Final Report
1978 Geology - Geochemistry - Geophysics
Programme

BOYA PROPERTY

94M/3W, 4E, 5E, 6W

G.R. Peatfield

December 1978 Project 62

VOL I: TEXT AND FIGURES

BRITISH COLUMBIA - CANADA

FINAL REPORT

1978 GEOLOGY - GEOCHEMISTRY - GEOPHYSICS

PROGRAMME

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G.R. PEATFIELD

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Vancouver, B.C.

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SUMMARY

This report describes the exploration programme completed during 1978 on the "BOYA Property" (Project 62), situated in northeastern British Columbia some 115 km southeast of Watson Lake, Yukon Territory. The holdings consist of 9 contiguous mineral claims, aggregating 94 claim units and covering approximately 2,250 hectares. These claims, wholly owned by Texasgulf Canada Ltd., were located between June 1977 and July 1978. The property covers significant occurrences of tungsten and molybdenum mineralization, in small skarn bodies and in quartz-vein stockworks in intrusive rocks.

The 1978 programme consisted of geological mapping at scales of 1:5,000 and 1:2,500, geochemical surveys covering most of the central portion of the claims, and ground magnetometer traverses in selected areas. A topographic map at a scale of 1:5,000 was prepared from air photographs. About 2.5 km of base-line was cut for control of geochemical and geophysical surveys. Several showings of tungsten and molybdenum mineralization were found but no systematic sampling was undertaken. An airborne magnetometer survey in the general region included the property, and more closely spaced flight lines were completed over the claims. Total expenditures on the property during the season were of the order of $50,000.

Results of the 1978 work were highly encouraging; an aggressive programme is recommended for 1979. This should include further geological and geochemical investigations, induced polarization tests and expanded ground magnetometer coverage, and diamond drilling.

CONCLUSIONS

1.) Geological work completed on the BOYA property to date indicates that the central portion of the claims is underlain at no great depth by a quartz-rich porphyritic intrusive complex, which has intruded lower Paleozoic or older miogeoclinal rocks, including some limestone units. Significant occurrences of tungsten and molybdenum mineralization have been found, both in small skarn bodies and in quartz vein stockworks in intrusive rocks. These showings represent a 'brand-new' mineral discovery, and are many tens of kilometres removed from the nearest similar showings in rocks having the same general aspect.

2.) Geochemical surveys have outlined several coincident anomalies in W, Mo, Cu, and Zn (Bi is also anomalous in some areas; coverage is not complete). The anomalies are, in most cases, restricted to areas of known mineralization, but at least one lesser anomaly has no known mineralization source.

3.) Geophysical work to date has been restricted to magnetometer traverses over one portion of the property. This work has indicated that the small skarn bodies have strong but local magnetic effects, and that otherwise the magnetic relief is rather low. Coverage to date is insufficient to make further conclusions.

4.) There is at least one diamond drill target presently known, and others can be chosen with minimal groundwork.

5.) The property is an important one, and deserves a major, integrated, aggressive programme in 1979. An obvious analog is the Logtung prospect, on the British Columbia - Yukon border near Teslin, on which AMAX made a $100,000 down payment on a heavy option agreement, and have since completed approximately 21,000 metres of diamond drilling. Work continues. Recently publicized information on the Logtung property suggests that BOYA is a very similar situation.

RECOMMENDATIONS

In line with the overall budgetary restraints for exploration being experienced throughout the Company this season, the funding presently requested for the BOYA project is inadequate. It must be understood at this time that some parts of the recommended work programme may have to be seriously curtailed or even eliminated. The programme is detailed because it is considered to be the minimum which should be completed, rather than what will necessarily be done.

1.) Geological mapping must be continued, to expand the present coverage and to provide more detailed information in some areas. Structural and stratigraphic investigations must be continued.

2.) Geochemical coverage must be expanded to the northwest, fill-in sampling in the Main Face area should be undertaken, and a systematic appraisal of the weak anomaly system southwest of the Main Face should be considered.

3.) Geophysical work must include an expanded ground magnetic survey, and should include at least a preliminary test of the induced polarization method in the Main Face and the Nighthawk Hill - West Hill areas.

4.) A diamond drill contract should be let for 450 metres of drilling, and a hole drilled to test the Main Face molybdenum mineralization. It should be understood that the entire contract could be used up in this hole. The drilling contractor must be advised to have at least 450 m of rods available at the jobsite.

5.) The property should be surveyed by a Land Surveyor, to verify the positions of all Legal Corner Posts. Detailed control should be placed on the Main Face to aid in detailed geological investigations and in the location of drill sites.

6.) Some blasting and sampling of surface exposures of mineralization should be contemplated if budgetary constraints allow such work to be undertaken.

INTRODUCTION

This report summarizes work done by Texasgulf on the 'BOYA' Property (Project 62) during 1978. Emphasis is placed on the regional geologic setting of the property, on the local geology, and on speculations regarding the metallogenic significance of the observed mineralization. There is also some discussion of geochemical surveys, and a more cursory treatment of geophysical programmes. The property is an important one, slated for a diamond drill test in 1979. Some discussion of drilling logistics is included in this report.

LOCATION, ACCESS, AND TERRAIN

The BOYA property is located immediately northeast of the confluence of the Kechika and Turnagain Rivers, in northeastern British Columbia (see Figure 1). The nearest supply and transportation centre is Watson Lake, Yukon, some 115 km to the northwest.

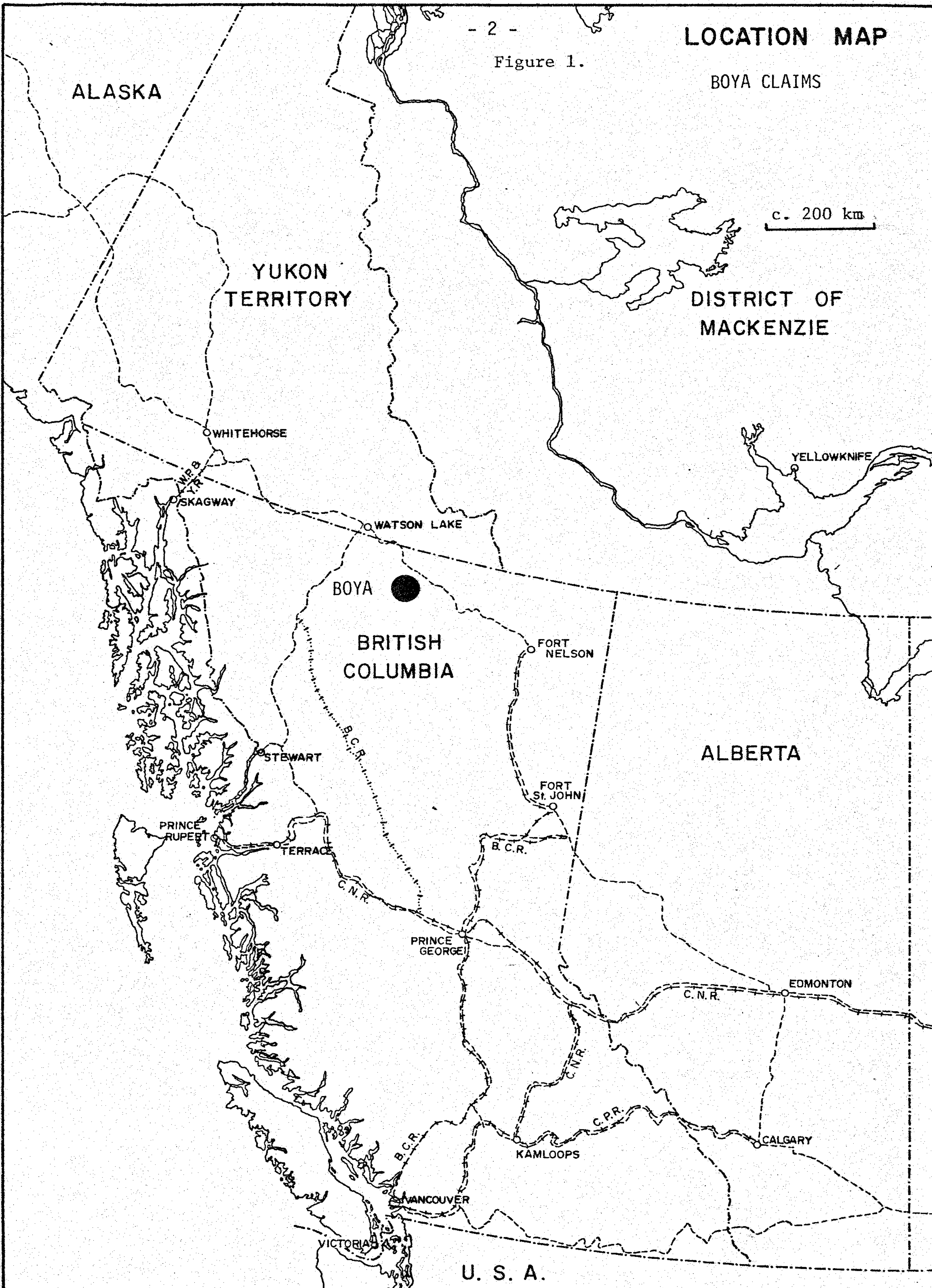
Access to the claims is presently by helicopter from various points on the Alaska Highway, the nearest being the settlement of Fireside, near the confluence of the Kechika and Liard Rivers some 50 km to the north-northeast. Fixed-wing aircraft can land at either Graveyard Lake or Birches Lake, respectively east and west of the property (see Figure 2). A good campsite is available at Graveyard Lake. There is no road access to the claims; broad gravel benches along the Kechika River suggest the possibility of relatively easy road construction to link the property with the Alaska Highway, a distance of some 65 km. This route would involve a crossing of the Liard River.

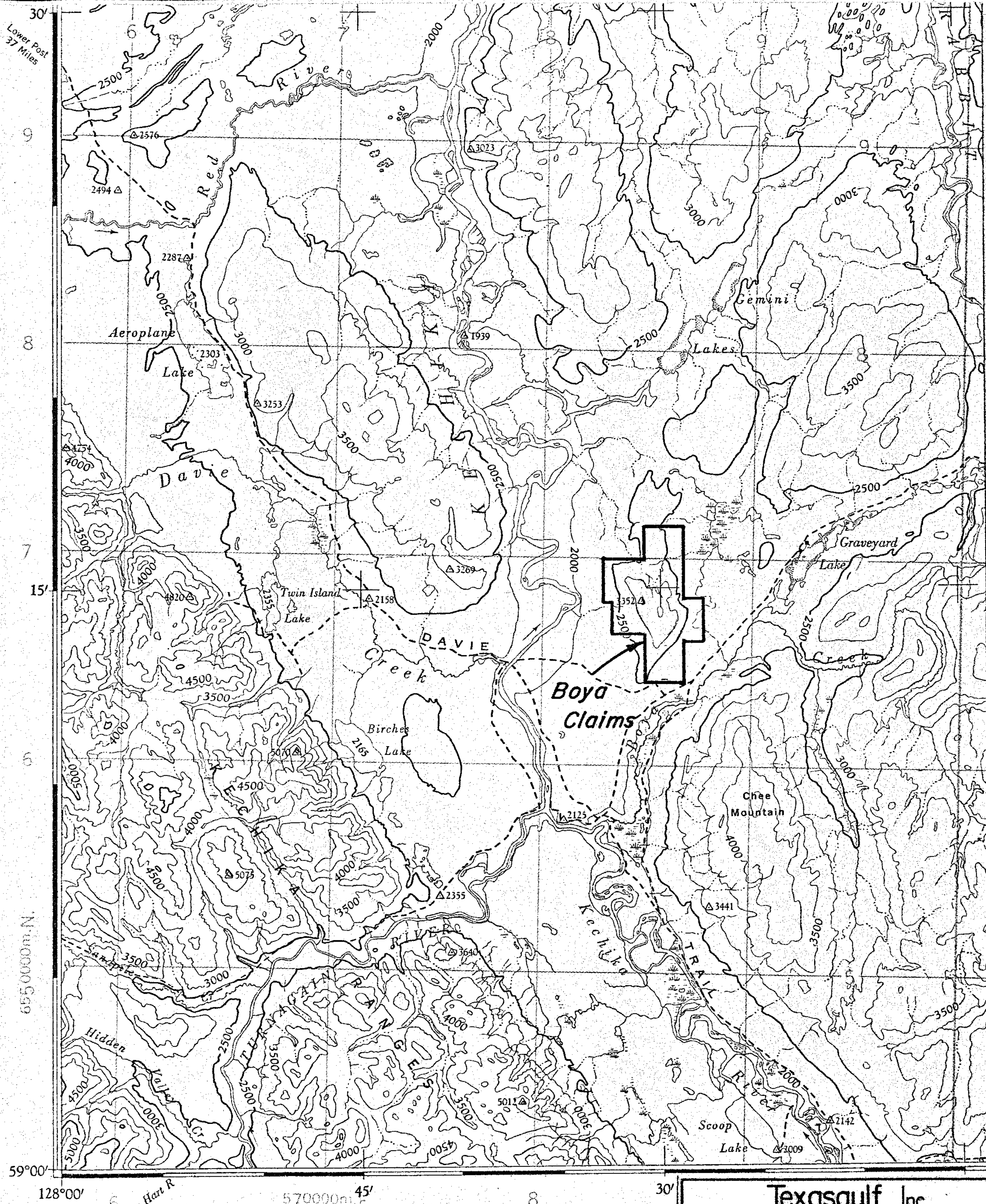
The BOYA claims are located in the extreme southwestern corner of the Liard Plain and cover most of a small hill rising some 300 m above a surrounding gravel-covered area. The maximum elevation on the hill is approximately 1050 m. Local relief is abrupt, especially along the eastern side of the hill (the 'Main Face' area); the surface is best described as

Figure 1.

LOCATION MAP

BOYA CLAIMS





Texasgulf Inc.			
Figure 2 Detailed Location Map **BOYA CLAIMS**			
WORK BY	DRAWN BY	DATE	DRW,G NO.

Scale in Metres: 2500 0 2500 5000 7500 10,000

Map Sheet 94 M - "Rabbit River"

'hummocky' in some areas, notably those of abundant outcrop, and more subdued in areas of extensive overburden. Forest cover is essentially complete, commonly comprising dense second growth, in large burned areas, which makes foot travel difficult. Open grass-covered slopes are found on the southern and southeastern portions of the hill. Water on the property is scarce, but abundant supplies are available within a few kilometres.

HISTORY

The history of Texasgulf's involvement in the BOYA property is not well documented and the following comments are, in part, interpretive. It must be emphasized that the prospect represents a new discovery; there is no evidence whatsoever of previous work, and no published records of any discovery of economic mineralization in this area.

The original discovery, of massive pyrrhotite bands with some chalcopyrite and (presumed) sphalerite, was made in June 1976 but the presence of scheelite was apparently not noted until September of that year. The results of analyses of rock chips led to a decision to acquire ground; the property was staked and recorded in June 1977. No further work was done in that year, and in 1978 the Company was faced with the problem of either paying cash in lieu of work, or forfeiting some or all of the claims. Relevant memoranda for these early phases of the property history are included as Appendix A to this report.

Pressing work in other areas within the region afforded an opportunity to visit the property before this decision had to be taken: in mid-May a brief examination of the ground was completed. At this time the presence of quartz-rich intrusive rocks with strong quartz veining, some scheelite, and traces of molybdenite, was first noted. A few soil samples were taken and a prominent anomaly in both tungsten and molybdenum was partially outlined. It was obvious that this new information was of major significance and the present programme of work began, first to do sufficient work to hold the claims, and later to more fully assess the importance of the property.

SUMMARY OF WORK COMPLETED IN 1978

The 1978 exploration programme on the BOYA property was a fragmented one, done in several sessions during the course of the field season. The following is a point-form listing of these stages, with the relevant dates and Texasgulf personnel involved:

May 16 - 18	- Initial examination - G.R.P.
May 31 - June 2	- Additional claims staked and sufficient geological and geochemical work done to file for assessment credit to hold the entire property (see Assessment Work Report included as Appendix B to this report.) - P.J.S. Boyle, H.R. Schmitt, G.N. Mannard, Jr.
June 26 - July 21	- Main phase of work, comprising prospecting, additional claim staking, and geological mapping of the entire property. - G.R.P., C.J. Rockingham, P.J.S. Boyle, J.M. Newell.
Aug. 22 - 30	- Line cutting by a crew from BEMA Industries Ltd.
Aug. 26 - 30	- Ground magnetometer survey (see Appendix C1.) - D.A. Londry.
Sept. 14 - 17	- Soil sampling and additional mapping. - G.R.P., P.C. Hubacheck, H.R. Schmitt, W. Gardiner.
Oct. 1 - 10	- Aeromagnetic survey conducted by personnel from Scintrex Ltd., utilizing the Texasgulf Vancouver-based Bell 206B helicopter (see Appendix C2.) - R.A.F. Graham, V.A.K. Edwards.

PROPERTY STATUS

The present BOYA property consists of 94 claim units (aggregating about 2,250 hectares) in 8 full claims and one fractional claim (see Figure 3). Appendix D is a schedule of claims, due dates, and other relevant data. Work completed to date but not yet filed for assessment credit will advance the expiry dates for all claims to at least 1983.

TOPOGRAPHIC MAPPING

Early geological and geochemical work at BOYA had poor spatial control, as the sole topographic base consisted of a published 1:250,000 topographic map "blown up" to 1:10,000 scale and with manually interpolated contours. This was clearly inadequate and in May 1978 McElhanney Surveying and Engineering Ltd. were commissioned to prepare a topographic base map, at a scale of 1:5,000 with a 15 m contour interval, covering the existing property and considerable ground to the west. This map has served well to control subsequent geological and geochemical surveys. While it will be adequate for similar work for the forseeable future, more detailed survey control will be required on the Main Face, for location of geological details and for fixing locations of diamond drilling sites.

LINE-CUTTING

Late in the 1978 field season, a limited programme of line-cutting was undertaken by a two-man crew under contract from BEMA Industries Ltd. Extremely thick deadfall conditions slowed this work and in the limited time-frame imposed by other logistical constraints they were able to complete only 2.5 km of line, as shown on Figure 4N.

This line provides easy walking access across the property, gave base-line control for a late season soil sampling programme, and will provide a convenient trail for laying water-line, should drilling be undertaken in the western portion of the property. Further discussion of this last point is reserved for a later Section.

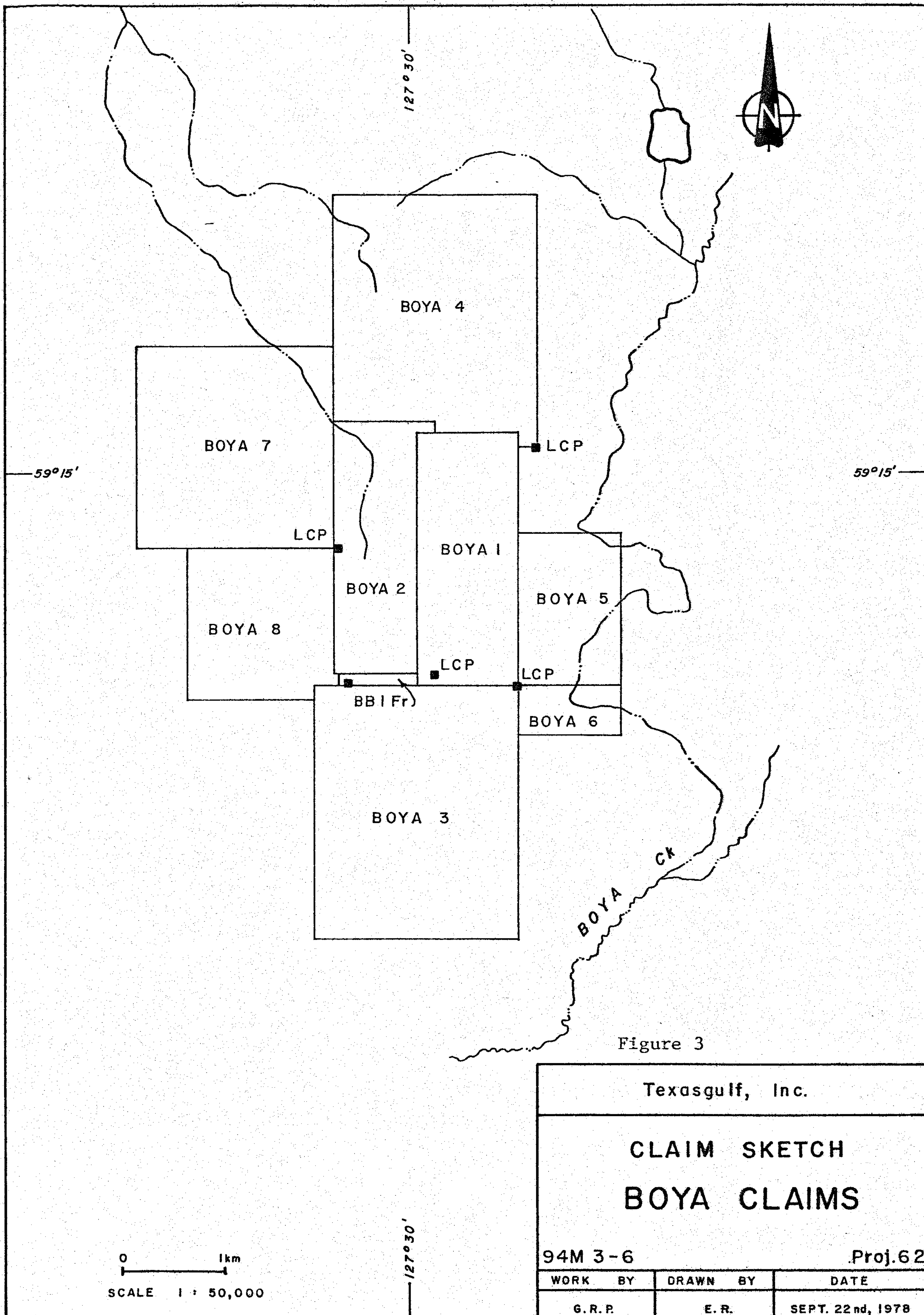

127°30'
59°15'
59°15'
BOYA 4
BOYA 7
LCP
BOYA 1
BOYA 2
BOYA 5
BOYA 8
LCP
LCP
LCP
BB1 Fr
BOYA 6
BOYA 3
BOYA Ck
127°30'
0
1km
SCALE 1 : 50,000
Texasgulf, Inc.
CLAIM SKETCH
BOYA CLAIMS
94M 3-6
Proj.62
WORK BY
DRAWN BY
DATE
G.R.P.
E.R.
SEPT. 22nd, 1978

Figure 3

GEOLOGY

Regional Setting

The BOYA property lies within a broad area mapped by Gabrielse (1962) as sedimentary rocks of his Units 1, 4a, 4b, and 4c, as follows:

CAMBRIAN AND ORDOVICIAN (mainly) [UNIT 4]

4a, thin-bedded, grey and buff, argillaceous and silty limestone and calcareous phyllite; limestone; intruded by greenstone sills and dykes; includes minor (?) dark grey graptolitic siltstone and shale of early Silurian age along Turnagain River; 4b, black and grey slate, siltstone, sandstone, chert, limestone, calcareous phyllite; may locally include 4a; 4c, undivided 4a, 4b, and 1.

CAMBRIAN AND OLDER [UNIT 1]

Impure grey and green quartzite, siltstone, sandstone, and argillite; calcareous sandstone; brown and black, laminated siltstone; quartz-pebble conglomerate; red and green slate and shale; limestone-cobble and boulder conglomerate; grit, greywacke; intruded by sills and dykes of gabbro and/or diorite.

This area is presently considered by Templeman-Kluit (1977) to form the southern extension of the Selwyn Basin.

The BOYA property can be interpreted as lying near the western edge of a narrow belt of Lower Cambrian carbonate rocks, near a westerly change to shales. This facies front is well developed along much of the Yukon - NWT border, where it seems to have controlled the localization of numerous tungsten and molybdenum showings and deposits. Assignment of an Early Cambrian age to the BOYA carbonate units is strictly tentative; no fossils have been found.

Evidence continues to mount for a major right-lateral displacement on the Tintina Fault system (see, e.g., Roddick, 1967; Templeman-Kluit, 1977). Estimates of displacement vary, but are generally several hundred kilometres. The BOYA property is immediately east of the presumed southern extension of the Fault and it is likely that a similar setting exists on the west side of the Tintina Trench, somewhere in the vicinity of Ross River.

Property Geology

Introduction

The geology of the BOYA property is complex and has not been studied exhaustively. The following description is based on approximately three weeks fieldwork and the examination of some 15 thin sections. Interpretation of the overall geological picture is made difficult by a low density of outcrop in many critical areas.

In summary, the claims cover an area underlain by a thick section of (presumed) lower Paleozoic sedimentary strata intruded and metamorphosed by a large complex system of Mesozoic(?) quartz-rich porphyritic rocks. This intrusive complex has associated with it several types of mineralization; the most important are pyrrhotite - chalcopyrite - scheelite - clinopyroxene skarns developed in limey strata, and quartz-vein stockworks, in intrusive rocks, carrying molybdenite and scheelite. Various aspects of the property geology are discussed in more detail in the following pages (see Figures 4N, 4S).

Stratified rocks

Several distinctive 'packets' of stratified rocks have been outlined to date. Major difficulties arise in attempts to correlate from one area to another. Many of the stratified rocks have been affected by the intrusive porphyry system; the following descriptions concentrate as much as possible on the original unmetamorphosed rocks.

The best exposed section, on the Main Face (see Figures 5 & 6), consists of at least 490 m of quartzite, calcareous shale, siliceous shale, siltstone and fine sandstone, interbedded shale and limestone, and relatively pure non-calcareous shale with interbedded thin units of pure massive limestone, capped by massive and banded limestone. The section includes, in its upper portion, about 40 m of andesitic flows, volcanic conglomerates with a limey matrix, and finely bedded tuffaceous rocks. Flow rocks and volcanic clasts are markedly amygdaloidal. Most of the rocks in this succession have been metamorphosed, as described in a succeeding subsection.

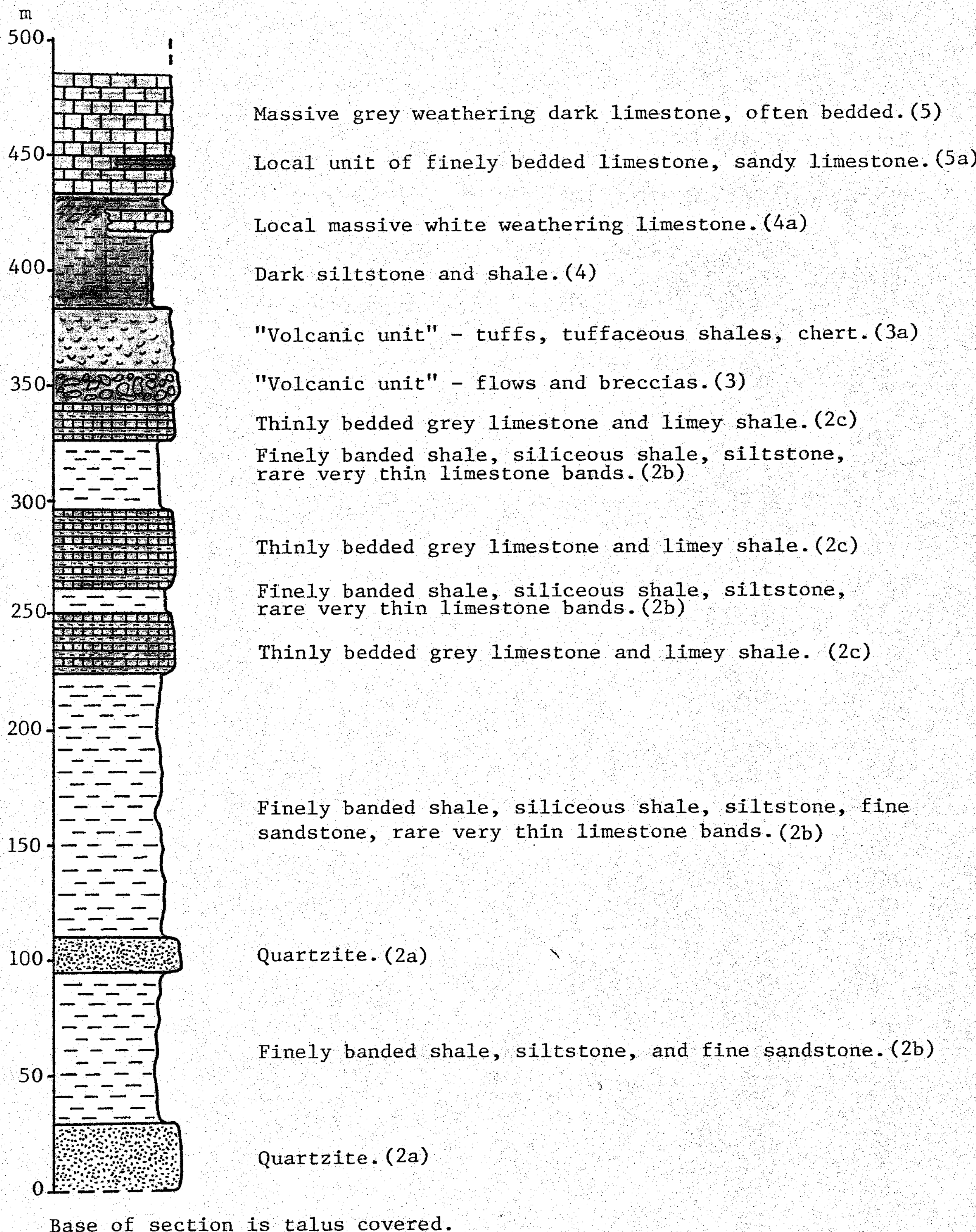


Figure 5. Composite Stratigraphic Section, Main Face Area.

The prominent uppermost limestone, of unknown thickness but probably in excess of 50 m, consists of massive and locally banded grey and black, somewhat recrystallized grey-weathering limestone and marble. The unit contains at least one thin subunit of thinly bedded limestone and sandy limestone. The massive carbonate unit is widespread over the property; locally it appears to be overlain by dark brown shale, although this occurs in an area of structural complexity and the evidence is not unequivocal.

At the extreme southern end of the hill, in the 'Hawk Pad' area, a prominent limestone unit has local areas of dolomitization towards its upper (?) contact. This 50 m thick unit is repeated and appears to define an overturned isoclinal fold. The limestone is apparently underlain by green and purple shales and overlain by a distinctive pebble conglomerate and grit unit. The succession probably does not correlate with that in the Main Face area. Very similar and presumably correlative strata (or at least the shale - limestone - dolomite portion of the section) are exposed much further north, on 'Cut Lip Hill', where they constitute an enigma.

Apparently underlying the major limestone unit in most of the central and western portions of the property is a package of shales and quartz-rich sandstones now mostly converted to hornfels. These rocks are somewhat reminiscent of the uppermost portions of the Main Face succession but apparently have much less limey material. There is at present far too little information available for a more definitive analysis of stratigraphic relationships or possible facies changes within the confines of the claims.

Intrusive rocks

Three varieties of intrusive rock, probably closely related, have been noted. The most widespread and probably most important is a medium grained quartz - biotite - feldspar porphyry (of quartz monzonite or granodiorite composition) which forms irregular dykes, sills and small stocks. Subrounded quartz eyes and small subhedral plagioclase feldspar phenocrysts are abundant; biotite, the only mafic mineral seen, forms small shiny black flakes. The unaltered rock has abundant potash feldspar in the aphanitic groundmass. Alteration phases of this unit are described in a later subsection.

The second intrusive variety is quartz porphyry, which in places might better be termed aplite. This rock is extremely leucocratic and only weakly porphyritic. The groundmass generally contains abundant potash feldspar; some specimens show a few feldspar phenocrysts and rare biotite flakes. It is often difficult to distinguish this rock from metamorphosed quartz sandstone.

The third intrusive type is found only as narrow dykes. The rock is a quartz-feldspar porphyry, consisting of phenocrysts of quartz, plagioclase and potash feldspar (microcline?) set in a dark purplish matrix. In some places the rock also carries small biotite crystals. Quartz veins have not been noted in these dykes.

The first and second rock types are cut by quartz veins, locally very strongly developed. This suggests, but does not prove, the existence of yet another intrusive phase, not seen at surface, which might be responsible for veining and mineralization. Perhaps the quartz - feldspar dykes are a manifestation of this (admittedly conjectural) unit.

Structure

The structural geology is obviously complex, and at present too little information has been collected to reach a full understanding of structural relationships. Several observations can, however, be made.

The strata exposed on the Main Face and to the southwest seem to represent a homoclinal succession of sedimentary rocks dipping moderately steeply to the west. There may be some local small-scale isoclinal folding in the thinly bedded members of the succession. The lower portions of the overlying limestone unit above the Main Face are structurally concordant with the underlying strata.

Westward, the picture changes markedly. Unmetamorphosed interbedded limestone - shale beds presumably correlative with undeformed strata in the Main Face area are strongly crumpled, with small folds plunging gently south-southeast. Most of the massive limestone unit exhibits steeply dipping compositional banding defining apparently south-southeasterly trending folds with nearly vertical axial planes. Regardless of this fact, the bottom of the limestone (or marble) unit seems to be nearly flat, or at most gently undulating. Structures in the underlying hornfels unit are much harder to outline, but such bedding attitudes as have been measured are nearly parallel to an almost vertical south-southeasterly striking schistosity (probably an axial plane cleavage), which is remarkably consistent throughout the area.

A preliminary, tentative interpretation is of strong crumpling in the core of a north-northwesterly trending major syncline; outcrop patterns suggest possible modification by cross-folding. Obviously, much more detailed work is necessary before a more refined structural analysis can be attempted.

At the southern end of the property, and possibly separated from the main outcrop area by a major fault, are several good exposures of steeply dipping limestone and clastic sedimentary rocks. The structure here appears, because of an apparent repetition of strata, to consist of a nearly vertical isoclinal anticline, slightly overturned to the east. The significance of this structure with respect to the rest of the property is at present unknown.

Metamorphism

Metamorphic rocks are contained within a large and poorly defined thermal aureole developed above and peripheral to the intrusive porphyry system described above. The nature of the rock produced is a function of the original lithology; three principal thermal metamorphic associations are recognized.

On the Main Face, a unit composed of thinly interbedded shale and limestone has been affected by the intrusive porphyry mass, represented at surface by sills and dykes, and assumed to underly the hill. As one approaches this complex from the south, one sees progressive metamorphism of sedimentary strata. The first noticeable effect is re-crystallization with no apparent movement of ions; pure carbonate bands are still recognizable, intercalated with 'cherty' layers. Closer to the intrusive, there appears to be an abrupt transition to 'porcellanite', a banded rock composed of thin relatively pure layers of clinopyroxene and of re-crystallized quartz. Here, there appears to have been movement of cations from shale layers to limestone bands to form clinopyroxene and to leave relatively pure silica; such migrations are only necessary over very short distances. Similar porcellanites are found in the 'Nighthawk Hill' - 'West Hill' area.

In the western portion of the property, a thermal aureole above a major intrusive complex contains hornfels derived from fine quartz-rich clastic sediments. The rock, which is dull purplish-brown, brittle, and has a subconchoidal fracture, is characterized by the formation of abundant interstitial metamorphic biotite. Some coarser quartzose units have been altered to quartzite; these also show the development of some secondary biotite. The grain-size and amount of biotite seem to increase as distance from intrusive rocks decreases.

The third important association is a diverse family of rock-types. Massive limestone has been variously re-crystallized to form marble, with coarser varieties apparently closest to intrusive rocks. Associated with the marbles are a variety of coarse calc-silicate 'skarns'. Some of these probably represent products of iso-chemical metamorphism; others are possibly metasomatic skarns or "tactites". The former are most often concordant garnet-rich rocks, the latter are dominantly pyrrhotite - diopside skarns with or without quartz. Skarns of the second type sometimes form concordant bodies, but often appear to crosscut the bedding in the marbles. Best developed on Nighthawk and West Hills, they are important because they contain small amounts of chalcopyrite, scheelite, and locally molybdenite. The concordant garnet skarns reach their maximum extent on 'Paint Can Hill'. Pyrrhotite - diopside - quartz skarns occur as thin lenses in porcellanite in the Main Face area, but there the process of formation may have been somewhat different.

Alteration

Hydrothermal alteration appears largely confined to rocks of the intrusive porphyry suite, although thin sections of porcellanite immediately adjacent to intrusive contacts have not been examined.

Although only a very few thin sections have been studied, it seems possible to outline a progressive sequence of alteration in the quartz - biotite - feldspar porphyries. The freshest rocks show only a little chloritization of biotite phenocrysts, generally adjacent to quartz veinlets, and a small amount of carbonate - sericite (?) alteration of feldspars. More altered varieties show complete chloritization of biotite, with some development of sericite, and partial to total alteration of feldspars to fine-grained sericite. With increasing intensity of alteration, biotite phenocrysts are converted completely to muscovite and the grain-size of the sericite in feldspar sites increases. The most intensely altered porphyries, which incidentally have abundant quartz veins, show complete replacement of biotite by muscovite, coarse aggregates of sericite in feldspar sites, and coarse muscovite - orthoclase aggregates on the margins of quartz veinlets.

From these few data it is obviously impossible to define alteration facies in the classic sense. The most weakly altered rocks may be assignable to the propylitic zone, more intensely altered ones to the argillic (or, since clay minerals are not specifically recognized, to a "quartz - sericite" assemblage), and rocks showing the development of secondary potash feldspar to the potassic zone, although secondary biotite is apparently not present. True greisen assemblages have not been recognized.

Quartz veining

Quartz veining is extremely common, usually within either intrusive rocks or the more brittle hornfels and porcellanite units. Density of veining ranges from very sparse parallel veins (fewer than two per metre) to intense 'swarms', largely unidirectional, where the vein density may reach 50% of the total rock mass. Locally, intense multidirectional stockworks are developed in intrusive rocks. The veins range in size from microscopic to a few centimetres, with the most common being about two centimetres. The largest vein seen to date is a composite one totalling about 25 cm in width.

Thin section examination of veinlets in intrusive rocks suggests that at least some of these formed by alteration along hairline fractures rather than by open-space filling. Conversely, some veins, especially the apparently late-stage ones with galena and sphalerite mineralization, exhibit cockscomb textures indicative of open-space filling.

A prominent feature of the quartz veining is the marked tendency, within a given area, for veins to be parallel and to dip vertically. This is evident on an outcrop scale, where vein strikes rarely vary by more than 10°, and in larger areas as well. A simple study of this phenomenon, based on plotting dominant vein directions (where noted) for each outcrop, allowed the construction of two rose diagrams, one for the western portion of the property, and one for the Main Face area. These diagrams, which are shown on Figure 4N, indicate that in both regions most of the vein strikes fall within a 30° arc, and that the respective maxima vary by about 45°. Clearly, two populations are represented, although the structural significance of this observation is not understood at the present time.

Mineralization

Several types of sulphide and tungstate mineralization are known to occur on the property; only a few of these are considered of potential economic importance. Summaries of assay results and descriptions of all samples assayed to date are included as Appendix E to this report.

Perhaps the most important type of mineralization is exposed in two small areas on the Main Face, where stockworks of quartz veinlets in intrusive rocks and to a lesser extent in porcellanite contain abundant molybdenite. Mineralized veinlets have several orientations and range in thickness from less than one centimetre to as much as eight centimetres. Molybdenite occurs as continuous thin streaks in 'ribbon veins' or as fine selvedges on thinner veins. A character sample of a well-mineralized five centimetre ribbon vein assayed 1.53% MoS_2. Some of the veins are brecciated, with fine-grained molybdenite in the fractures. Quartz veins with strong molybdenite mineralization generally have lesser amounts of both scheelite and molybdian scheelite.[1] No coarse rosettes of molybdenite have been seen.

In some areas, again on the Main Face, there are strong 'swarms' of subparallel one-half to two centimetre quartz veins comprising as much as 50% of the rock mass. Such veins may contain moderate amounts of very fine-grained scheelite, with some molybdian scheelite and rare, extremely fine molybdenite. Sampling is very difficult, due to the 'ribby' nature of the rock, but such work as has been done suggests that the tungsten content is erratic and probably does not exceed 0.1% WO_3 over appreciable widths.

Of no direct economic importance, but of considerable geological interest, are various types of sulphide mineralization contained in quartz veins. On the Main Face, above and peripheral to the molybdenum mineralization, quartz veins contain abundant coarse granular pyrite, with traces of galena, sphalerite, chalcopyrite, molybdenite and scheelite. Close to the molybdenum zones, some probably late stage veins contain arsenopyrite and perhaps bismuthinite. In the western portions of the property, quartz veins are essentially unmineralized except for very rare molybdenite and scheelite. However, in one locality tiny crystals of a mineral assumed to be bismuthinite have been found.

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1 Powellite is the pure endmember $CaMoO_4$, whereas the material here is more likely scheelite with 1 - 3% MoO_3 substituting for WO_3 (see Little, 1959, p. 2).

Two other types of unimportant but intriguing mineralization have been found in the western area. At two locations south of Paint Can Hill, weakly metamorphosed mudstones and quartz sandstones have been strongly deformed and intensely quartz veined, with irregular veins or segregations which contain considerable chalcopyrite and lesser amounts of pyrite, galena and sphalerite. These occurrences are very small. The second type occurs on Paint Can Hill, and consists of a lens, probably about 30 cm by perhaps 10 m, of semi-massive mineralization in a vertical fracture in marble. Minerals present include arsenopyrite, pyrite, sphalerite, chalcopyrite, and traces of scheelite. A few narrow quartz veins nearby have the same orientation, and rarely contain a little chalcopyrite.

The third potentially important type of mineralization occurs in numerous pods or lenses, ranging from very small to as much as three metres wide and of undetermined length and consisting of massive to semi-massive pyrrhotite mineralization with traces of extremely fine-grained scheelite and chalcopyrite in diopside - quartz skarn, contained either in marble or porcellanite. The larger pods are in marble, in the western portion of the property. The tungsten and copper contents are low, averaging (for 5 assays) approximately 0.09% WO_3 and 0.13% Cu. Akin to this mineralization is very fine disseminated pyrrhotite developed in the porcellanite. Where quartz veins cut pyrrhotite lenses in porcellanite, they tend to contain traces of base metal sulphides and scheelite whereas they are more likely to be barren, or contain only pyrite, above and below the pyrrhotite horizons. An interesting and potentially important sub-type of the skarn mineralization occurs in two apparently restricted locations south of West Hill, near a very small intensely quartz-veined intrusive body. Here, clinopyroxene - quartz skarn contains disseminated pyrrhotite, lesser chalcopyrite, traces of scheelite, and appreciable molybdenite (one assay of a character grab-sample returned 0.22% MoS_2.

Regional Metallogenic Significance

Figure 7 is a page-size reproduction of a simplistic compilation map showing several of the more important deposits and occurrences of tungsten and molybdenum mineralization in the Northern Cordilleran region. The drawing was originally prepared for the Exploration Division Budget Meetings held in the latter part of 1978.

Two significant points should be noted. Firstly, the majority of the occurrences shown lie within a few kilometres of the locus of transition from carbonate to shale in Lower Cambrian strata, although the deposits themselves need not necessarily be hosted by Cambrian rocks. Secondly, there is here further evidence for the major right-lateral offset on the Tintina Fault system. The facies change has been interpreted from data released on open-file compilation maps produced by the Geological Survey of Canada, and is in many areas only crudely located, since the Cambrian rocks are not always either well exposed or mapped in sufficient detail.

The BOYA mineralization is very significant in that it represents a major southern extension of the tungsten - molybdenum province lying north-east of the Tintina Fault. Prior to this new discovery, the most southerly occurrences of note were about 100 km north of Watson Lake. There is no reason to suspect that the intervening country is any less geologically favourable, but it does represent an area of extensive forest cover and low outcrop density. Work in this region appears to be justified.

Although they do not show up on the reproduction of Figure 7, there are prominent intermediate to basic volcanic and volcaniclastic members within the Cambrian section near the Cantung Mine. In light of this observation, the BOYA volcanics may take on added significance.

Recent encouraging exploration results at the Red Mountain molybdenum property (AMOCO) and at Logtung (AMAX) tend to enhance the BOYA property. Appendix F includes a more detailed description of the Logtung deposit, which has many apparent similarities to the BOYA situation.

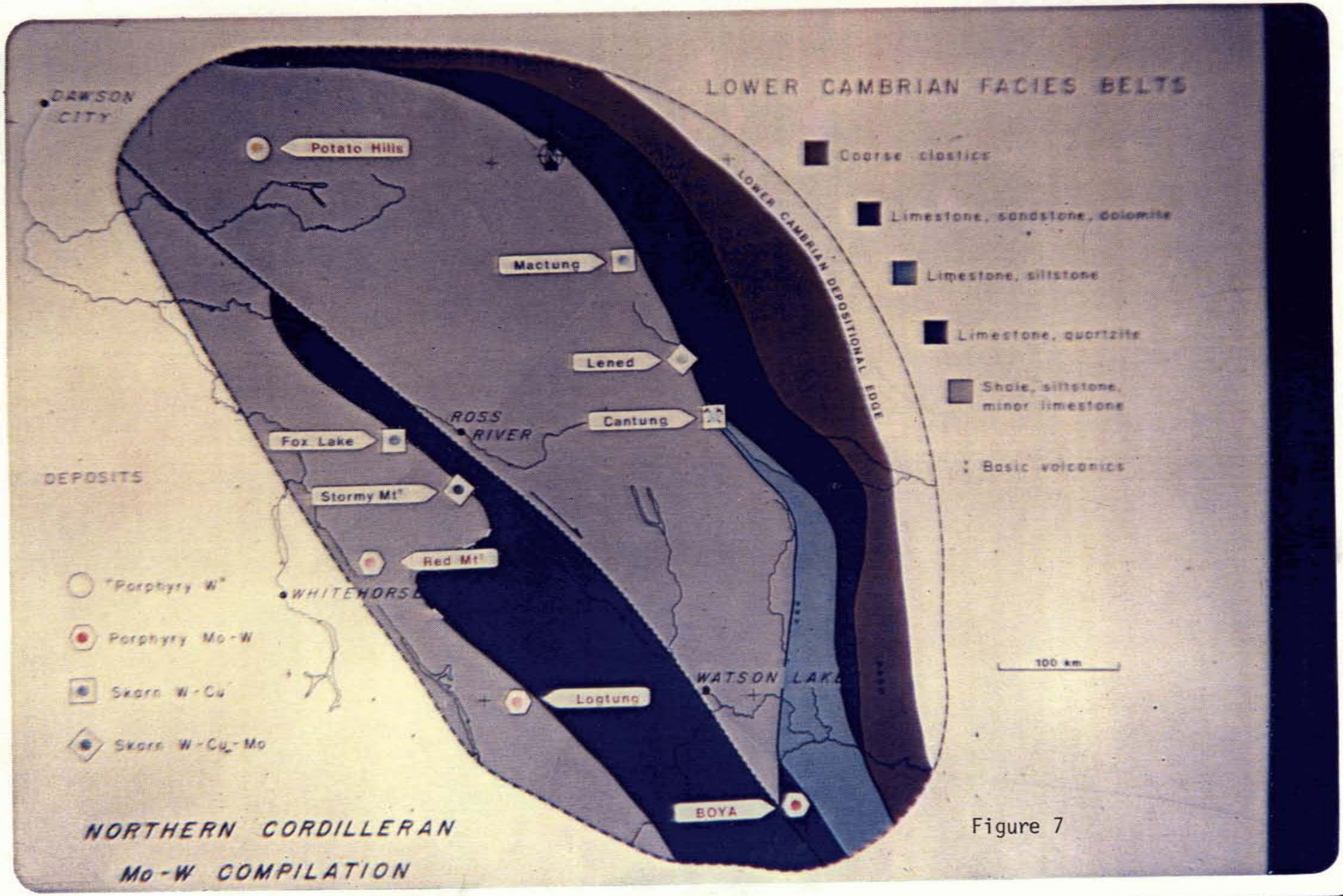
LOWER CAMBRIAN FACIES BELTS
Coarse clastics
Limestone, sandstone, dolomite
Limestone, siltstone
Limestone, quartzite
Shale, siltstone, minor limestone
Basic volcanics
LOWER CAMBRIAN DEPOSITIONAL EDGE
100 km
DAWSON CITY
ROSS RIVER
WHITEHORSE
WATSON LAKE
Potato Hills
Mactung
Lened
Cantung
Fox Lake
Stormy Mt
Red Mt
Logtung
BOYA
DEPOSITS
"Porphyry W"
Porphyry Mo-W
Skarn W-Cu
Skarn W-Cu-Mo
NORTHERN CORDILLERAN
Mo-W COMPILATION

Figure 7

GEOCHEMISTRY

During September, a short-term programme of soil-sampling was completed, in an attempt to evaluate large areas of the property which have sparse outcrop but which appeared in the basis of geologic mapping to be favourable. Areas of known mineralization were sampled for control purposes. The object of the programme was to establish whether more zones of Mo and W mineralization were exposed at the bedrock surface in such a way as to give rise to coherent soil geochemical anomalies.

The distribution of samples is shown on Figure 8a. A total of 335 samples of B-zone material were taken at regular intervals, on traverses controlled by compass and chain and tied to the existing cut base-line. The minus 80 mesh portions of these samples were analyzed, by Bondar-Clegg and Company Ltd. in North Vancouver, for Cu, Zn, Mo and W; selected samples were later analyzed for Bi.

The results of the analyses are shown on Figures 8b - f. It is apparent that strong coherent anomalies exist in all metals but that these anomalies are restricted to areas of presently known mineralization. A few erratic weakly anomalous results have no obvious cause. Unfortunately, the anomalies in all metals are coincident and there is very little tendency for the anomalous pattern of any one metal to be more extensive than that of any other, although there is some very slight suggestion of a narrow Zn, Cu, W halo on a Mo core in the Main Face area.

The maps included in Appendix B show the results of the much more loosely controlled preliminary geochemical survey. The original Main Face anomaly has been well substantiated by the later work. A much weaker anomaly in Cu, Zn and Mo with some threshold values in W, located some 1500 m southwest of the Main Face anomaly, has at present no known mineralization source. The relative locations of these samples are suspect and a comprehensive soil sampling survey in this area is required, coupled with additional geologic mapping.

GEOPHYSICS

Ground Magnetics

Appendix C1 is a short report by D. Londry detailing results of a preliminary ground magnetometer survey over the northwest portion of the property. The results of this work are somewhat disappointing, as they simply confirm the existence of previously known skarn bodies and do not outline any further areas of interest. Magnetic relief over the bulk of the hornfels is remarkably flat.

Airborne Magnetics

As an adjunct to a regional airborne magnetic programme undertaken in the area during October, a detailed survey (approximately 100 m line spacing) was made of the immediate property area. Scintrex Limited did this work, using Texasgulf's Vancouver-based helicopter, and have experienced considerable difficulty in reducing and plotting the data. Their report is included as Appendix C2.

The regional survey shows that much of the area covered has only very low magnetic relief. However, a significant portion of the ground, only partially covered by the existing claims, is occupied by what might be interpreted as an elongate ring of magnetic 'highs' surrounding a magnetic plateau. This northwest-trending feature measures about 10 by 5 km, and the southwest boundary follows the already defined intrusive - magnetic - mineralization axis between West Hill and the Main Face. More detailed contouring and interpretation of this feature are presently in progress, and will be reported on at a later date.

The detailed flying of the property essentially confirms the picture drawn from geologic mapping and limited ground magnetometer traverses. No additional prominent magnetic features are evident. The high to the south of the property is probably a reflection of the different stratigraphy in the Hawk Pad area.

OVERALL DISCUSSION OF PROPERTY

Work on the BOYA property is obviously at a very preliminary stage; it is too early to make any but the most general remarks concerning the merits of the prospect. Several points should, however, be emphasized.

The property geology suggests the presence of a large intrusive system (over four kilometres in long dimension) with attendant metamorphism, alteration, and mineralization (see Figures 4N, 9). This is very large when compared with many major molybdenum deposits elsewhere. Exposed patterns of metamorphism and mineralization are suggestive of a buried mineralized system. Extensive surface exploration can do no more than provide hints as to the direction that deeper probing should take. The size of the system makes it difficult to imagine how discouraging results in one or two diamond drill holes could be regarded as damning for the property as a whole.

Several non-geological features are considered favourable. Texasgulf Canada Ltd. holds sole mineral rights, so there are no option obligations or royalty payments to be considered. The discovery is new; no backlog of discouraging results exists to be overcome, and the surrounding region may be considered to have potential for discovery of similar occurrences. The prospect has a reasonably favourable location, and a physical situation which would make exploration and development work much less difficult than on many prospects in mountainous terrain. Although some access road construction would be necessary, such road would be relatively easy to build and maintain. It is unlikely that even the most ardent environmentalist could raise meaningful objections to a mine development in this area.

During the last two years, three significant molybdenum deposits have been discovered and partially outlined in quartz-rich rocks intrusive into miogeoclinal strata along the western margin of the North American craton, in British Columbia and Yukon (see Appendix F.) These deposits (Logtung, Red Mountain, and Trout Lake) are presently being aggressively explored by major companies or consortia. In my opinion, the BOYA prospect deserves no less.

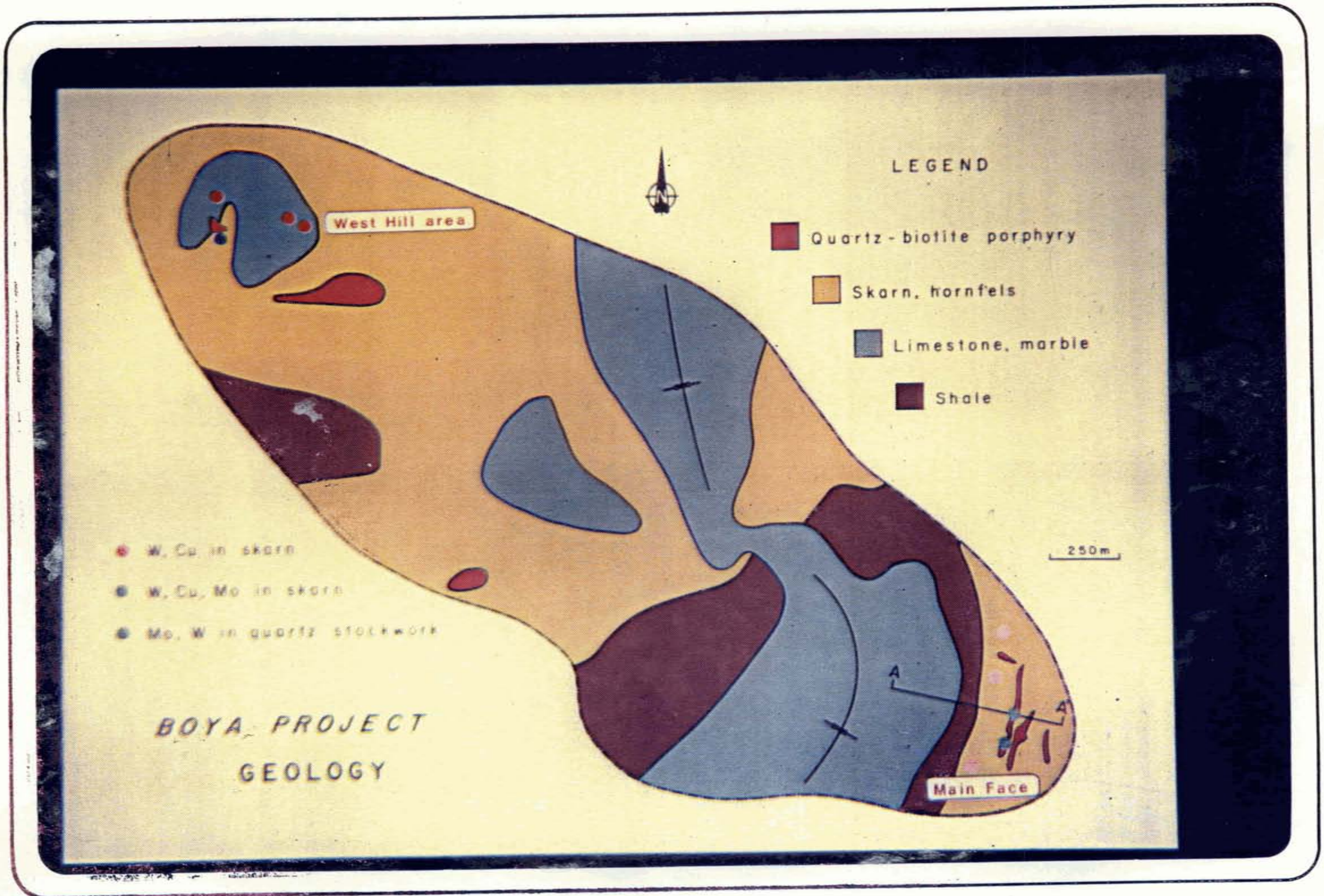
LEGEND
Quartz - biotite porphyry
Skarn, hornfels
Limestone, marble
Shale
West Hill area
W, Cu in skarn
W, Cu, Mo in skarn
Mo, W in quartz stockwork
250m
A
A'
Main Face
BOYA PROJECT
GEOLOGY

Figure 9

FACTORS AFFECTING THE PROPOSED DRILLING PROGRAMME

Mobilization Logistics

The logistics of mobilizing a drilling rig and ancillary gear onto the BOYA property are by no means simple. Several alternatives, or combinations of alternatives, are available and are being studied. The most obvious is to transport the entire drilling outfit by fixed-wing aircraft (Single Otter) from Watson Lake to Graveyard Lake, and thence trans-ship to the property using the Texasgulf Bell 206B helicopter. This is obviously preferable to using the helicopter to move the equipment from Fireside, but is complicated by the fact that Graveyard Lake has no good unloading sites. A jetty or raft would have to be constructed. This is not so much of a problem with respect to such items as drill rods, core boxes, fuel and other articles which either have a relatively low unit weight or can stand accidental immersion in water with no ill effects, but it is a problem for such heavy items as drill motors. A far more suitable technique would seem to be the utilization of a large chartered helicopter for a minimum number of trips to position the drill rig directly onto a prepared site on the property. Frontier Helicopters Ltd. have a Bell 205 (pay-load approximately 3,500 lbs) based at Watson Lake, and this machine could be used to take the drill off a truck at Fireside. Savings would be effected, certainly of time, and probably in terms of total dollars expended. Ancillary gear would be transported by Single Otter and helicopter as described above. The possibility of moving fuel and possibly some other materials up the Kechika River by boat has been considered and rejected as too uncertain, both in terms of timing of suitable water conditions, and of reliability and costs. This is a method which deserves further study for possible future programmes.

Significant savings could be effected by moving all possible supplies, both camp materials and fuel for drilling and helicopter operations, onto Graveyard Lake at such a date that a wheeled or ski-equipped aircraft (probably a Twin Otter) could land on the ice. This course of action would require firm decisions by February or early March. Investigations are presently underway to determine the cost of moving the drill and ancillary gear in on the ice as well and paying the necessary demurrage charges, if any. Hard figures are not available at this time, but there would not likely be any increase in overall costs. Drill bids have been solicited from two major drilling firms.[1]

Proposed Camp Location

It is presently proposed to locate the camp, for all phases of the 1979 programme including diamond drilling and concurrent reconnaissance work, at Graveyard Lake and to commute by helicopter. This is because of a critical shortage of camping sites with potable water on the hill itself, within walking distance of the work areas, and also because it saves the expense of transporting all camp materials and supplies by helicopter from Graveyard Lake to a camp on the hill. This site is also preferable because it can be supplied by fixed-wing aircraft and it can serve as a convenient base for the reconnaissance work.

Drill Water Supply

Water for drilling (but not for drinking) is available from a small stagnant pond north of the Main Face area (see Figure 4N). Distances from this pond to the proposed drilling areas are approximately:

Main Face - 2,000 metres,
West Hill - 3,000 metres.

The existing cut line will provide a suitable trail for laying much of the water line to the West Hill area. It might be possible, in a wet season, to obtain sufficient drill water closer to West Hill, but this cannot be guaranteed.

---

1 Since the above discussion was written, the decision has essentially been taken to put all possible supplies in on the ice. The discussion is left in the report, however, as a possible aid in future planning. No decision has yet been made with respect to the timing of the drill mobilization.

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G.R. Peatfield

G.R. Peatfield

LEGEND

INTRUSIVE ROCKS

7a — Quartz - biotite - feldspar porphyry dykes, sills, and irregular intrusive bodies.

METAMORPHIC ROCKS (Within the thermal aureole of Unit 7c)

D — 'Porcellanite' - fine, banded siliceous skarn, composed of alternating layers of quartz and diopside.

B — Coarse garnet skarn, generally occurring as concordant layers in limestone or marble.

Thin stratiform lenses of pyrrhotite - chalcopyrite - scheelite mineralization in quartz - diopside skarn.

UNMETAMORPHOSED SEDIMENTARY STRATA

5 a — Massive grey weathering limestone, often bedded;
a: local unit of finely bedded limestone, sandy limestone.

4 a — Dark siltstone and shale;
a: local massive white weathering limestone.

3 a — "Volcanic unit" - andesitic flows and breccias;
a: tuffs, tuffaceous shales, chert.

2c — Thinly bedded grey limestone and limey shale.

2b — Finely banded shale, siliceous shale, siltstone, fine sandstone, rare very thin limestone bands.

2a — Quartzite (seen only in the metamorphic zone).

note: Units 2 a - c are intercalated.

SYMBOLS

Bedding.

Cleavage.

Jointing.

Joint filled with quartz vein.

Apparent limit of transition to porcellanite in shales and silty rocks.

Apparent limit of complete transition of all rocks except quartzite to porcellanite.

L.C.P — Legal Corner Post for Mineral Claims.

Note : This map has been revised following topographic survey work completed in 1979 by McElhanney Surveying and Engineering Ltd.

Scale 1 : 2,500

Contour Interval 30 m

Figure 4

Texasgulf Inc.

BOYA CLAIMS

DETAILED GEOLOGY - MAIN FACE

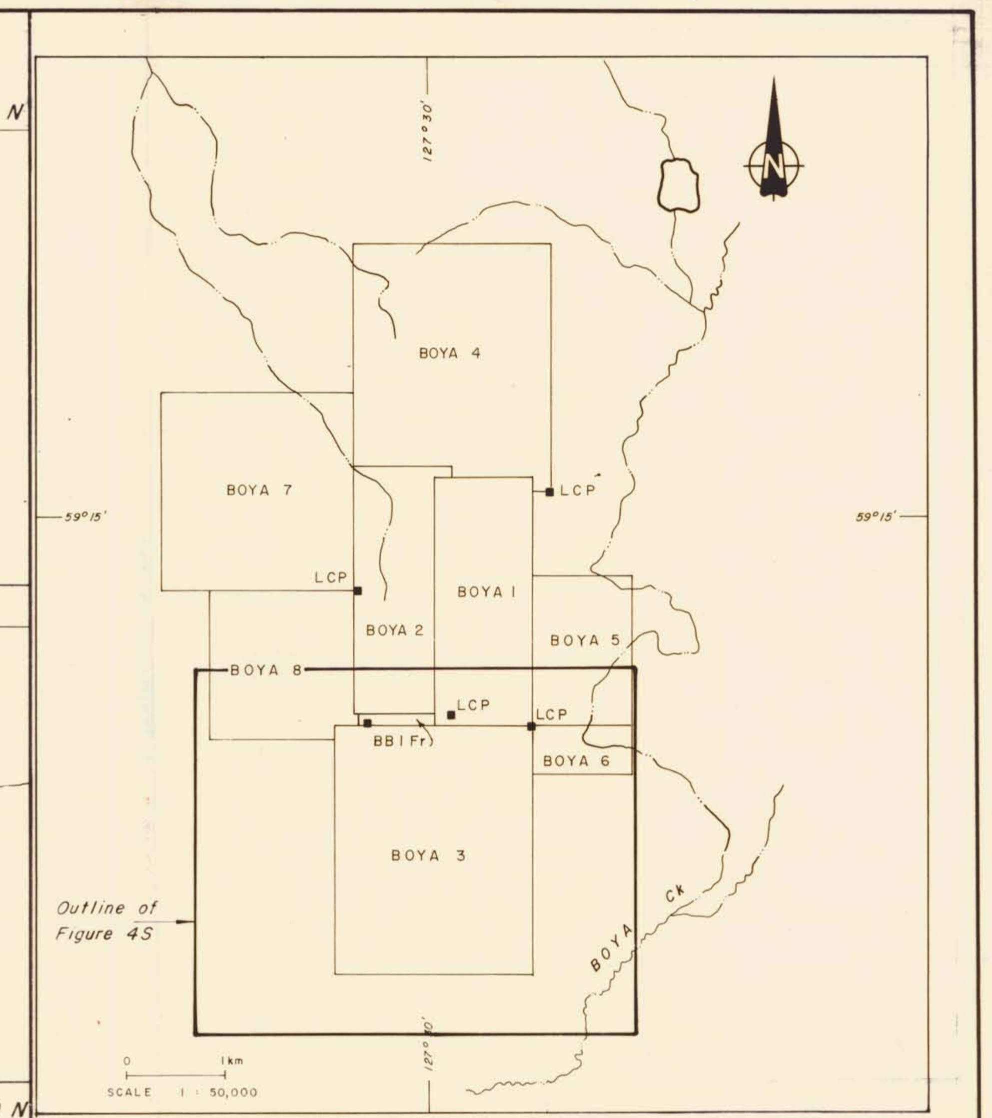
NTS 94M/3W

Proj. 62

WORK BY	DRAWN BY	DATE	DRW,G NO.
G.R.P., C.R.	E.R.	APRIL 28, 1980	

50 0 50 100 150 200

Scale in Metres



LEGEND

INTRUSIVE ROCKS

7c	Quartz - feldspar porphyry dykes.
7b	Quartz porphyry, aplite.
7a	Quartz - biotite - feldspar porphyry.

METAMORPHIC ROCKS (WITHIN THE THERMAL AUREOLE OF UNITS 7a-c)

D	'Porcellanite' - fine, banded siliceous skarn, alternating layers of quartz and diopside.
C	Coarse diopside - quartz skarn, often with appreciable pyrrhotite.
B	Coarse garnet skarn.
A	Hornfels.

note: Marbles are not mapped separately, but are included with unit 5 below.

UNMETAMORPHOSED SEDIMENTARY STRATA

MAIN FACE SECTION

(see Figure 5 for detailed column)

5 a	Massive limestone; a: thin-bedded limestone, sandy limestone.
4 a	Dark shale; a: massive white-weathering limestone.
3	'Volcanic unit' - flows, breccias, tuffs, tuffaceous shales, chert.
2c	Thinly interbedded limestone and limey shale.
2b	Thinly banded shale, limey shale, siliceous shale, fine sandstone.
2a	Quartzite (seen only in the metamorphic zone).

note: units 2a - c are intercalated.

NORTHWEST AREA SECTION

6	Dark shale.
5	Massive limestone and marble.
4b	Shale, sandy shale, fine sandstone.

correlation uncertain

HAWK PAD SECTION

Id	Grit, pebble conglomerate.
Ic	- Dolomite -
Ib	- Limestone -
Ia	- Shales -

CUT LIP HILL SECTION

Ic, Ib, Ia

SYMBOLS

- bedding
- cleavage
- jointing
- joints with quartz veins
- x sub-outcrop
- Legal Corner Post for Mineral Claims

Apparent limit of transition to porcellanite in shales and silty rocks, or to hornfels in more quartz-rich clastic rocks.

Apparent limit of complete transition of all rocks except quartzite to porcellanite.

Scale 1:5,000 Contour interval 60 m

Figure 4S

Texasgulf Inc.

BOYA CLAIMS

GEOLOGY - SOUTH SHEET

NTS 94M/3W, 4E Proj. 62

WORK BY	DRAWN BY	DATE	DRW,G NO.
G.R.P., C.R.	E.R.	December 1978	

100 0 100 200 300 400

Scale in Metres

583,000 E
584,000 E
585,000 E
586,000 E
587,000 E
6,569,000 N
6,568,000 N
6,567,000 N
865
805
925
985
1045
745
BOYA 4
BOYA 7
BOYA 1
BOYA 2
BOYA 5
BOYA 8
BOYA 6
BOYA 3
LCP
SCALE 1:50,000
LEGEND
All sample numbers on report sheets are of the form 62 - # - 78
Cut line traverse
Chain and compass traverse
Chained contour traverse
Scale 1:5,000
Contour interval 60 m
Figure 8a
Texasgulf Inc.
BOYA CLAIMS
SOIL GEOCHEMISTRY
SAMPLE LOCATIONS
NTS 94M/3W, 4E, 5E, 6W
Proj. 62
WORK BY
DRAWN BY
DATE
DRW'G NO
G.R.P.
E.R.
SEPT. 1978
Scale in Metres

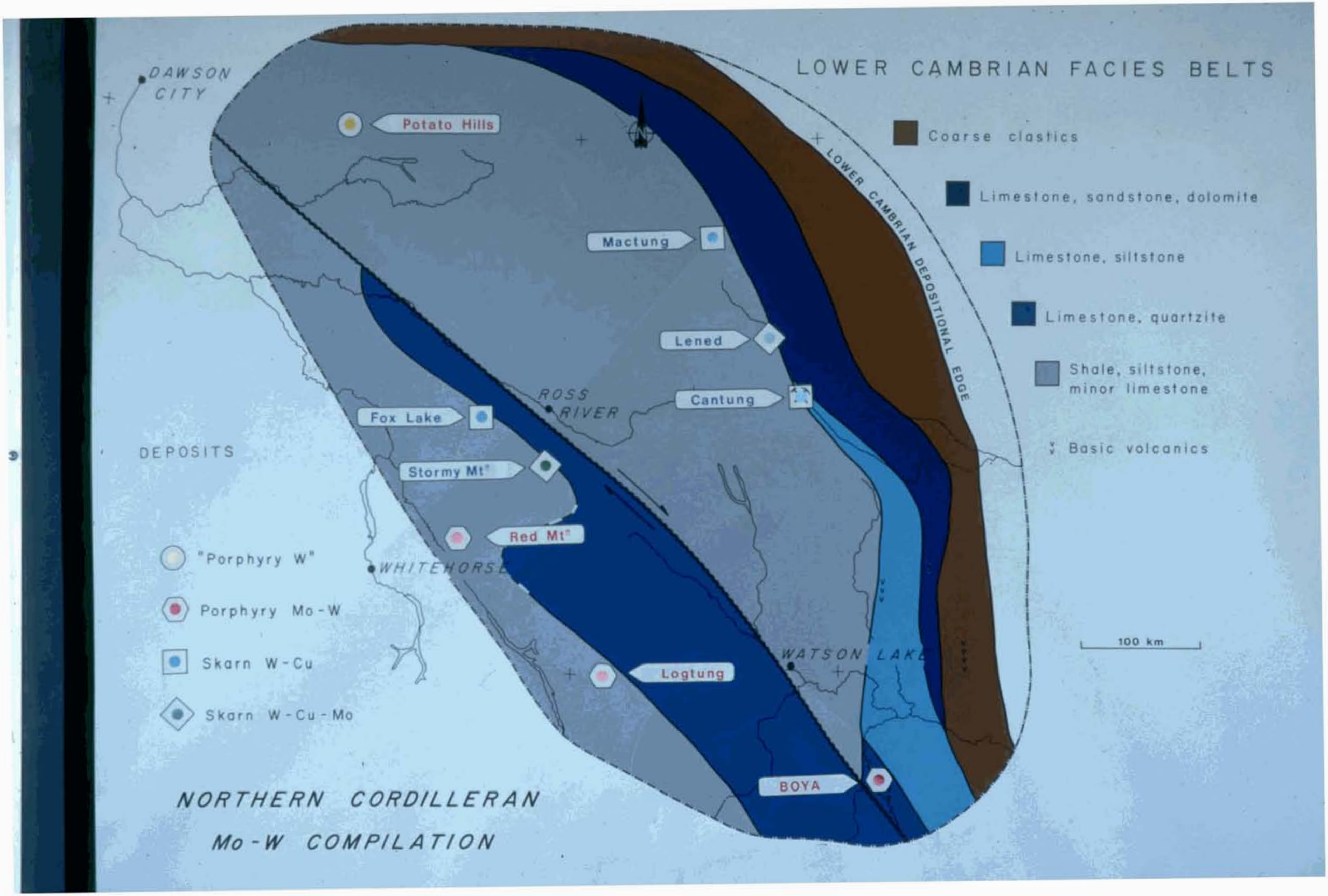
583,000 E
584,000 E
585,000 E
586,000 E
587,000 E
6,569,000 N
6,568,000 N
6,567,000 N
BOYA 1
BOYA 2
BOYA 3
BOYA 4
BOYA 5
BOYA 6
BOYA 7
BOYA 8
LCP
Contour intervals:
1 - 25
26 - 50
51 - 100
101 - 200
201 - 400
401+
Number of samples
Value interval (ppm)
LEGEND
All sample numbers on report sheets are of the form 62-#-78
Cut line traverse
Chain and compass traverse
Chained contour traverse
Scale 1:5,000
Contour interval 60 m
Figure 8d
Texasgulf Inc.
BOYA CLAIMS
SOIL GEOCHEMISTRY
Cu in soils (ppm)
NTS 94M/3W, 4E, 5E, 6W
Proj. 62
WORK BY
G.R.P.
DRAWN BY
E.R.
DATE
SEPT. 1978
DRW'G NO.
Scale in Metres


583,000 E
584,000 E
585,000 E
586,000 E
587,000 E
6,569,000 N
6,568,000 N
6,567,000 N
865
805
925
985
1045
745
BOYA 4
BOYA 7
BOYA 1
BOYA 2
BOYA 5
BOYA 8
BOYA 6
BOYA 3
LCP
BB 1 (Fr)
SCALE 1 : 50,000
Number of samples
Value interval (ppm)
Contour intervals
0 - 7
8 - 15
16 - 30
31 - 60
61 - 120
121 +
LEGEND
All sample numbers on report sheets are of the form 62 - # - 78
Cut line traverse
Chain and compass traverse
Chained contour traverse
Scale 1 : 5,000
Contour interval 60 m
Figure 8 b
Texasgulf Inc.
BOYA CLAIMS
SOIL GEOCHEMISTRY
W in soils (ppm)
NTS 94M/3W, 4E, 5E, 6W
Proj. 62
WORK BY
G.R.P.
DRAWN BY
E.R.
DATE
SEPT. 1978
DRW,G NO.
Scale in Metres

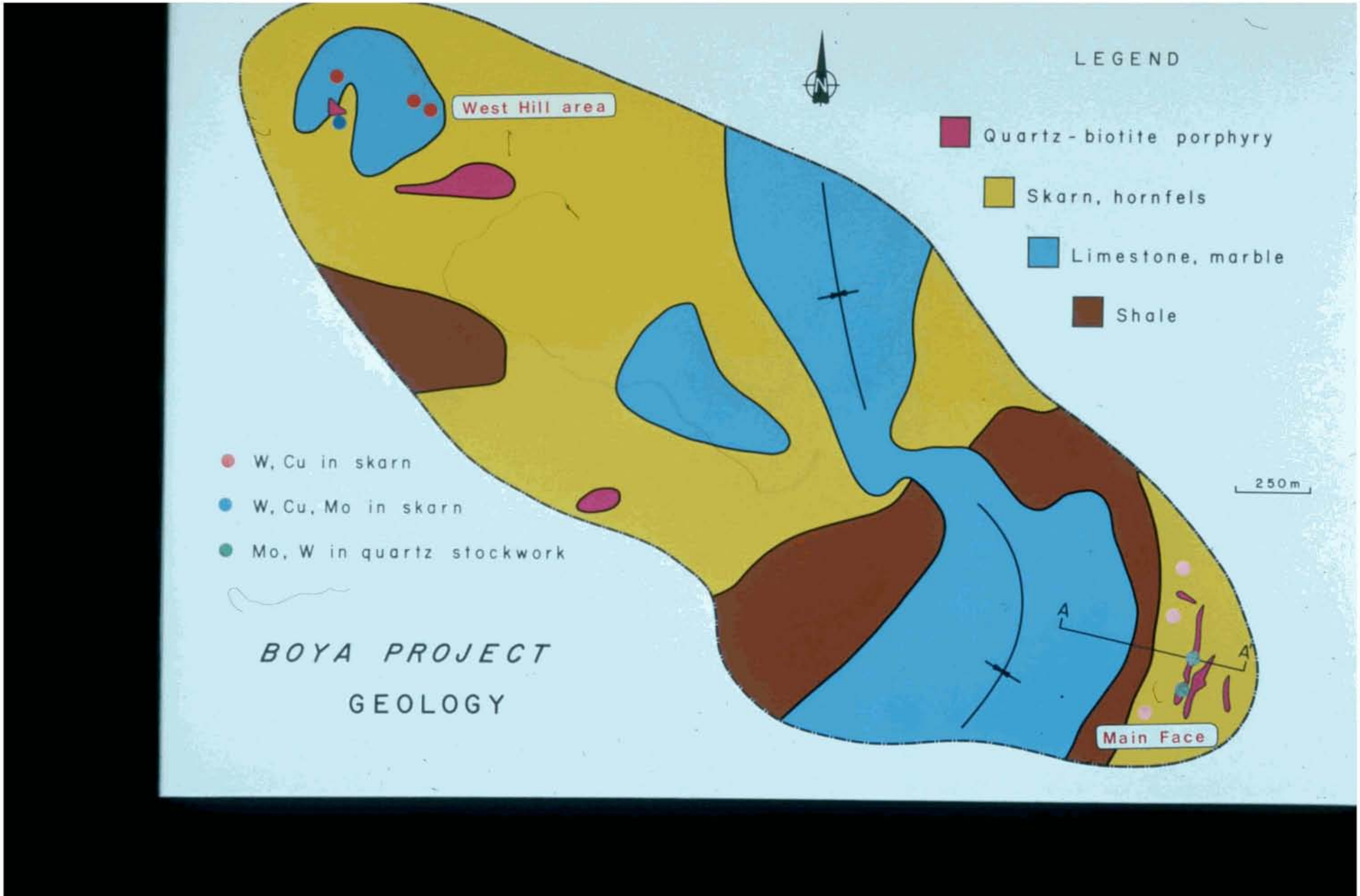

583,000 E
584,000 E
585,000 E
586,000 E
587,000 E
6,569,000 N
6,568,000 N
6,567,000 N
745
805
865
925
985
1045
BOYA 1
BOYA 2
BOYA 3
BOYA 4
BOYA 5
BOYA 6
BOYA 7
BOYA 8
LCP
BOYA Ck
SCALE 1 : 50,000
127°30'
Number of samples
Value interval (ppm)
Contour intervals:
1 - 4
5 - 10
11 - 20
21 - 40
41 - 80
81 +
LEGEND
All sample numbers on report sheets are of the form 62 - # - 78
Cut line traverse
Chain and compass traverse
Chained contour traverse
Scale 1 : 5,000
Contour interval 60 m
Texasgulf Inc.
BOYA CLAIMS
SOIL GEOCHEMISTRY
Mo in soils (ppm)
NTS 94M/3W, 4E, 5E, 6W
Proj. 62
WORK BY
G.R.P.
DRAWN BY
E.R.
DATE
SEPT. 1978
DRW,G NO.
Scale in Metres
Figure 8c

583,000 E
584,000 E
585,000 E
586,000 E
587,000 E
6,569,000 N
6,568,000 N
6,567,000 N
BOYA 1
BOYA 2
BOYA 3
BOYA 4
BOYA 5
BOYA 6
BOYA 7
BOYA 8
LCP
Contour intervals:
1 - 100
101 - 200
201 - 400
401 - 800
801 - 1600
1600 +
Number of samples
Value interval (ppm)
LEGEND
All sample numbers on report sheets are of the form 62-#-78
Cut line traverse
Chain and compass traverse
Chained contour traverse
Scale 1:5,000
Contour interval 60 m
Figure 8e
Texasgulf Inc.
BOYA CLAIMS
SOIL GEOCHEMISTRY
Zn in soils (ppm)
NTS 94M/3W, 4E, 5E, 6W
Proj. 62
WORK BY
DRAWN BY
DATE
DRW.G NO
G.R.P.
E.R.
SEPT. 1978
Scale in Metres

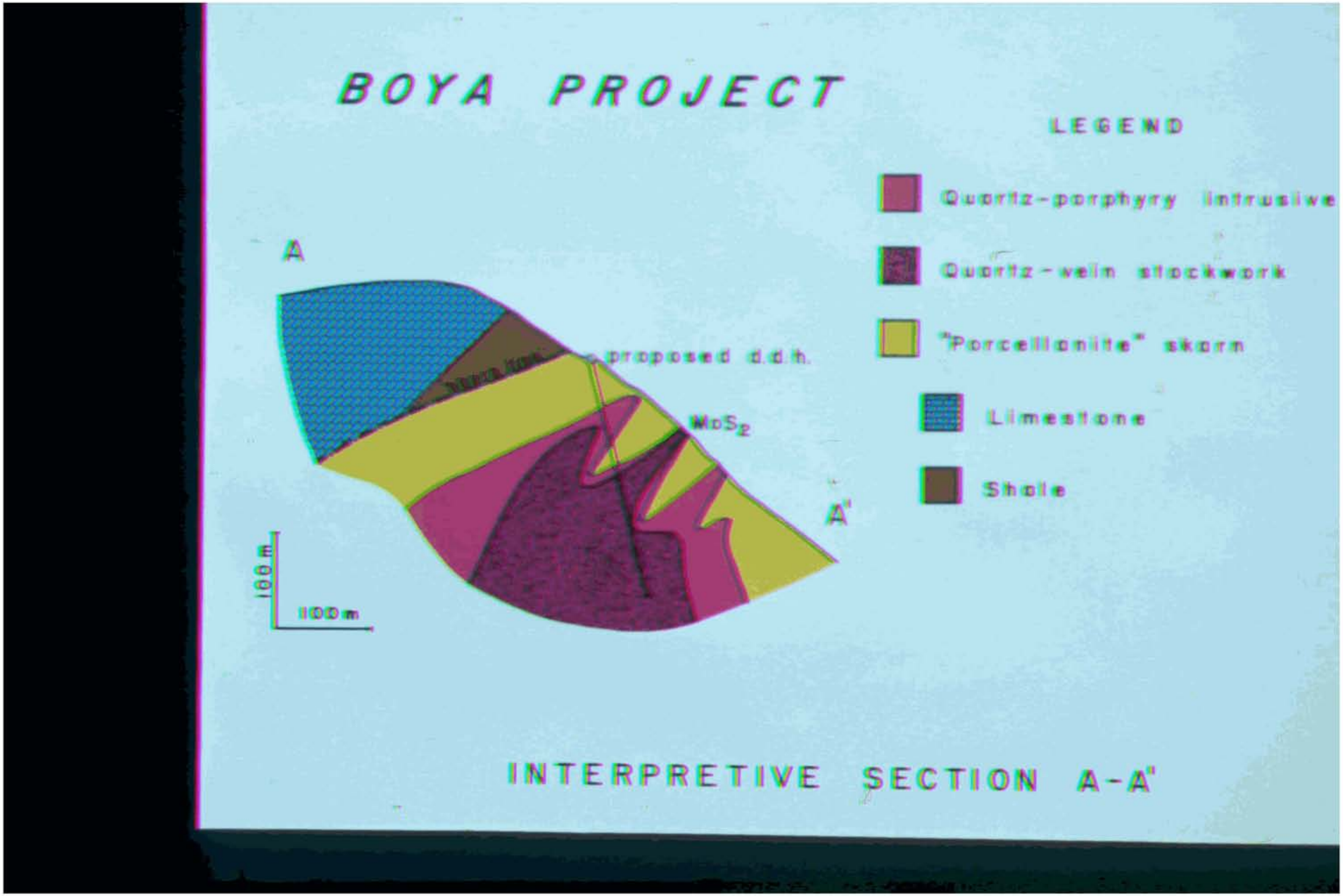

583,000 E
584,000 E
585,000 E
586,000 E
587,000 E
6,569,000 N
6,568,000 N
6,567,000 N
865
805
925
985
1045
745
BOYA 1
BOYA 2
BOYA 3
BOYA 4
BOYA 5
BOYA 6
BOYA 7
BOYA 8
LCP
SCALE 1 : 50,000
Contour intervals
1 - 2
3 - 5
6 - 10
11 - 20
21 - 40
41+
Number of samples
Value interval (ppm)
LEGEND
All sample numbers on report sheets
are of the form 62 - # - 78
Cut line traverse
Chain and compass traverse
Chained contour traverse
Scale 1 : 5,000
Contour interval 60 m
Figure 8f
Texasgulf Inc.
BOYA CLAIMS
SOIL GEOCHEMISTRY
Bi in soils (ppm)
NTS 94M/3W, 4E, 5E, 6W
Proj. 62
WORK BY
G.R.P.
DRAWN BY
E.R.
DATE
SEPT. 1978
DRW,G NO.
100 0 100 200 300 400
Scale in Metres



LOWER CAMBRIAN FACIES BELTS
Coarse clastics
Limestone, sandstone, dolomite
Limestone, siltstone
Limestone, quartzite
Shale, siltstone, minor limestone
Basic volcanics
100 km
LOWER CAMBRIAN DEPOSITIONAL EDGE
DAWSON CITY
ROSS RIVER
WHITEHORSE
WATSON LAKE
Potato Hills
Mactung
Lened
Cantung
Fox Lake
Stormy Mtn
Red Mtn
Logtung
BOYA
DEPOSITS
"Porphyry W"
Porphyry Mo-W
Skarn W-Cu
Skarn W-Cu-Mo
NORTHERN CORDILLERAN
Mo-W COMPILATION



LEGEND
Quartz - biotite porphyry
Skarn, hornfels
Limestone, marble
Shale
West Hill area
N
250m
W, Cu in skarn
W, Cu, Mo in skarn
Mo, W in quartz stockwork
A
A'
Main Face
BOYA PROJECT
GEOLOGY


BOYA PROJECT
LEGEND
Quartz-porphyry intrusive
Quartz-vein stockwork
"Porcellanite" skarn
Limestone
Shale
A
proposed d.d.h.
MoS_2
A'
100m
100m
INTERPRETIVE SECTION A-A'