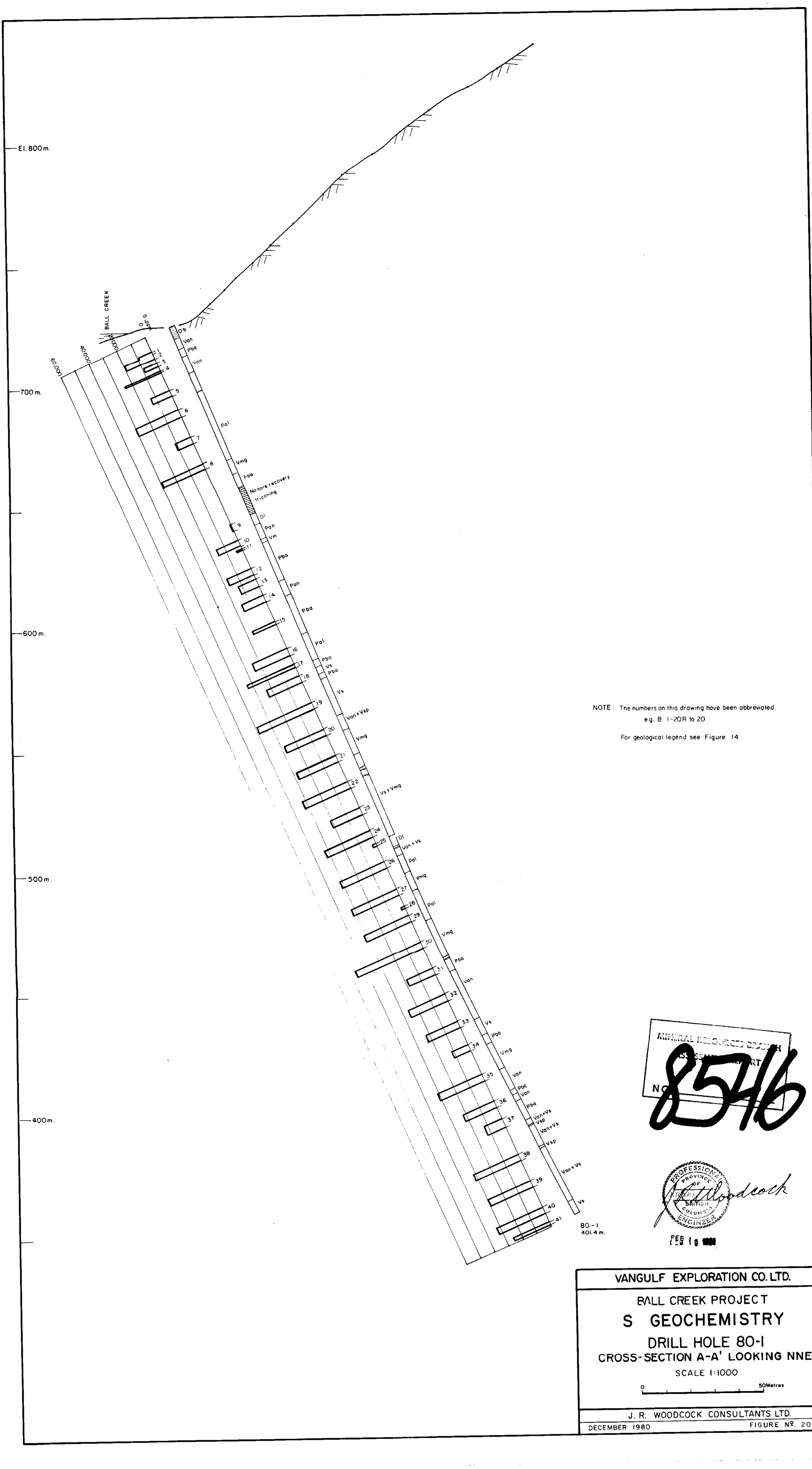
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 50Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 19



NOTE : The numbers on this drawing have been abbreviated.
e.g. B 1-20R to 20

For geological legend see Figure 14

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BALL CREEK PROJECT

S GEOCHEMISTRY

DRILL HOLE 80-1

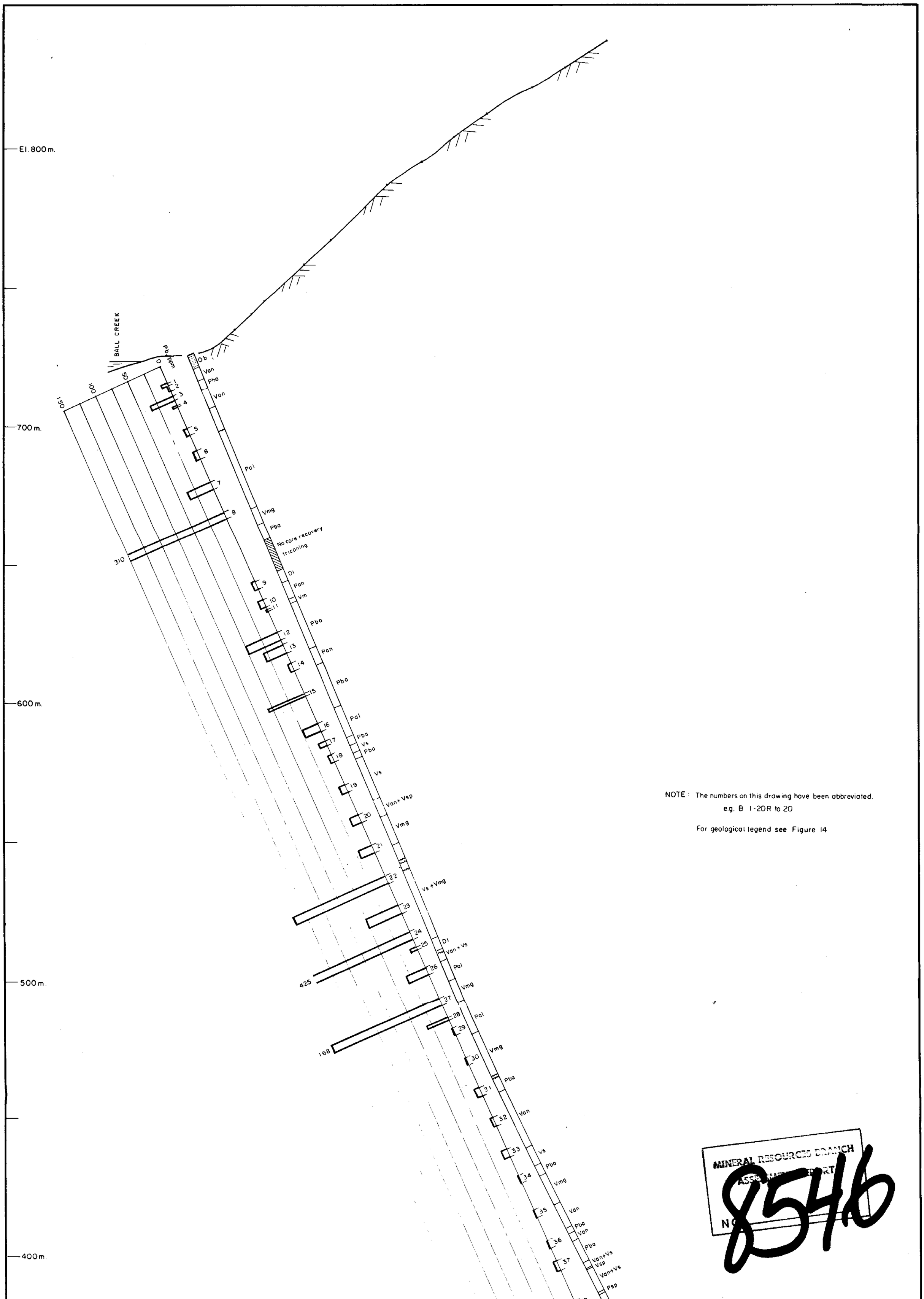
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 20



NOTE : The numbers on this drawing have been abbreviated.
e.g. B 1-20R to 20

For geological legend see Figure 14

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BALL CREEK PROJECT

Pb GEOCHEMISTRY

DRILL HOLE 80-1
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 21

NOTE : The numbers on this drawing have been abbreviated.
e.g. B 1-20R to 20

For geological legend see Figure 14

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BALL CREEK PROJECT

Zn GEOCHEMISTRY

DRILL HOLE 80-1

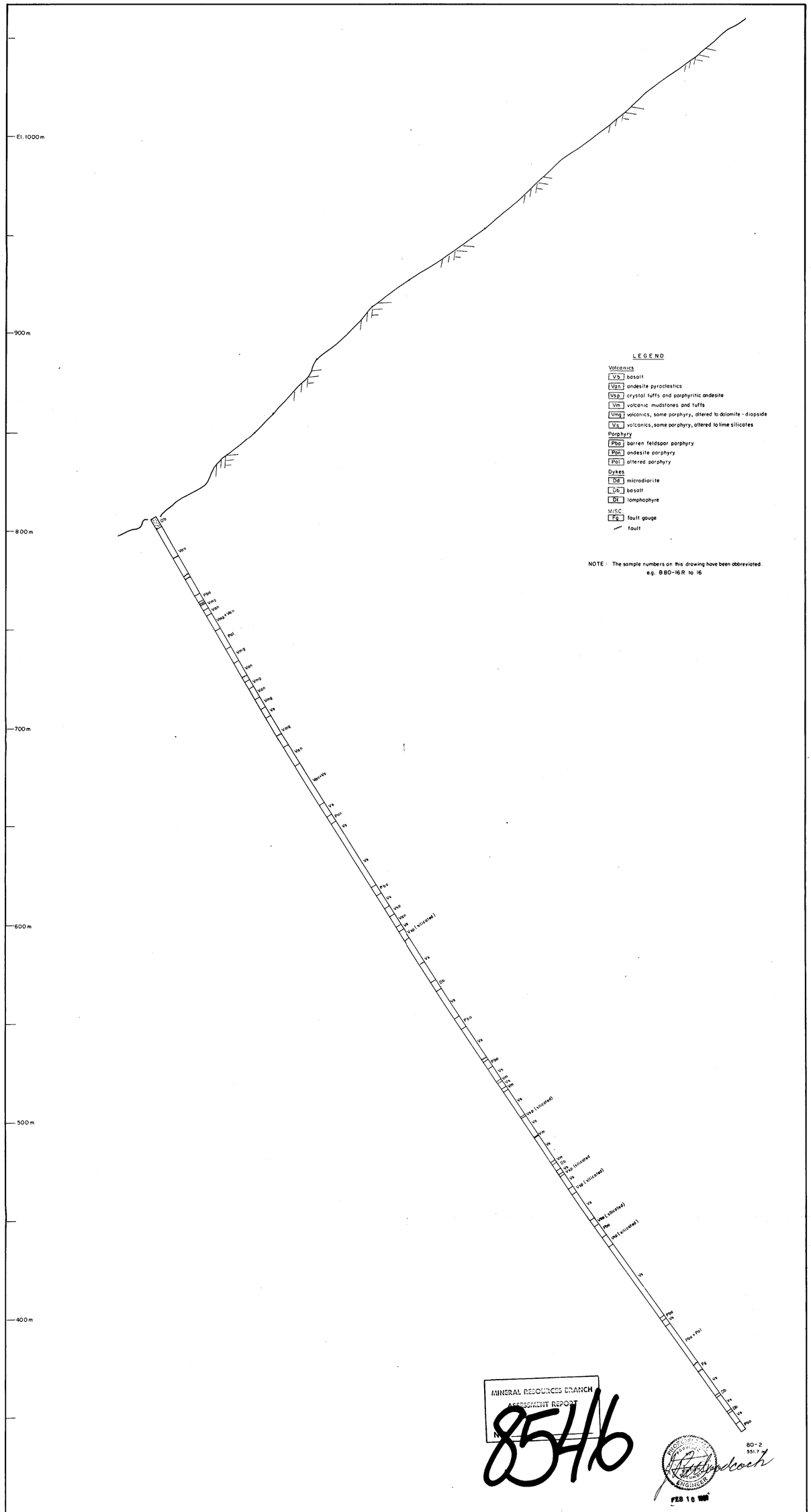
CROSS-SECTION A-A' LOOKING NNE

SCALE 1:1000

0 50 Metres

J. R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 22



VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

GEOLOGY

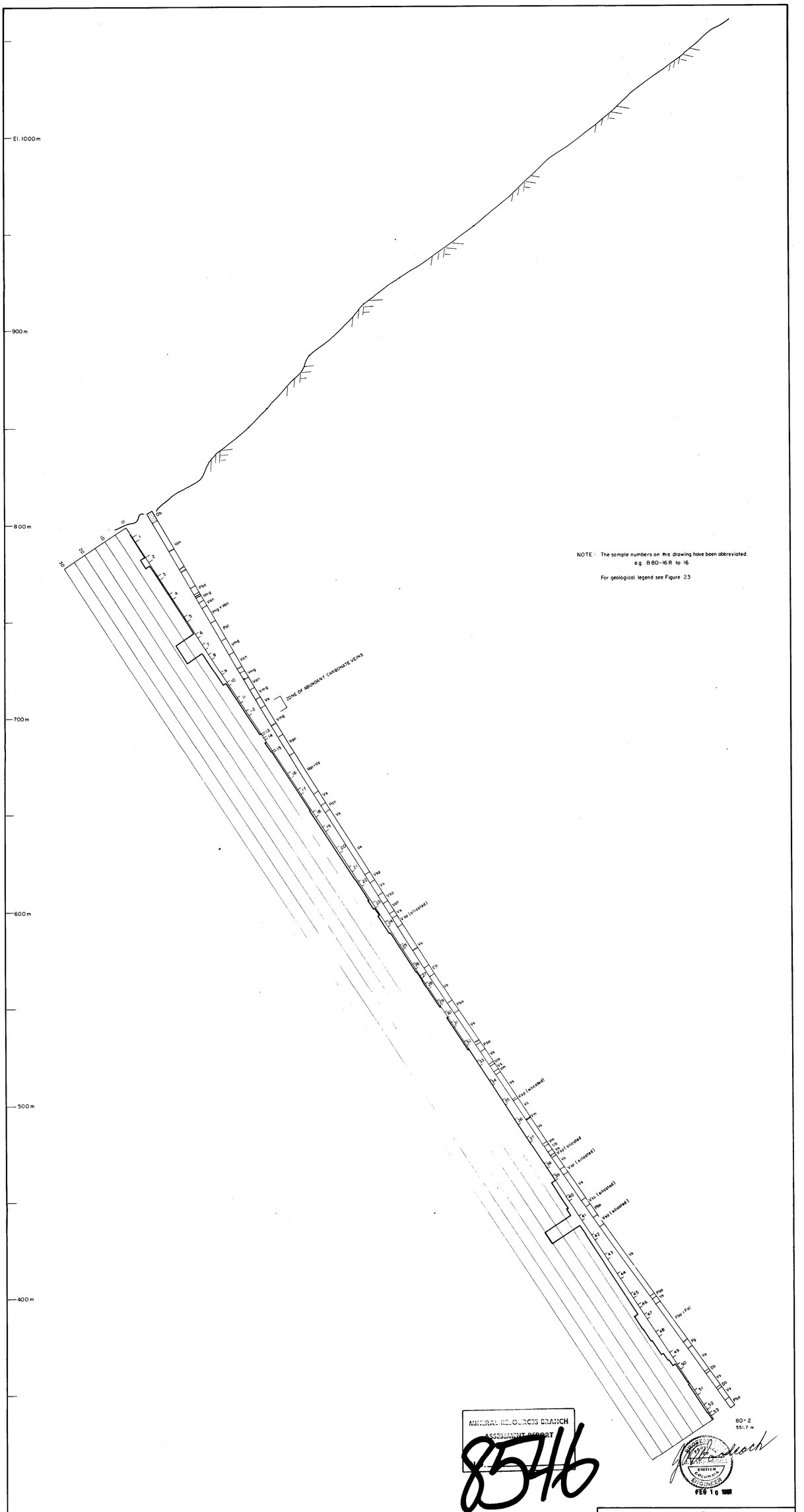
DRILL HOLE 80-2
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 23



NOTE: The sample numbers on this drawing have been abbreviated.
e.g. B80-16R to 16

For geological legend see Figure 23

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BALL CREEK PROJECT

QUARTZ VEINLETS

DRILL HOLE 80-2

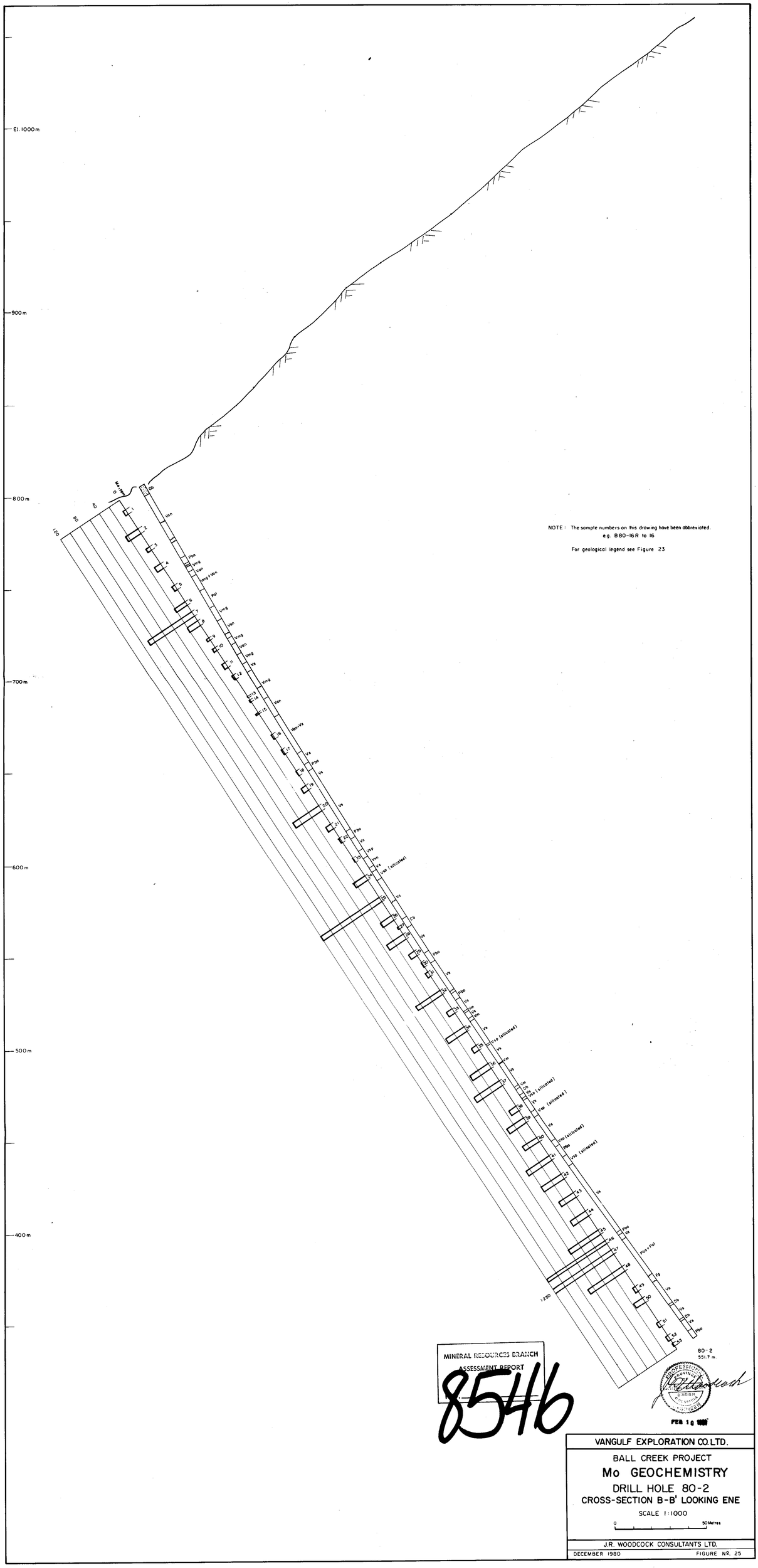
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE NO. 24



NOTE : The sample numbers on this drawing have been abbreviated.
e.g. B80-16R to 16

For geological legend see Figure 23

FEB 16 1981

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BALL CREEK PROJECT

Mo GEOCHEMISTRY

DRILL HOLE 80-2

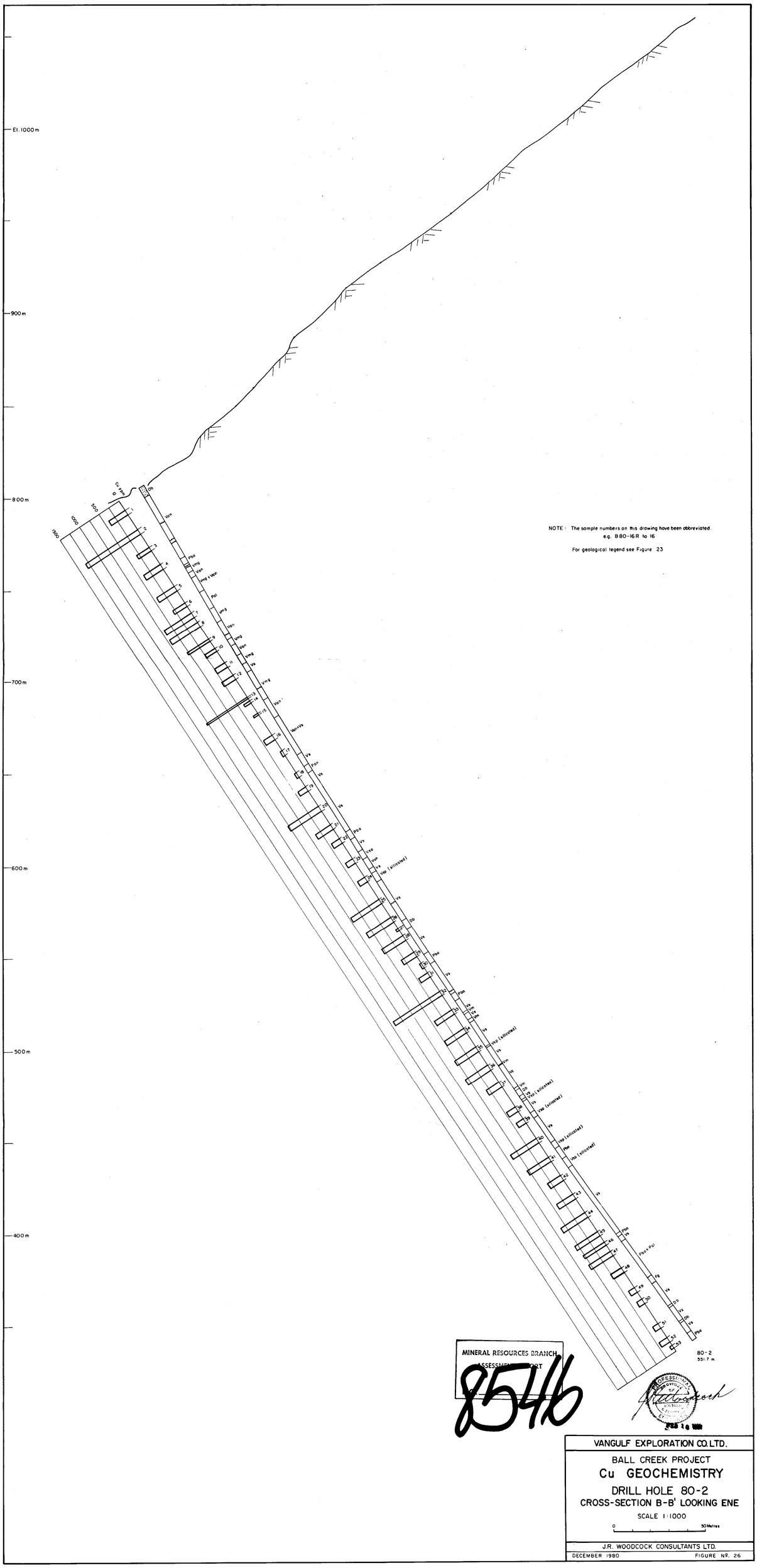
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 25



NOTE : The sample numbers on this drawing have been abbreviated.
e.g. B80-16R to 16

For geological legend see Figure 23

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

Cu GEOCHEMISTRY

DRILL HOLE 80-2

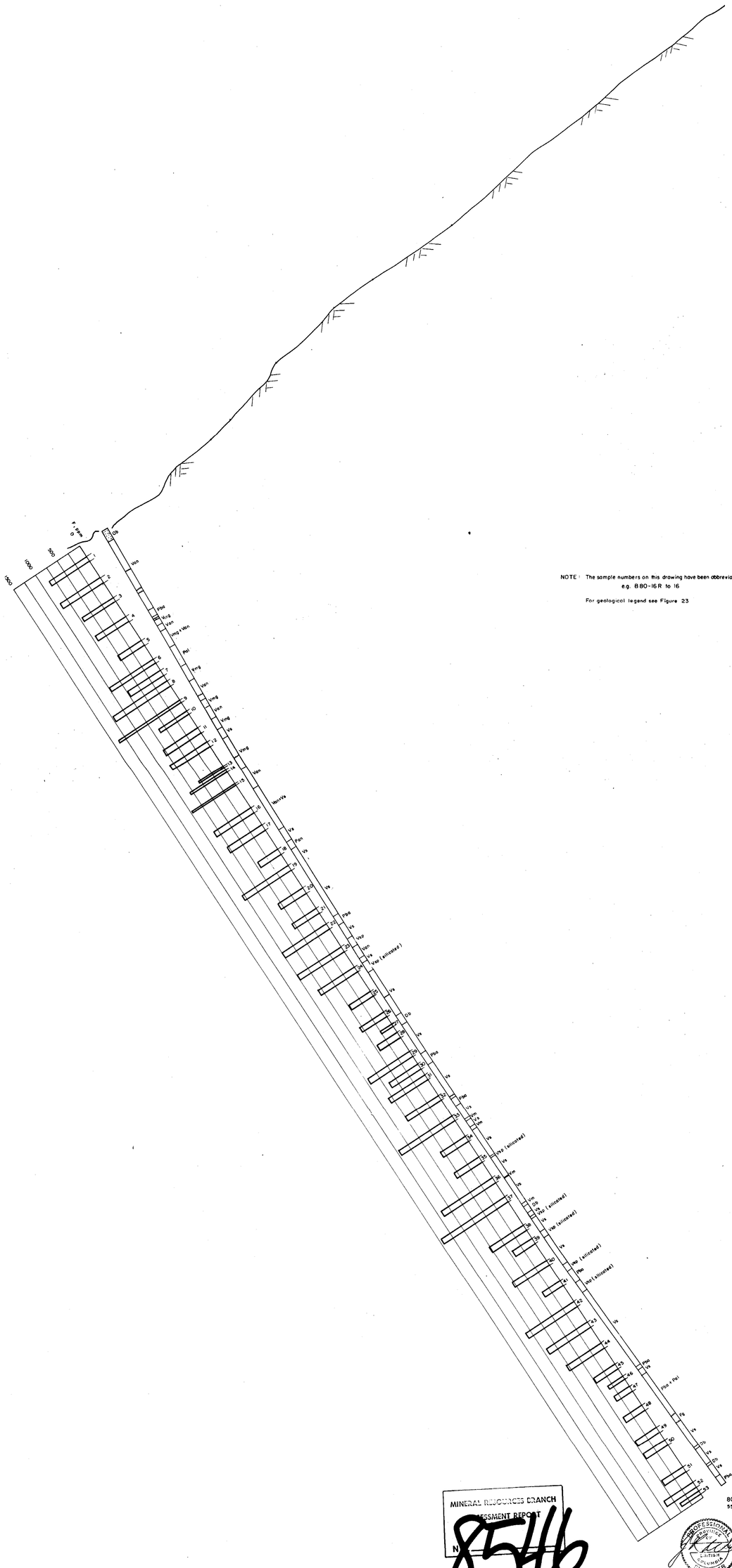
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 26



NOTE: The sample numbers on this drawing have been abbreviated.
e.g. 880-16R to 16

For geological legend see Figure 23

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BALL CREEK PROJECT

F GEOCHEMISTRY

DRILL HOLE 80-2

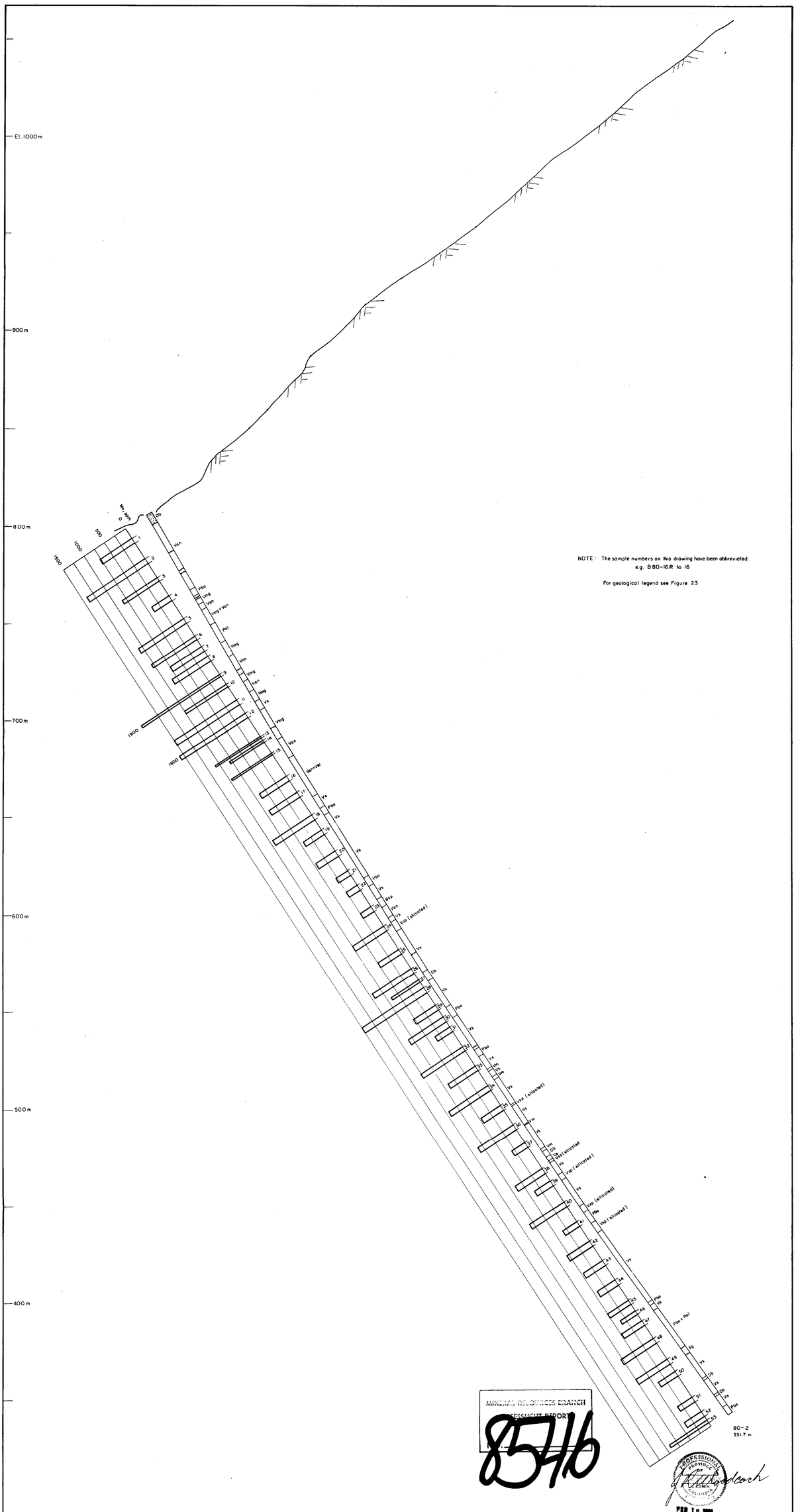
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE No. 27



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BALL CREEK PROJECT

Mn GEOCHEMISTRY

DRILL HOLE 80-2

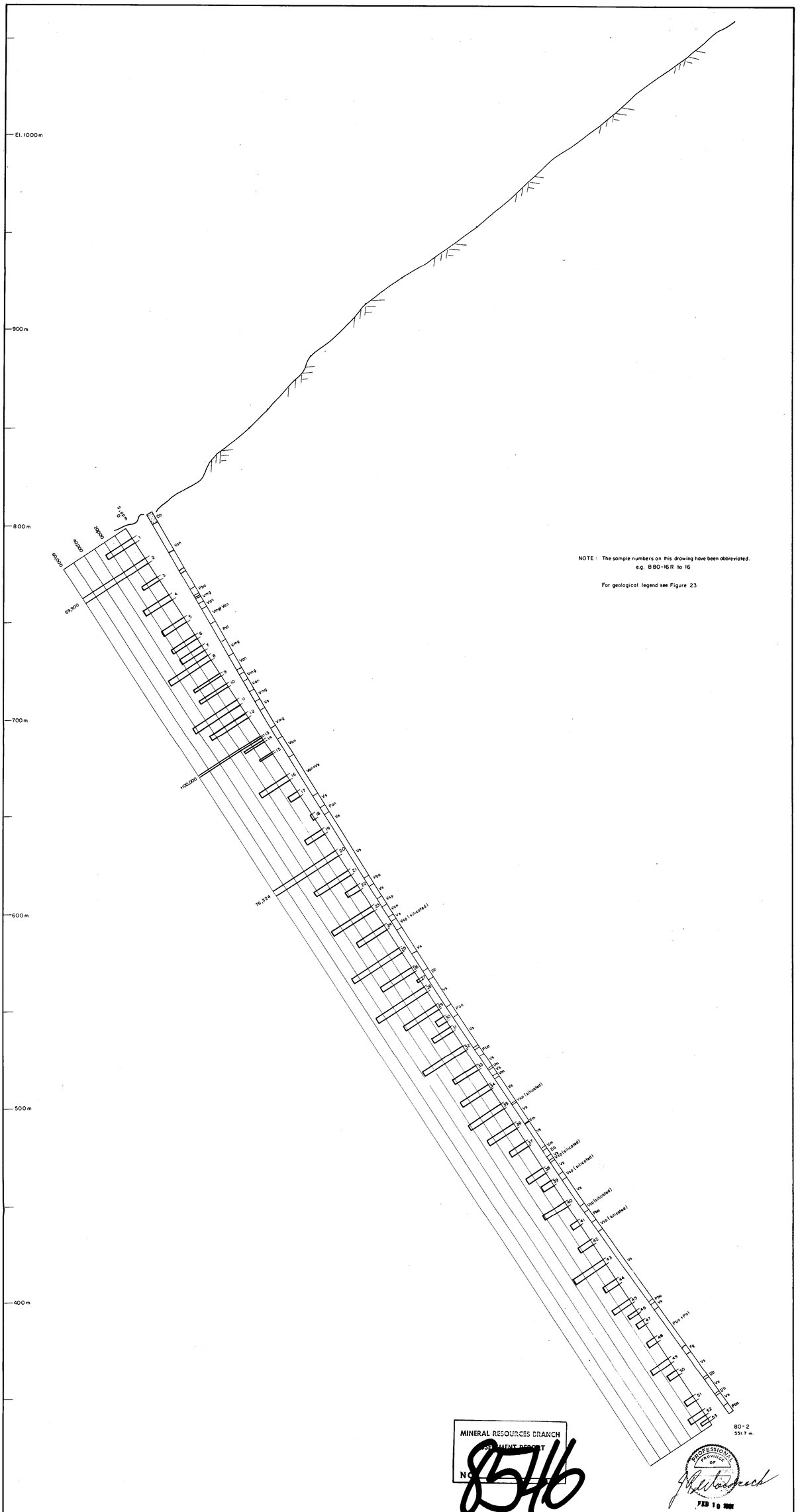
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 30 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 28



NOTE : The sample numbers on this drawing have been abbreviated.
e.g. B80-16R to 16

For geological legend see Figure 23

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BALL CREEK PROJECT
S GEOCHEMISTRY

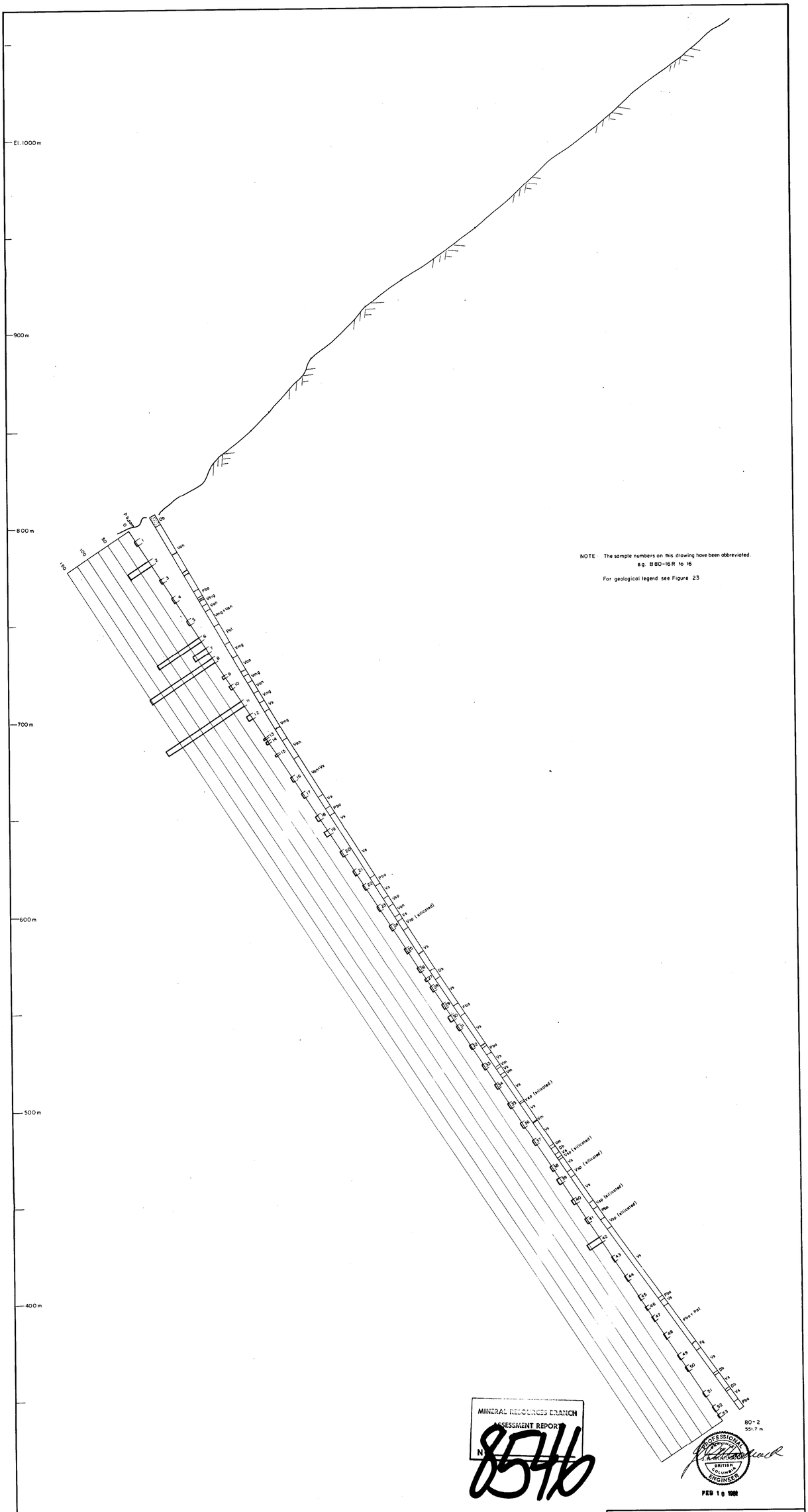
DRILL HOLE 80-2
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 29



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BALL CREEK PROJECT

Pb GEOCHEMISTRY

DRILL HOLE 80-2

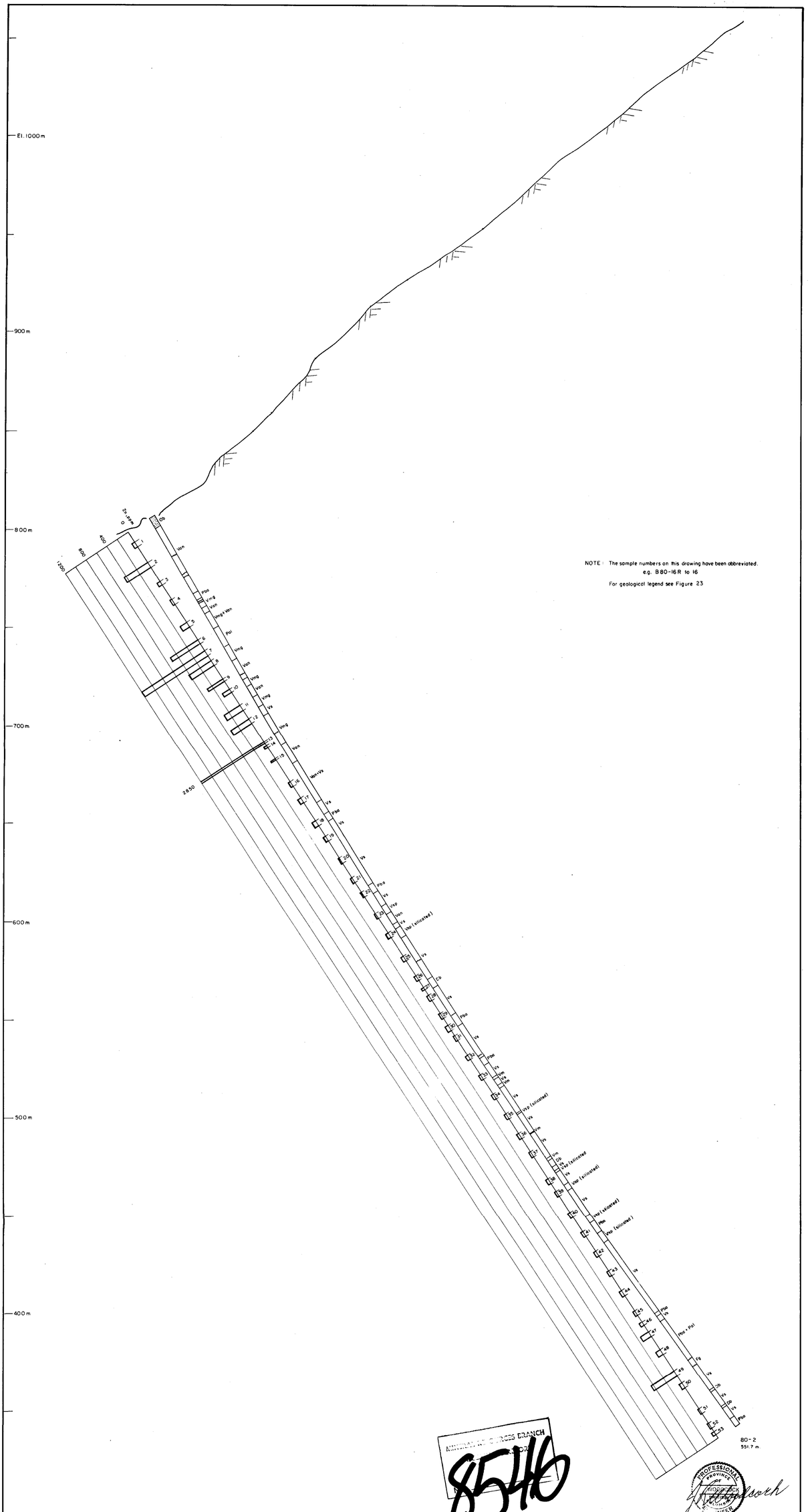
CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 30



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FEB 10 1981

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BALL CREEK PROJECT

Zn GEOCHEMISTRY

DRILL HOLE 80-2

CROSS-SECTION B-B' LOOKING ENE

SCALE 1:1000

0 50 Metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 31

SYMBOLS

- ····· Edge of outcrop
- ~-·-·· Geologic contact (approximate, assumed)
- ~~~ Fault
- ~ Stream
- o Sample site (rock)
- X Specimen site
- Ga □ Galena - sphalerite carbonate vein
- Mo □ Molybdenum mineralization
- △—| 80-1 Diamond drill hole collar and horizontal trace

LEGEND

GEOLOGY

Volcanic

- Van Andesitic volcanics, mainly pyroclastics
- Vbl Bleached and/or pyritic volcanics
- Vmg Volcanics with dolomite - diopside ? alteration

Intrusives

- Pba Barren feldspar porphyry (includes some andesite porphyry)
- Pd Diorite porphyry and diorite

Intermixed rocks

- Pba-Vmg Intermixed volcanics and feldspar porphyry
- L Limestone

Vbl
Vbl?
Knob Creek
415757
6348824
Pba
Vbl
Vbl
Vbl
Pba
Vbl
Vbl
White Creek
Vbl
Pd
Van
Pbp
Van
Vmg
Vmg
Pba - Vmg
Mo
Ga
MoGa
Ga
Ga
Mo
415545
6347298
Pba
Van
X
Van
CAMP
BALL CREEK
414190
6346965
80-1
Bear Creek
Alder Creek
Goal Creek
Mid Creek
80-2
Moly Creek
N

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8546

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BALL CREEK PROJECT

GEOLOGY

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 32


SYMBOLS
Edge of outcrop
Geologic contact (approximate, assumed)
Fault
Stream
Sample site (rock)
Specimen site
Ga Galena - sphalerite carbonate vein
Mo Molybdenum mineralization
Diamond drill hole collar and horizontal trace
80-1
LEGEND
GEOLOGY
Volcanic
Van Andesitic volcanics, mainly pyroclastics
Vbl Bleached and/or pyritic volcanics
Vmg Volcanics with dolomite - diopside alteration
Intrusives
Pba Barren feldspar porphyry (includes some andesite porphyry)
Pd Diorite porphyry and diorite
Intermixed rocks
Pba-Vmg Intermixed volcanics and feldspar porphyry
L Limestone
Vbl
Van?
Knob Creek
Pba
Vbl
White Creek
L
Pd
Van
Vmg
Pba - Vmg
Mo
Ga
Ga
BALL CREEK
CAMP
80-1
80-2
Bear Creek
Alder Creek
Molly Creek
Mid Creek
Goat Creek
N
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8546
FEB 10 1981
VANGULF EXPLORATION CO. LTD.
BALL CREEK PROJECT
GEOLOGY
RECONNAISSANCE NORTH OF BALL CREEK
Variable scale 1:5000 to 1:7000
Base map is a 40 chain air photo (BC 5291 - 074) blow up 5 x
0 100 200 300 metres
0 100 200 300 400 metres
J. R. WOODCOCK CONSULTANTS LTD.
DECEMBER 1980
FIGURE No. 32


SYMBOLS
Edge of outcrop
Geologic contact (approximate, assumed)
Fault
Stream
Sample site (rock)
X Specimen site
Ga Galena - sphalerite carbonate vein
Mo Molybdenum mineralization
BOH Diamond drill hole collar and horizontal trace
LEGEND
GEOLOGY
Volcanic
Van Andesitic volcanics, mainly pyroclastics
Vbl Bleached and/or pyritic volcanics
Vmg Volcanics with dolomite - diopside alteration
Intrusives
Pba Barren feldspar porphyry (includes some andesite porphyry)
Pd Diorite porphyry and diorite
Intermixed rocks
Pba-Vmg Intermixed volcanics and feldspar porphyry
L Limestone
COLOUR ANOMALY
Grey, no limonite
Gossan
Bright conspicuous gossan
Brilliant red gossan and/or bleached zones
Vbl
Van?
Knob Creek
Pba
Pd
Vmg
Pba - Vmg
White Creek
Van
L
BALL CREEK
CAMP
Bear Creek
Alder Creek
80-1
80-2
N
MINERAL RESOURCES BRANCH
8546
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PROVINCE OF BRITISH COLUMBIA
J.R. WOODCOCK
FEB 19 1981
VANGULF EXPLORATION CO. LTD.
BALL CREEK PROJECT
COLOUR ANOMALY
RECONNAISSANCE NORTH OF BALL CREEK
Variable scale 1:5000 to 1:7000
40 chain air photo (BC 5291 - 074) blow up 5 x
0 100 200 300 metres
0 100 200 300 400 metres
J.R. WOODCOCK CONSULTANTS LTD.
DECEMBER 1980
FIGURE Nº. 33

SYMBOLS

- ····· Edge of outcrop
- ----·-·- Geologic contact (approximate, assumed)
- ~~~ Fault
- ~ Stream
- O Sample site (rock)
- X Specimen site
- Ga □ Galena - sphalerite carbonate vein
- Mo □ Molybdenum mineralization
- △—| 80-1 Diamond drill hole collar and horizontal trace

LEGEND

GEOLOGY

Volcanic

- Van Andesitic volcanics, mainly pyroclastics
- Vbl Bleached and/or pyritic volcanics
- Vmg Volcanics with dolomite - diopside alteration

Intrusives

- Pba Barren feldspar porphyry (included some andesite porphyry)
- Pd Diorite porphyry and diorite

Intermixed rocks

- Pba-Vmg Intermixed volcanics and feldspar porphyry
- L Limestone

NOTE : The sample numbers on this map have been abbrievated e.g. G80-312 R to 312

Knob Creek

WHILE CREEK

BALL CREEK

Bear Creek

Alder Creek

Moly Creek

Mid Creek

Cool Creek

CAMP

80-1

80-2

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
N 8546

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA

FEB 1 0

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BALL CREEK PROJECT

SAMPLE NUMBERS

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 34

SYMBOLS

- ····· Edge of outcrop
- Geologic contact (approximate, assumed)
- Fault
- Stream
- O Sample site (rock)
- X Specimen site
- Ga □ Galena - sphalerite carbonate vein
- Mo □ Molybdenum mineralization
- 80-1 Diamond drill hole collar and horizontal trace

LEGEND

GEOLOGY

Volcanic

- Van Andesitic volcanics, mainly pyroclastics
- Vbl Bleached and/or pyritic volcanics
- Vmg Volcanics with dolomite - diopside alteration

Intrusives

- Pba Barren feldspar porphyry (includes some andesite porphyry)
- Pd Diorite porphyry and diorite

Intermixed rocks

- Pba-Vmg Intermixed volcanics and feldspar porphyry
- L Limestone

GEOCHEMISTRY (Mo in ppm)

- O 0 - 3
- O 4 - 6
- O 7 - 12
- O 13 - 25
- O 26 - 50
- O > 50

Knob Creek

White Creek

Bear Creek

Alder Creek

Moly Creek

Mid Creek

Goat Creek

BALL CREEK

CAMP

GOAT ZONE

Mo Ga 36 Mo Ga 90 Mo Ga 3, 18, 118 Mo Ga 164, 54

Pba - Vmg

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8546

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA
J. R. Woodcock
FEB 18 1981

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

Mo GEOCHEMISTRY

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 35

SYMBOLS

- Edge of outcrop
- Geologic contact (approximate, assumed)
- Fault
- Stream
- Sample site (rock)
- X Specimen site
- Ga Galena - sphalerite carbonate vein
- Mo Molybdenum mineralization
- 80-1 Diamond drill hole collar and horizontal trace

LEGEND

GEOLOGY

Volcanic

- Van Andesitic volcanics, mainly pyroclastics
- Vbl Bleached and/or pyritic volcanics
- Vmg Volcanics with dolomite - diopside alteration

Intrusives

- Pba Barren feldspar porphyry (includes some andesite porphyry)
- Pd Diorite porphyry and diorite

Intermixed rocks

- Pba-Vmg Intermixed volcanics and feldspar porphyry
- L Limestone

GEOCHEMISTRY (Cu in ppm)

- 0 - 75
- 76 - 150
- 151 - 300
- 301 - 600
- 601 - 1200
- >1200

Knob Creek

White Creek

BALL CREEK

Bear Creek

Alder Creek

Mid Creek

Molly Creek

Cool Creek

CAMP

80-1

80-2

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8546

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA
J.R. Woodcock

FEB 10 1981

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

Cu GEOCHEMISTRY

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 36

SYMBOLS

- Edge of outcrop
- Geologic contact (approximate, assumed)
- Fault
- Stream
- O Sample site (rock)
- X Specimen site
- Ga □ Galena - sphalerite carbonate vein
- Mo □ Molybdenum mineralization
- Diamond drill hole collar and horizontal trace 80-1

LEGEND

GEOLOGY

Volcanic

- Van Andesitic volcanics, mainly pyroclastics
- Vbl Bleached and/or pyritic volcanics
- Vmg Volcanics with dolomite - diopside alteration

Intrusives

- Pba Barren feldspar porphyry (includes some andesite porphyry)
- Pd Diorite porphyry and diorite

Intermixed rocks

- Pba-Vmg Intermixed volcanics and feldspar porphyry
- L Limestone

GEOCHEMISTRY (Pb in ppm)

- 0 - 15
- 16 - 30
- 31 - 60
- 61 - 120
- 121 - 240
- >240

Vbl, Van, Van?, Pba, Pd, Vmg, Pba - Vmg, X, L, ?

Knob Creek, White Creek, Bear Creek, Alder Creek, Mid Creek, Mary Creek, Goat Creek, BALL CREEK, CAMP, 80-1, 80-2

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8546

J. R. Woodcock
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
FEB 19 1981

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BALL CREEK PROJECT

Pb GEOCHEMISTRY

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 39

SYMBOLS

- Edge of outcrop
- Geologic contact (approximate, assumed)
- Fault
- Stream
- Sample site (rock)
- X Specimen site
- Ga □ Galena - sphalerite carbonate vein
- Mo □ Molybdenum mineralization
- 80-1 Diamond drill hole collar and horizontal trace

LEGEND

GEOLOGY

Volcanic

- Van Andesitic volcanics, mainly pyroclastics
- Vbl Bleached and/or pyritic volcanics
- Vmg Volcanics with dolomite - diopside alteration

Intrusives

- Pba Barren feldspar porphyry (includes some andesite porphyry)
- Pd Diorite porphyry and diorite

Intermixed rocks

- Pba-Vmg Intermixed volcanics and feldspar porphyry

- L Limestone

GEOCHEMISTRY (Mn in ppm)

- 0 - 500
- 501 - 1000
- 1001 - 1500
- 1501 - 2000
- 2001 - 2500
- > 2500

Knob Creek

White Creek

Bear Creek

Alder Creek

Moly Creek

Mid Creek

Goat Creek

BALL CREEK

CAMP

80-1

80-2

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 8546

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J.R. Woodcock

FEB 10 1981

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BALL CREEK PROJECT

Mn GEOCHEMISTRY

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 38

SYMBOLS

..... Edge of outcrop

Geologic contact (approximate, assumed)

Fault

Stream

O Sample site (rock)

X Specimen site

Ga Galena - sphalerite carbonate vein

Mo Molybdenum mineralization

80-1 Diamond drill hole collar and horizontal trace

LEGEND

GEOLOGY

Volcanic

Van Andesitic volcanics, mainly pyroclastics

Vbl Bleached and/or pyritic volcanics

Vmg Volcanics with dolomite - diopside alteration

Intrusives

Pba Barren feldspar porphyry (includes some andesite porphyry)

Pd Diorite porphyry and diorite

Intermixed rocks

Pba-Vmg Intermixed volcanics and feldspar porphyry

L Limestone

GEOCHEMISTRY (F in ppm)

O 0 - 300

O 301 - 600

O 601 - 900

O 901 - 1200

O >1200

Knob Creek

White Creek

Bear Creek

Alder Creek

Molly Creek

Mid Creek

Goat Creek

BALL CREEK

CAMP

80-1

80-2

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 8516

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA
J.R. Woodcock
FEB 10 1981

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

F GEOCHEMISTRY

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres

0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 37

SYMBOLS

- ····· Edge of outcrop
- ----·-·- Geologic contact (approximate, assumed)
- ~~~ Fault
- ~ Stream
- O Sample site (rock)
- X Specimen site
- Ga □ Galena - sphalerite carbonate vein
- Mo □ Molybdenum mineralization
- △—| 80-1 Diamond drill hole collar and horizontal trace

LEGEND

GEOLOGY

Volcanic

- Van Andesitic volcanics, mainly pyroclastics
- Vbl Bleached and/or pyritic volcanics
- Vmg Volcanics with dolomite - diopside alteration

Intrusives

- Pba Barren feldspar porphyry (includes some andesite porphyry)
- Pd Diorite porphyry and diorite

Intermixed rocks

- Pba-Vmg Intermixed volcanics and feldspar porphyry
- L Limestone

GEOCHEMISTRY (Zn in ppm)

- O 0 - 75
- O 76 - 150
- O 151 - 300
- O 301 - 600
- O 601 - 1200
- O >1200

Knob Creek

White Creek

BALL CREEK

Bear Creek

Alder Creek

Goat Creek

Mid Creek

Moly Creek

CAMP

80-1

80-2

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 8546

FEB 19 1981

VANGULF EXPLORATION CO. LTD.

BALL CREEK PROJECT

Zn GEOCHEMISTRY

RECONNAISSANCE NORTH OF BALL CREEK

Variable scale 1:5000 to 1:7000

Base map is a 40 chain air photo (BC 5291 -074) blow up 5 x

0 100 200 300 metres
0 100 200 300 400 metres

J.R. WOODCOCK CONSULTANTS LTD.

DECEMBER 1980 FIGURE Nº. 40