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A GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL REPORT

ON

THE FYRE LAKE MASSIVE SULPHIDE DEPOSITS

KONA MINERAL CLAIMS

N.T.S. 105G/2

YUKON TERRITORY

FOR THE PERIOD TO SEPTEMBER 9, 1981

BY W. JAMES CRAWFORD

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 13,600 —.

A Watson

for Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

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KONA PROPERTY ***View to the West across Massive Pyrite, ZONE "E"*** frontispiece

SUMMARY

The Fyre Lake massive pyrite showing with contained copper, zinc, gold and silver was acquired by the Basin Project of Welcome North Mines on August 23, 1980. The deposit was staked as the KONA Claims after the discovery of a disseminated chalcopyrite extension to the original showings.

Sixty-eight claims comprising the KONA Claim Group were staked in early September, 1980, in accordance with the Yukon Quartz Mining Act. The claims cover approximately 1421 hectares. The claims lie above Fyre Lake, within the Whitehorse Mining District on N.T.S. 105G/2 at 61°15' north latitude and 130°31' west longitude. The property is situated 120 km south of the Robert Campbell Highway by a feasible route along Money Creek.

The full potential of the property, due to an unseasonably early September, 1980 snowfall, has not been fully assessed in the field. However, the major mineralized zones were examined by the author. In addition, the 1981 Basin Project ran and soil-sampled 16.9 km of geochemical grid lines over possible extensions of the Fyre Lake Showing. In conjunction with this report, all available geological, geophysical and geochemical data were incorporated courtesy of Cassiar Asbestos and Atlas Explorations, who previously explored the property during the early 1960's.

The KONA trend extends northwesterly for 2.5 km through an open alpine area with intermittent showings in creeks, cliffs and scree. Drilling by Cassiar and Atlas (805 m of AX size core) indicated a near surface and sub-horizontal mineralized zone ranging in thickness from 7.3 to 13 m. The mineralization, essentially cupriferous iron formation facies, varies in character from laminated massive pyrite-chalcopyrite-sphalerite-quartz, through banded cupriferous iron formation (quartz-magnetite-chlorite-chalcopyrite-sphalerite) to disseminated chalcopyrite and pyrite in greenschists. The KONA mineralization occurs within the

SUMMARY (cont'd.)

Nisutlin Allochthon in a dark-green chlorite schist unit about 100 m below the contact with the overlying quartz-sercite schist.

Magnetometer and EM survey anomalies show good response to, and coincidence with, mineralized outcrops, mineralization intersected in drill holes and associated Cu-geochemical anomalies. The 1981 soil geochemical survey clearly delineated the northwest trending cupriferous zone. This zone of essentially cupriferous iron formation facies grades over 1500 m from massive sulphides (pyrite and chalcopyrite) through oxide iron formation (magnetite and chalcopyrite) into cupriferous greenschists (chalcopyrite).

Previous workers in the late 1960's considered the mineralization to be fault controlled. Although the property could not be thoroughly examined by the author, the copper mineralization massive sulphides and associated iron formation facies in chlorite schists and greenstones, according to current theories, suggest an original volcanogenic origin in crystal tuffs, flows and sills. In fact, a recent paper on massive sulphides in the Klondike schist of the Fyre Lake area (Morin, 1981) proposes a Besshi-type volcanogenic exhalative model. These factors, plus the widespread occurrence of massive sulphide locally within the Klondike schist clearly justifies an ongoing program.

INTRODUCTION

The KONA Property was acquired through staking by Welcome North Mines as part of the Basin, 1980 regional exploration of the southeastern Yukon. The claim group covers the previously known Fyre Lake massive sulphide and related cupriferous iron formation deposits. These deposits were the subjects of exploratory drilling by Cassiar Asbestos Corporation and Atlas Explorations Ltd. in 1961 and 1966 respectively.

New mineral discoveries made in 1980 by Welcome North's Basin Project appear to add significantly to the mineral potential of the area. The remapping of the area in 1974-1977 by D.J. Tempelman-Kluit of the Geo-Logical Survey of Canada has necessitated the re-interpretation of prior exploration results through present-day geological concepts. These modern concepts, especially in regard to suture zones and volcanogenic deposits reinforce the conclusion that the property warrants additional work.

Since the new KONA deposits were discovered late in the 1980 field season, work on the property was seriously curtailed by unseasonably early snowfalls. During 1981, the Basin Project, in an attempt to delineate possible extensions of the main mineralized zone, ran 16.9 km of geochemical grid lines. These lines, extensions of the original Atlas grid, as shown on the maps, were run and sampled by Ketza Enterprises of Ross River and analyzed for Cu/Pb/Zn by Barringer Magenta. This report covers the Basin Project's 1980 geological mapping, the 1981 geochemical survey, plus previous geological, geochemical and geophysical surveys accomplished by Cassiar Asbestos and Atlas. The excellent nature of the Cassiar and Atlas work is hereby acknowledged.

The surface expression of the Fyre Lake deposits form an impressive outcrop (frontispiece). Sampling and diamond drilling of the outcrop has confirmed the significant dimensions and grade of the deposit. In spite

LOCATION AND ACCESS

The Fyre Lake showings and KONA Mineral Claims are located at 61° 15'N latitude and 130° 30' West longitude 120 km southeast along the Tintina fault from Ross River (Fig.1). The claims lie within the Watson Lake Mining District, N.T.S. 105G/2 in the Yukon Territory.

Fyre Lake lies within the Simpson Range of the eastern Pelly Mountains, just to the east of the Tintina fault valley. Topographic relief in the glaciated but somewhat subdued mountains ranges from 1200 m valley floors to 1900 m ridge crests. Peak 7721 (2351 m) north of the Property is the highest point in the area. The Fyre Lake area, in general, is characterized by linear open valleys and high rolling to craggy ridges and mountains. As a result of glaciation, an extensive till cover renders prospecting somewhat slow and tedious as outcrops are limited to stream canyons and cliffs. Near Fyre Lake a dense spruce forest extends to treeline at 1500 m. To the north, the dense forest gives way to an open forest, buckbrush (dwarf birch) and eventually to cariboo moss.

The Fyre Lake showings, at a 1465 m elevation, outcrop along mountain streams in relatively open valley. Streams appear to hold flows of water sufficient for drill purposes at least into mid-September. The mountain stream drains down 6 km to Fyre Lake where Atlas Explorations camped in 1966. Near the outlet of Fyre Lake, an outfitter, Doug Smarch, of Teslin maintains a cabin and hunting camp. At the northwest end of the lake a fine sandy beach is backed by a pleasant jackpine grove. Present access to Fyre Lake is by either float equipped fixed wing aircraft or helicopter from Ross River 120 km to the north-west, or Watson Lake 160 km to the southeast.

In 1980 Welcome North worked the area from a conveniently located camp near Frances Lake, at Ceasar Creek on the Robert Campbell highway. The 50 km trip to the property via the virtually all weather route up Money Creek with a Hughes 500C usually took twenty minutes. A tote road from the Robert Campbell Highway runs via the Hoole River to the Hoo Property about 50 km northwest of Fyre Lake.

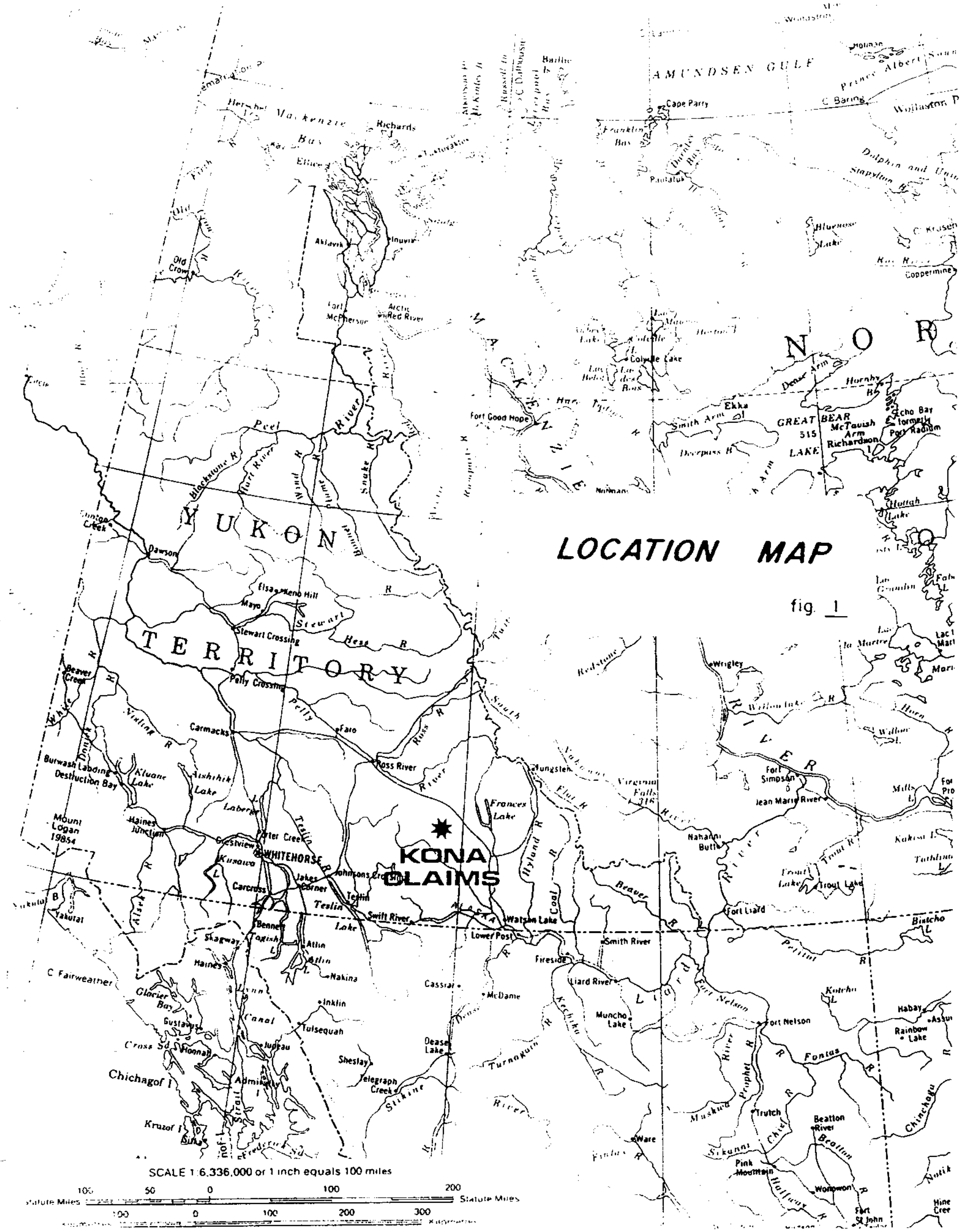

LOCATION MAP
fig. 1
KONA CLAIMS
YUKON TERRITORY
WHITEHORSE
Dawson
Mayo
Elsa
Keno Hill
Stewart Crossing
Pelly Crossing
Carmacks
Faro
Ross River
Teslin
Watson Lake
Lower Post
Carcross
Haines Junction
Burwash Landing
Destruction Bay
Inuvik
Aklavik
Fort McPherson
Fort Good Hope
Fort Simpson
Fort Liard
Fort Nelson
Tungsten
Cassiar
Dease Lake
Atlin
Skagway
Haines
AMUNDSEN GULF
GREAT BEAR LAKE
SCALE 1:6,336,000 or 1 inch equals 100 miles
Statute Miles

FIG. 1

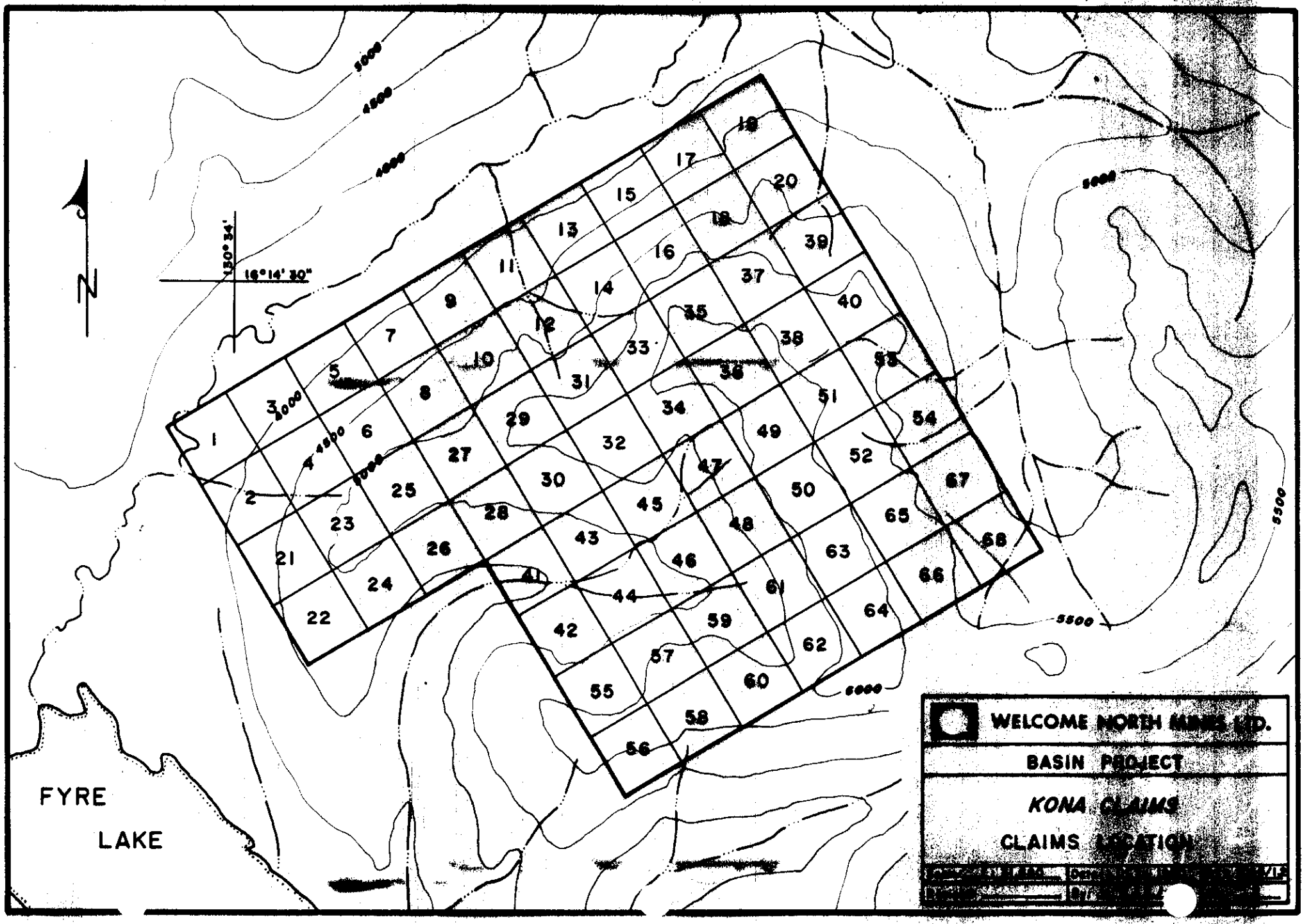
MINERAL CLAIMS STATUS

A total of sixty-eight claims have been staked to cover the Fyre Lake showings. The KONA Claims have been staked and recorded in accordance with the provisions of the Yukon Quartz Mining Act. These claims comrpise a total of approximately 1421 hectares. The claims have been accepted for recording as follows:

CLAIMS	DATE RECORDED	GRANT NUMBERS	EXPIRY DATE
KONA 1-68	Sept. 9, 1980	YA56560 to YA56627	Sept. 9, 1983*

The KONA Claims are held on a joint venture basis by Welcome North Mines Ltd. and Esperanza Explorations Ltd. as a result of a 50-50 Basin Project participation. The KONA Claims are unencumbered by any overriding interests or royalties. However, the claims are subject to a prospecting agreement with one of Welcome North's prospectors under a prospectors incentive bonus.

* Subject to acceptance of work currently being filed as assessment work


N
130° 34'
16° 14' 30"
5000
4500
4000
5000
5500
5500
6000
FYRE
LAKE
WELCOME NORTH MINES LTD.
BASIN PROJECT
KONA CLAIMS
CLAIMS LOCATION

HISTORY

The Pelly Mountains were originally mapped on a reconnaissance basis by the Geological Survey of Canada during 1959 (Wheeler et al., 1960). In the following year (September 1960) the Fyre Lake showings were discovered by Cassiar Asbestos Corporation and staked as the TOP Claims (Fig.3). The claims covered the original find - a two metre diameter sulphide float boulder found in the vicinity of the outfitters cabin, the massive pyrite showing, Zone 'E', plus other less significant finds. During 1960 and 1961, Cassiar drilled 24 shallow packsack diamond drill holes and 12 deeper AX holes for a total of 805 m. The company reported an average grade of mineralization encountered in drilling as 1.01% copper, 0.14 oz/ton silver (4.80 g/t), 0.021 oz/ton gold (0.72 g/t) and 0.95% zinc (Table 3).

In January 1966, Atlas Explorations restaked the original Fyre Lake showings as the DUB Claims and conducted extensive airborne and ground magnetometer and electromagnetic surveys, plus geochemical surveys for copper, lead and zinc. Cassiar anomalies (#2 and #4, see Fig.18) were tested by six AX diamond drill holes (589 m drilled in total). The drilling extended the limits of cupriferous iron formation as outlined by previous Cassiar drilling. Intersections to 12.2 m in thickness were reported in this drilling (Table 4).

In 1967 Atlas drilled three AX diamond drill holes into the DUB 1 showing anomaly near the original float boulder (showing 11). The drilling indicated the presence of a mineralized zone with extensive disseminated pyrite and pyrrhotite (enough to account for the anomaly) but no economic intersections were encountered.

SUMMARY OF EXPLORATION HISTORY

1960 - Fyre Lake massive sulphide showing discovered by Cassiar Asbestos exploration crew and staked as TOP Claims.

1960 - 1961 Cassiar dilled twenty-four packsack drill holes and twelve AX diamond drill holes for a total of 805 m.

1966 - Atlas Explorations restaked showing as DUB Claims, conducted an extensive airborne and ground magnetometer and EM survey, plus a Cu/Zn/Pb sould grid, drilled six AX diamond drill holes for a total of 589 m. Best intersection was 12.2 m massive sulphides.

1967 - Atlas drilled three AX diamond drill holes in DUB #1 showing near Fyre Lake.

1976 - Amax restaked showing as Fyre Claims, undertook limited mapping.

1980 - Welcome North - Basin Project restaked showing as KONA Claims; property mapping and compilation of previous data.

1981 - Basin Project - geochemical soil grid over possible extensions at mineralized trend; revision of 1980 report (this report) for assessment purposes.

HISTORY (cont'd.)

During 1974 to 1977, D.J. Tempelman Kluit of the Geological Survey of Canada remapped and extensively revised the geology of the Pelly Mountains. Subsequently, in July, 1976, AMAX restaked the massive pyrite showing as the FYRE Claims and undertook limited geological mapping. Lack of funding for the project caused the claims to be dropped in 1977.

Recent studies by Morin (1981) on the Fyre Lake-type massive sulphides have indicated that the sulphides are of primary volcanogenic orgin. Erdmer (1981) has recently examined in detail the Money Klippen.

The discovery of disseminated chalcopyrite in greenschists some 2 km north of the previously known pyrite showings, prompted Welcome North to stake the KONA Claim Group in August, 1980. Early snowfalls and other priorities prevented the accomplishment of any comprehensive program on the claim group. Therefore, the information presented herein mainly represents a compilation of previously known results.

During 1981, the Welcome North - Basin Project contracted geochemical assessment work on the KONA Property. A Ketza Enterprises crew ran and soil-sampled 16.5 m of grid lines. The results for the 255 soil samples as analyzed for Cu/Pb/Zn ppm are summarized under Exploration Results - Geochemistry.

REGIONAL GEOLOGY

The regional geologic setting of the eastern Pelly Mountains as recently and imaginatively re-interpretated by D. J. Tempelman-Kluit (1979) is best illustrated by the Money Klippen immediately north of the property (Figures 4 and 5.). Here, Tempelman-Kluit identified three allochthonous thrust sheets of regional extent, derived from the Teslin Suture Zone 130 km to the west. These allochthons, in the eastern Pelly Mountains, rest upon the autochthonous, Pelly gneiss and Pelly-Cassiar Platform sediments of the Omineca Crystalline Belt, and sediments of the Selwyn Basin.

The lowest allochthon, the Nisutlin Allochthon (4) forms the main ridges of the area, and consists of schists and mylonitonized quartzites. North of Fyre Lake, the main valleys are apparently underlain by the Pelly augen gneisses (8). The overlying allochthons are restricted to isolated klippens. The Anvil-Campbell Allochthon contains greenstones, serpentinized basaltic pillow lavas (ophiolites), and ultramafic rocks. The uppermost thrust sheet, the Simpson Allochthon comprises sheared quartz monzonite and granodiorite (2). These thrusts and autochthonous units have been intruded by a post tectonic (?) quartz monzonite (1) and its migmatitic equivalent (1 +) of Cretaceous age.

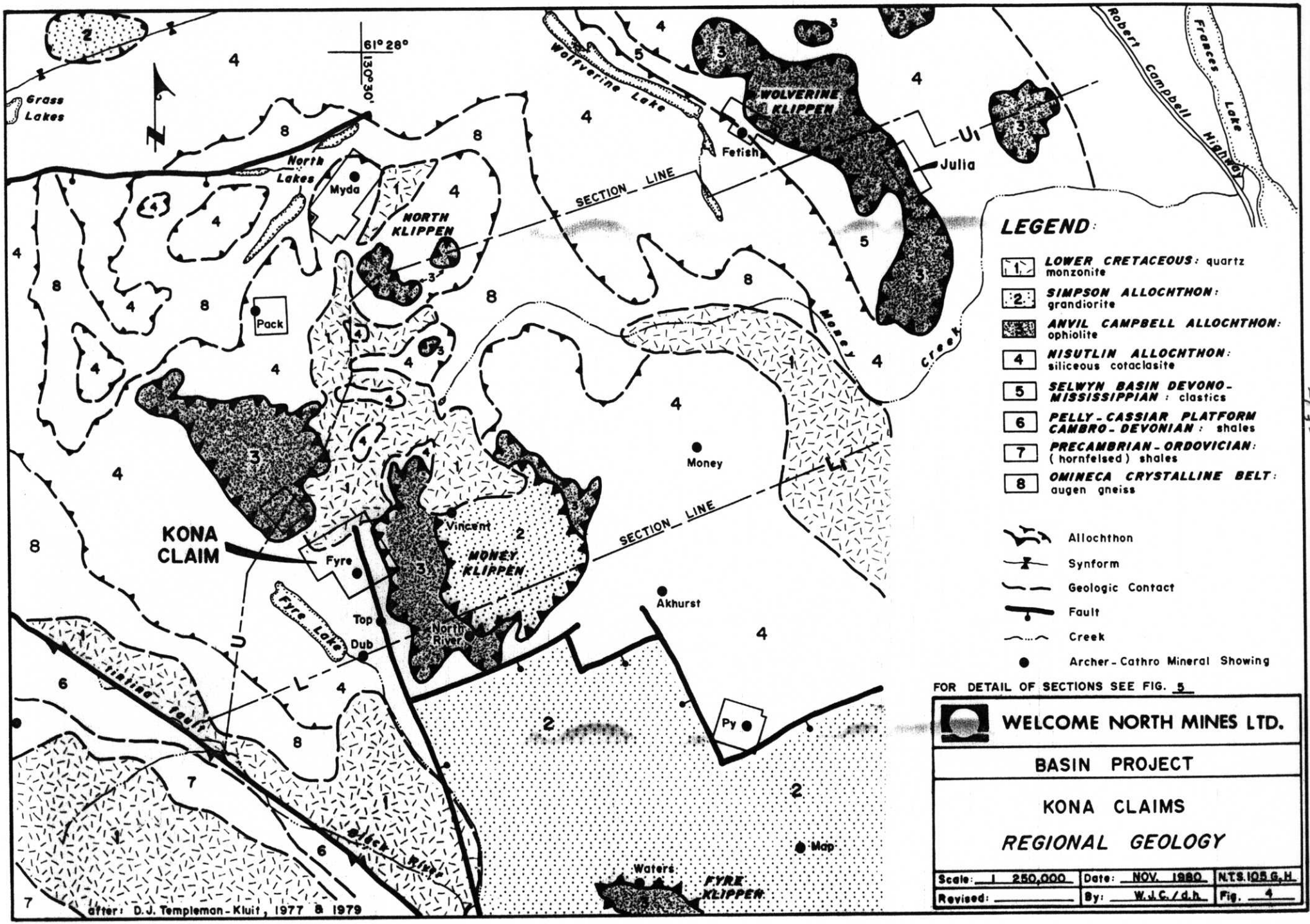
In the Fyre Lake area, the Nisutlin schists host most mineral occurrences (Fig.6). One exception is, however, the JULIA massive pyrite showings, also discovered by Welcome North which occurs in the Wolverine Klippen on the eastern edge of the Anvil-Campbell Allochthon.

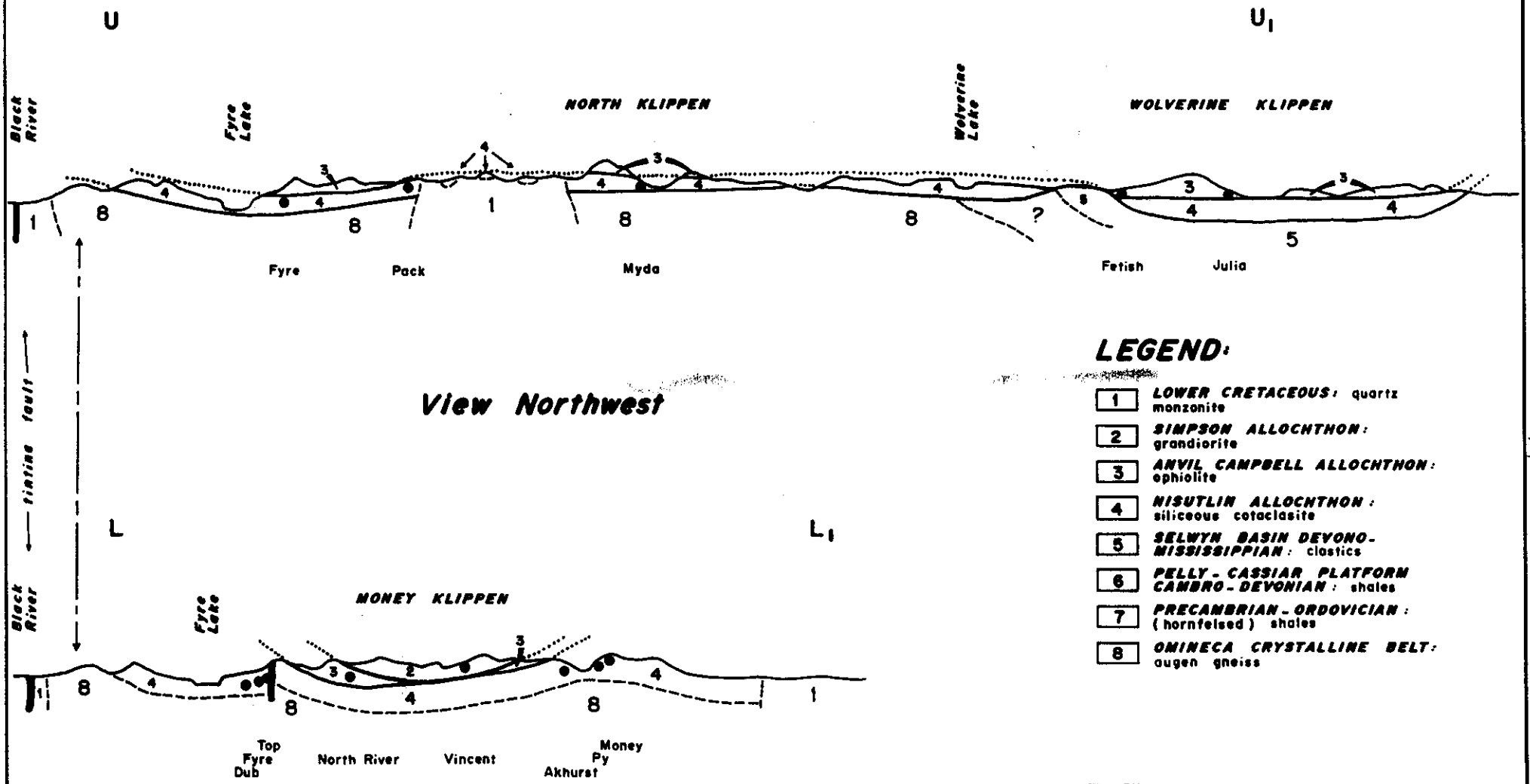
PROPERTY GEOLOGY

Within the Nisutlin schist unit, on the KONA Property, a dark green chlorite schist hosts virtually all known mineral occurrences (Figures 7 & 8). These quartz-chlorite schists and included greenstones (epidiorites?), according to current theories on the genesis of massive sulphide deposits, represent the metamorphic equivalent of crystal tuffs, flows and sills of an original volcanogenic setting.

The chlorite schists, at the pyrite showing, intertongue with the overlying quartz sericite schist to the north, whereas, to the north, these units are in abrupt contact. In both areas, the main sulphide horizons lie approximately 130 m below the contact. The intertonguing relationship is not fully understood because of limited field data and even more limited outcrops. However, the various schists may represent original pelitic sediments - and/or acidic to basic volcanic facies relationships. The alternative possibility is - in view of the metamorphism and structural complexity-recumbent infolding. Nevertheless, mineralization does appear to follow clearly defined horizons.

In addition, the transition from intermediate to basic volcanics (greenstones) with associated disseminated chalcopyrite on the north to intermediate acidic volcanics(crystal tuffs) with massive pyrite to the south, strongly suggest a volcanogenic massive pyrite setting.


61° 28°
130° 30'
Grass Lakes
North Lakes
Myda
Pack
NORTH KLIPPEN
Wolverine Lake
WOLVERINE KLIPPEN
Fetish
Julia
Robert Campbell Highway
Frances Lake
SECTION LINE
Money Creek
Money
KONA CLAIM
Fyre
Vincent
MONEY KLIPPEN
SECTION LINE
Akhurst
Top
Dub
North River
Fyre Lake
Tintina fault
Py
Map
Waters
FYRE KLIPPEN
after: D.J. Templeman-Kluit, 1977 & 1979
LEGEND:
1 LOWER CRETACEOUS: quartz monzonite
2 SIMPSON ALLOCHTHON: grandiorite
ANVIL CAMPBELL ALLOCHTHON: ophiolite
4 NISUTLIN ALLOCHTHON: siliceous cataclasite
5 SELWYN BASIN DEVONO-MISSISSIPPIAN: clastics
6 PELLY-CASSIAR PLATFORM CAMBRO-DEVONIAN: shales
7 PRECAMBRIAN-ORDOVICIAN: (hornfelsed) shales
8 OMINECA CRYSTALLINE BELT: augen gneiss
Allochthon
Synform
Geologic Contact
Fault
Creek
Archer-Cathro Mineral Showing
FOR DETAIL OF SECTIONS SEE FIG. 5
WELCOME NORTH MINES LTD.
BASIN PROJECT
KONA CLAIMS
REGIONAL GEOLOGY
Scale: 1 250,000
Date: NOV. 1980
N.T.S. 105 G, H
Revised:
By: W.J.C./d.h.
Fig. 4



LEGEND:

1. **LOWER CRETACEOUS:** quartz monzonite
2. **SIMPSON ALLOCHTHON:** grandiorite
3. **ANVIL CAMPBELL ALLOCHTHON:** ophiolite
4. **NISUTLIN ALLOCHTHON:** siliceous cataclasite
5. **SELWYN BASIN DEVONO-MISSISSIPPIAN:** clastics
6. **PELLY - CASSIAR PLATFORM CAMBRO - DEVONIAN:** shales
7. **PRECAMBRIAN - ORDOVICIAN:** (hornfelsed) shales
8. **OMINECA CRYSTALLINE BELT:** augen gneiss

SYMBOLS:

- Geologic Contact
- Thrust Fault
- Fault
- Archer - Cathro Mineral Showing

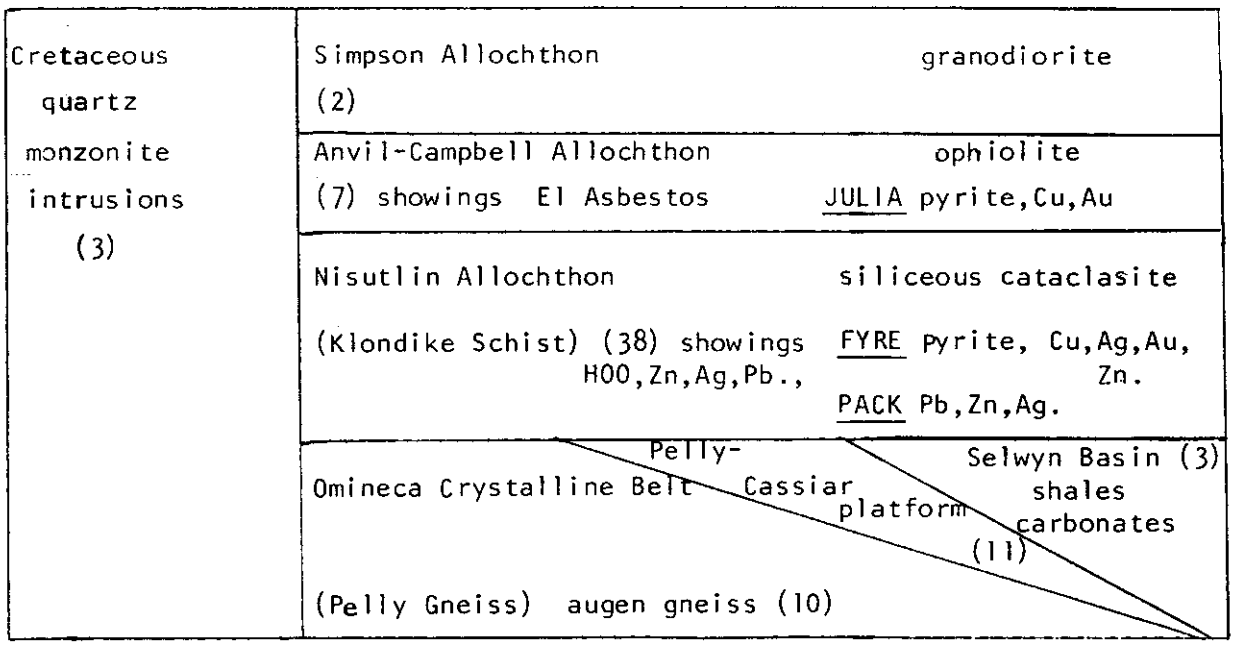
WELCOME NORTH MINES LTD.

BASIN PROJECT

REGIONAL CROSS - SECTIONS

Scale: 1 : 250,000	Date: NOV. 1980	N.T.S. 105 E, H
Revised:	By: W.J.C. / d.h.	Fig. 3

Correlation diagram schematic stratigraphy and mineral deposits - eastern Pelly Mountains.



Notes: JULIA and FYRE - Welcome North showings, EL, FYRE, H00 and PACK showings, the only showings in this area to have diamond drill work. (Fig.6)

( ) number of showings in unit, Finlayson Lake sheet.

Data from Archer Cathro Northern Cordillera Mineral Inventory 1972.

EXPLORATION RESULTS

The major mineral showings originally discovered by Cassiar Asbestos but now included in the KONA Claim Block are exposed well above the fork in the main stream (Fig.9). Elsewhere, the valley floor is covered by alpine meadows interspersed with dense alpine thickets. Correlation between outcrops and diamond drill holes away from major showings is therefore tentative, and can only be confirmed by future drilling. Further exploration, will undoubtedly discover more mineralization along the general trend of the showings.

For ease of reference, the original Cassiar numbering system for showings has been retained and extended. Hence showings 11, 12 and 13 refer to Cassiar showings adjacent to the present property (Fig.4) and showings A, B, C are located well to the north off the property. The presently known mineral showings and zones on the KONA Property are listed below and described in more detail hereafter (locations, Fig.4).

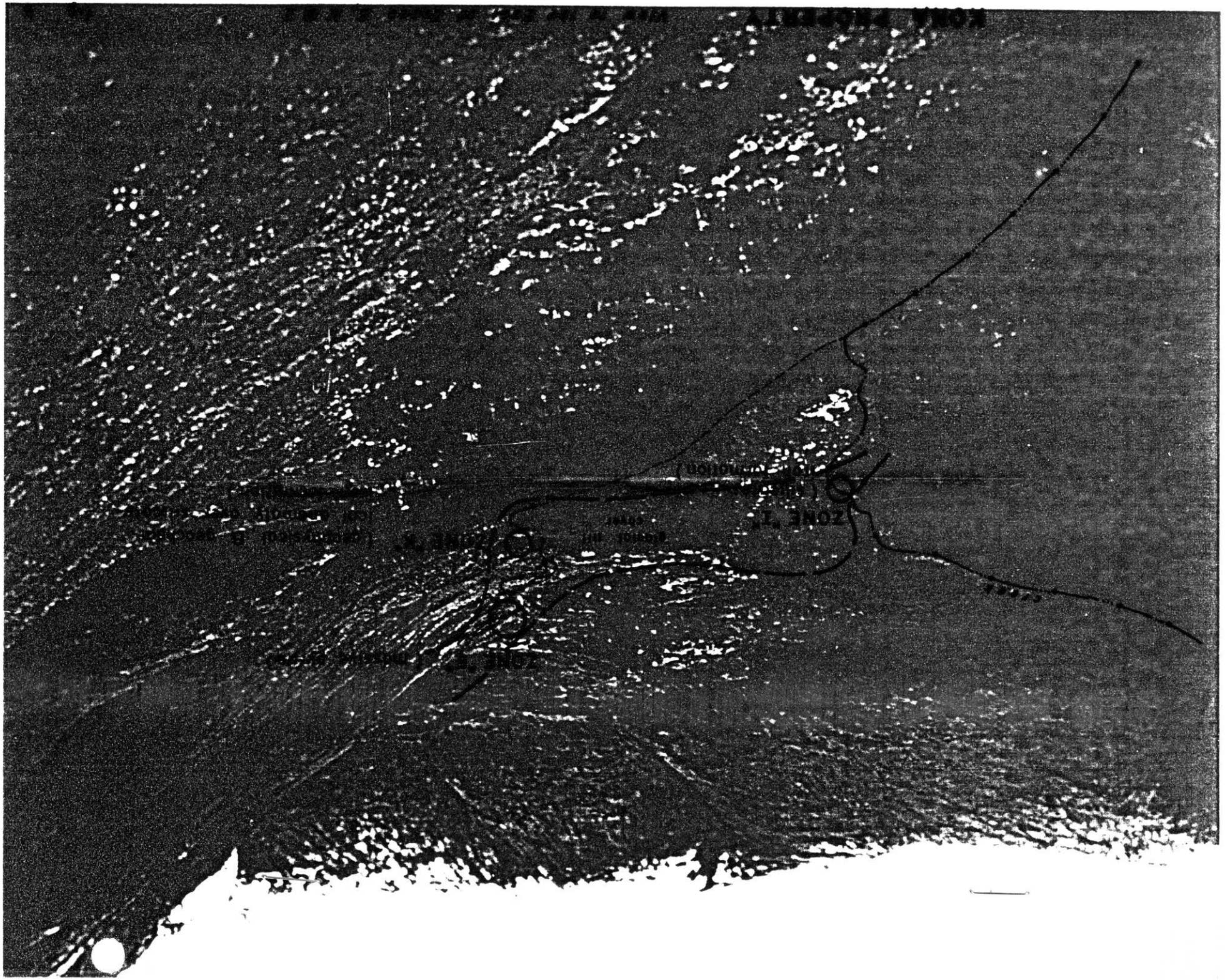
Showings 'A' 'B' 'C'	Off property to north-apparently not significant.
Showing 'D', E-4	Down main stream - float
Zone 'E'	Massive pyrite, Cassiar anomaly #1
Showings 'F' 'G' 'H'	On hill to north of 1 - float
Zone 'I'	Cupriferous iron formation, Cassiar anomaly #4.
Zone 'J'	George Johnny's showing - Welcome North #89.
Zone 'K'	Cassiar anomaly #2
Showing 'L'	Welcome North silver showing #90
Showing 'M'	Iron formation in scree North of 'I'.

a) ZONE 'E': Massive Pyrite

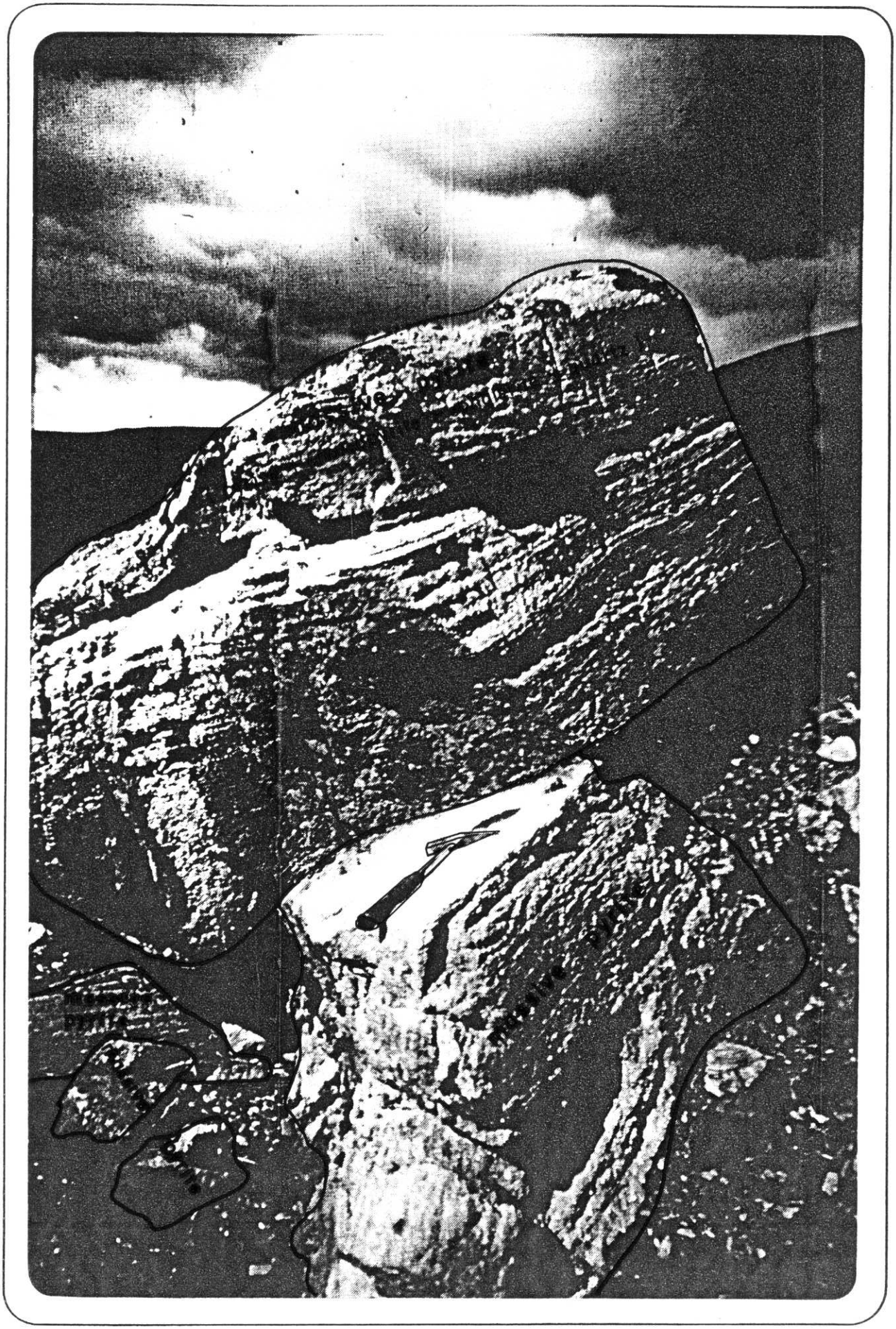
At Zone 'E' a three metre thick section of massive pyrite is exposed in a tilted block beside a small rapids at D.D.H. #1 (Figures 10 and 11). The pyrite outcrops in the creek bed for another 18 m upstream. Trenching by Cassiar in 1960, exposed 28 m in length (D.D.H. 11 to 12) of massive pyrite immediately to the east. The 28 m trench has completely caved. However, blocks of pyrite lie along another 8 m long trench in a stream and on strike to the north. Downstream from the tilted pyrite block a gossan with limonite cemented pyrite covers a chlorite schist. The chlorite schist, in places, contains narrow centimetre bands of pyrite.

A number of spectacular massive pyrite blocks occur on the property (frontispiece and Figures 10 and 11. As previously mentioned a three metre thick block of well laminated massive pyrite outcrops besides a small rapids at D.D.H. #6. A similar smaller block with D.D.H. #7 through it lies downstream and a two metre diameter erratic lies near the 8 m trench at D.D.H. #9. These loose blocks were undoubtedly derived from the adjacent massive pyrite outcrops. Other float showings ('D and 'E-4') plus float over Zone 'K' may represent erratics from Zone 'E'.

According to Cassiar Asbestos (1961), the diamond drilling results indicated a subhorizontal tabular massive pyrite body (Figures 12 and 13). The massive pyrite zone measures approximately 100 m by 45 m by 7.5 m thick. The average weighted mean grade for the deposit ran 1.01% copper, 0.14 oz/ton silver (4.80 g/t), 0.021 oz/ton gold (0.72 g/t), and 1.05% Zinc (Table 3). Grab samples ran to 2.3% Copper, 0.40 oz/ton silver (11.3 g/t), and 0.08 oz/ton gold (2.26 g/t), (Table 1).



The massive pyrite deposit, according to Cassiar records, is distinctly zoned. A gossan of limonite, leached porous quartz, and pyrite blocks derived from the underlying massive pyrite caps the deposit. The well laminated massive pyrite deposit contains chalcopyrite and sphalerite plus some quartz. Towards the base, the massive pyrite contains thin bands of chlorite schist. The pyrite zone is underlain by a heavily mineralized cupriferous, silicate iron formation (quartz-magnetite - chlorite and chalcopyrite and sphalerite) which grades downward into barren green schist. The underlying silicate iron formation extends in a distal fashion beyond the borders of the massive pyrite zone. A fence of diamond drill holes at Zones 'I' and 'K' encountered iron formation. Furthermore, a trench in the limonite-porous quartz gossan on Cassiar anomaly #3 near D.D.H. #1 encountered copper stained silicate iron formation. Drilling at D.D.H.'A' and 'B' immediately north of the pyrite deposit stopped in overburden.



ZONE "E"

MASSIVE PYRITE at D.D.H. # 1
(prospector's pick for scale)

fig. 11

b) ZONE 1 AND SHOWING M: CUPRIFEROUS SILICATE IRON FORMATION

The Zone 1 silicate iron formation outcrops on the north fork of the stream, 395 metres along the Cassiar baseline from Zone 'E' (Fig.7). Zone '1' a zone of rusty weathering outcrops, angular blocks and rounded glacial erratics extends for 50 m along the stream bank (Fig.14). This zone dips moderately east (upstream) and is up to 12 m thick. The silicate iron formation consists of dense, hard planar laminated quartz-magnetite-chlorite with fine laminations of chalcopyrite and sphalerite (Fig.15).

A fence of three diamond drill holes, drilled upstream on a magnetic anomaly by Atlas in 1966, penetrated iron formation in the first two drill holes (Fig.16). Similar rusty weathering silicate iron formation occurs in the lowest scree, near treeline, upslope to the north at showing 'M'.

Assays from Zone '1' over 3 to 13 metres ran 0.8% copper and 0.1 to 0.22 oz/ton silver (3.1 to 6.8 g/t), (Table 4). The showing is enclosed within an envelope of friable rusty-weathering, sericite schist.

c) ZONE 'K'

Zone 'K', a Cassiar and Atlas geophysical anomaly which apparently has no surface expression, underlies the lower part of a wash below Zone 'E' (Fig.7). Pack sack and AX diamond drill holes intersected the underlying silicate iron formation (Fig.17), (Table 4).

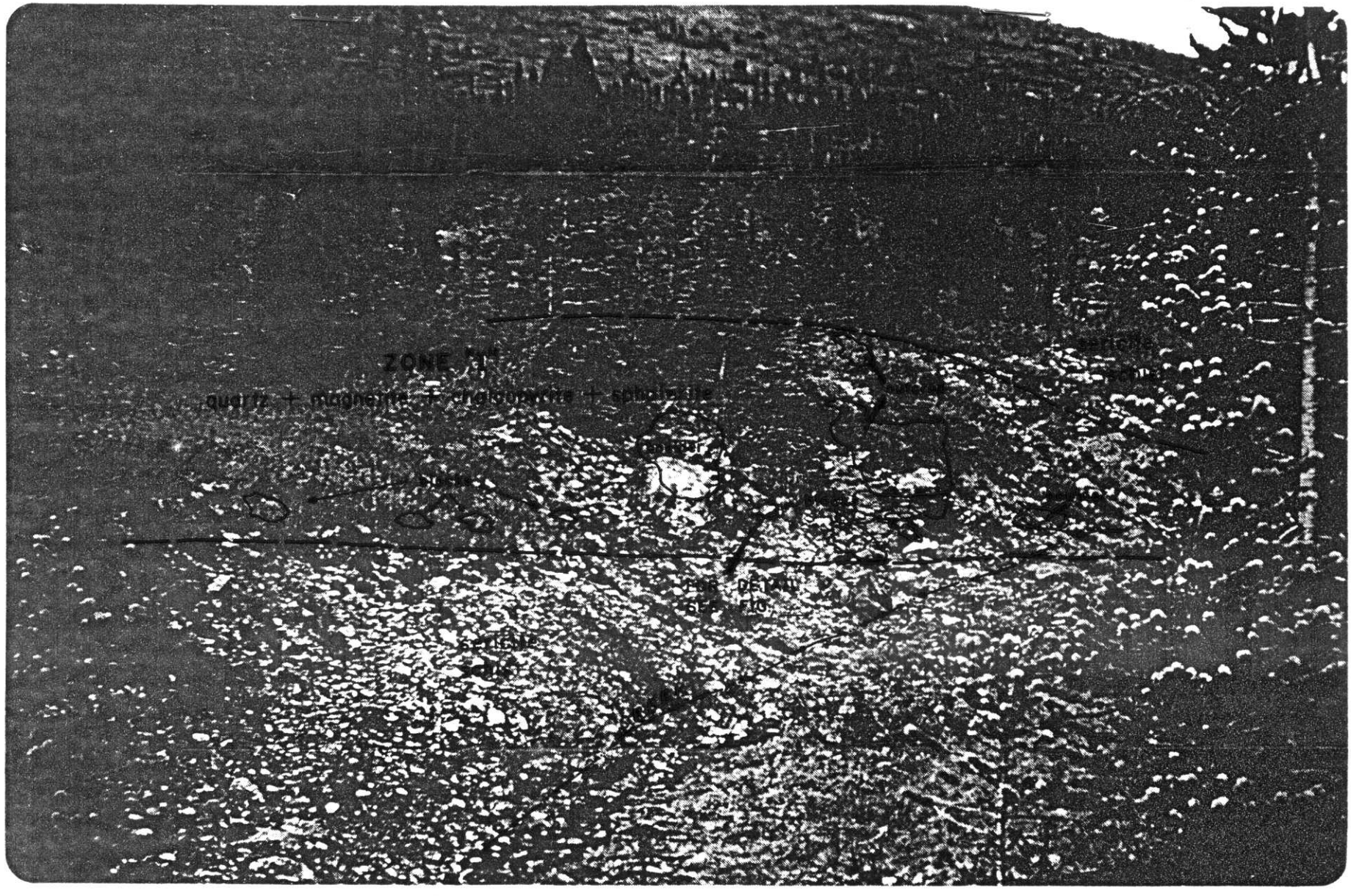
d) ZONE 'J' GEORGE JOHNNY'S SHOWING

Zone 'J' is exposed along gulleys, spurs and vertical cliffs overlooking the main valley to the north (Fig.3, Plate 1). The original showings comprise two apparently distinct continuous bands of disseminated chalcopyrite. The upper band consists of greenstones, whereas the lower band is granodiorite gneiss. Both bands are enclosed within the greenschist which also contains significant values in chalcopyrite (Table 2).

The main mineralized bands lies at about 124 m and 136 m below the sericite-chlorite schists contact. The mineralized horizons can be traced through rusty weathering copper stained outcrops for over 1000 m along strike (Fig.6, Plate 1).
Late in the 1980 field season, just prior to the first snowfall, several other mineralized bands of undetermined extent, were discovered higher in the section (see Fig.5, Plate 1). The mineralized horizons, in general, dip moderately southward towards the iron formation and massive pyrite showings.

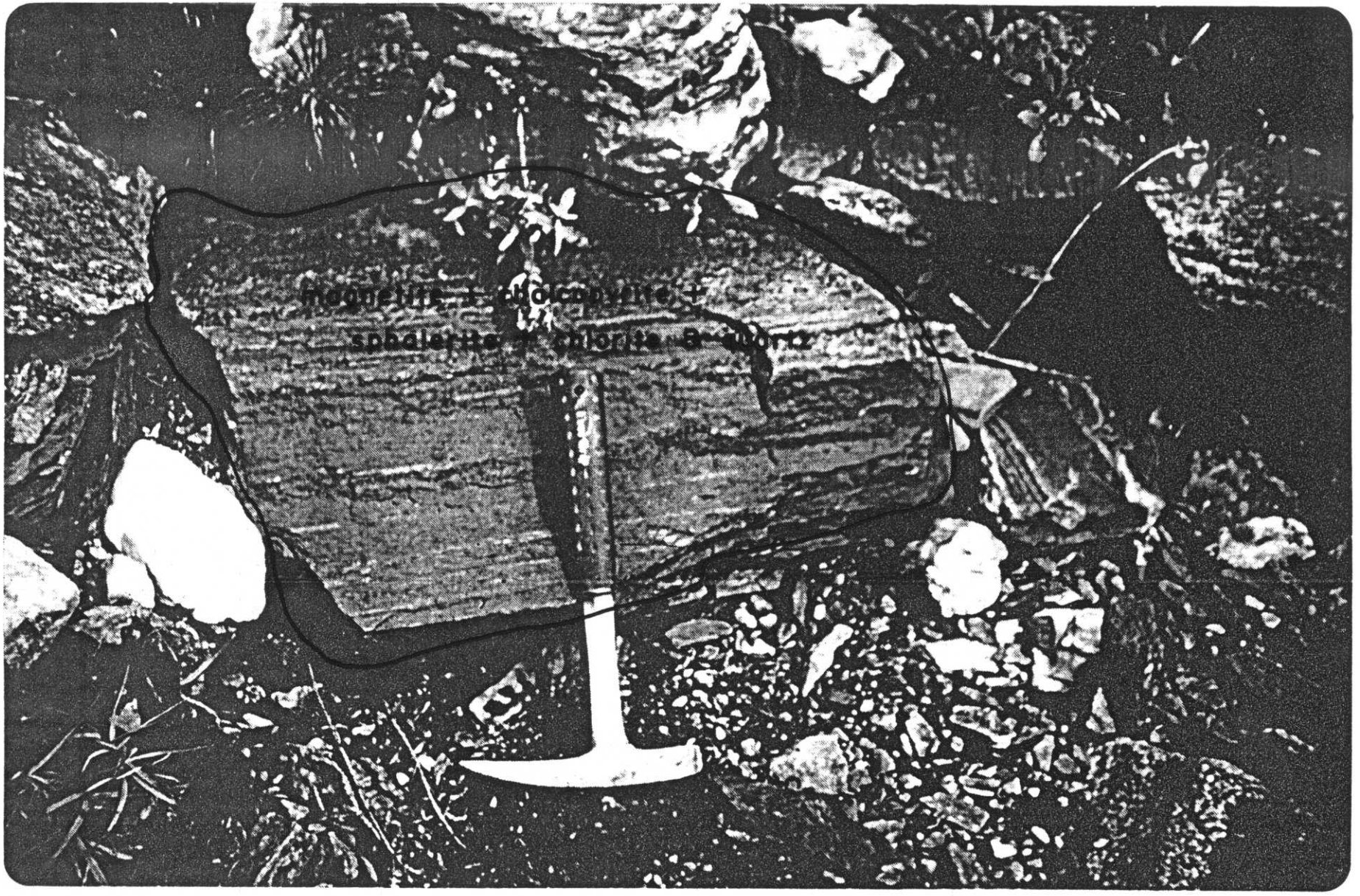
e) SHOWING 'L'

Showing 'L' occurs within a quartz-sericite schist unit near the top of the Nisutlin Allochthon on the west side of the Money Klippen (Figure 3). The mineralization fine-grained galena and black sphalerite occurs, in contrast to other showings, in a medium grained quartz-muscovite schist. Assays as shown in Table 2 ran to 2.77 oz./ton silver (85.8 g/t). The showing is exposed in a slide area, on a dip slope, and an extensive search failed to reveal any outcrop in place.



ZONE "I" SILICATE IRON FORMATION from the south

fig. 14



ZONE "I" IRON FORMATION (block at base of outcrop)

fig. 15

f) SHOWINGS 'F', 'G' and 'H'

These Cassiar showings probably represent float from an extension of showings 'J' and 'M'. No field work was done in this area.

g) SHOWINGS 'D' and 'E-4'

Showings 'D' and 'E-4' consist, according to Cassiar reports, of tabular 20 cm blocks of sulphide float (Figure 3). Showing 'D' lies near a distinctive rusty gossan in a stream canyon. In consideration of glacial flow directions and the amount of pyrite blocks on the wash below Zone 'E', the showings might possibly represent glacial float from Zone 'E'.

h) SHOWINGS 11, 12 and 13

The original Fyre Lake showing #11 in the vicinity of the outfitters cabin, consists of 2.5 m by 2 m diameter sulphide boulder on a glacial moraine (Figure 3). Atlas on the basis of geophysical and geochemical anomalies drilled the showing and, as previously mentioned, theyintersected only disseminated pyrite and phyrrhotite.

Showing #12 appears to be a series of chip and/or grab samples from an area of low grade mineralization. Likewise, showing #13 is a small galena showing.

GEOPHYSICAL AND GEOCHEMICAL SURVEYS

a) Cassiar Asbestos ground Magnetometer and EM Surveys

During 1961, Cassiar conducted ground magnetometer and EM surveys on a 100 foot grid over the pyrite and iron formation showings (Pitcher and Plumb 1961). The magnetometer, a ABEM, MZ-4, a vertical component instrument measures the earth's magnetic field to an accuracy of 38 over a range of 150,000 gammas. The electromagnetic survey was undertaken with a Sheridan-Kelp Magniphase unit.

The combined magnetometer and EM anomalies fairly precisely defined the known mineralized zones 'E' and 'I' (Cassiar anomalies 1 and 3) (Figure 18). In addition, the discovery of Zone 'K' with no surface expression at Cassiar anomaly #2 confirmed the usefulness of these methods. An additional anomaly, Cassiar anomaly #3 covers the gossan near DDH 1.

b) Atlas Explorations ground and airborne magnetometer and EM Surveys

The airborne magnetometer and EM surveys were flown by Lockwood Survey Corporation (Brock 1967) and covered most of the original DUB Property (Figure 19). The noteable exception being the DUB 11, the present KONA area - obstensively due to topographic difficulties! However, periferal anomalies do substantiate and extend the northwest trending ground geophysical anomalies described below.

Ground magnetometer and electromagnetic surveys were run on a grid covering much of the present KONA Property. Grid spacing was 200 to 400 feet N-S and 200 feet E-W (Figure 20). The magnetometer a Jalander 46-65 vertical component magnetometer has a 10 gamma to 250,000 gamma range. The electromagnetic survey instruments, a Crone dual frequency, inductive type was used as a horizontal loop apparatus with a 300 foot separation on 480 and 1800 cps. The maximum effective penetration is 300 feet on a vertical conductor and 100 feet for a vertical conductor.

b) Atlas Explorations Ground and Airborne Magnetometer and EM Surveys (cont'd.)

The ground magnetometer and EM surveys confirm a general northwest trend of anomalies over the known showings (Figure 20). These anomalies extend past the known showings to the borders of the ground geophysical survey and essentially merge with the periferal airborne survey anomalies.

c) Geochemical Survey

The geochemical soil surveys conducted by Atlas Explorations (Brock, 1967) and the 1981 Basin Project produced a number of significant copper anomalies (+200 ppm Cu). These anomalies are depicted on Figure 19 and described on the following page. The 1981 Basin Project assessment work was contracted to Ketza Enterprises and comprised 16.9 km of grid lines with 255 samples over extensions of the KONA grid. The north extension over Zone 'J' covered 8.0 km of grid lines with stations at 50 m intervals, whereas the southern area, near the Fyre Lake sulphide boulder find, covered 8.7 km of grid lines with a 100 m station intervals. Soil samples taken from the 'B' horizon were treated and analyzed by Barringer Magenta of Calgary, Alberta. The Cu/Pb/Zn geochemical results as shown on computor data sheets, Table 5, are plotted on Figures 21 through 23.

GEOCHEMICAL (COPPER) ANOMALIES - KONA MAIN AND WEST ZONES

ANOMALY	COINCIDENCE
Geochemical Anomaly 'A'	Shows good coincidence with outcrop and diamond drill intersections of massive sulphide showing - Zone 'E', also with EM anomaly.
'B'	Covers area upslope from cupriferous iron formation Zone 'I' where iron formation occurs in scree. Shows good coincidence with magnetometer and EM anomalies.
'C'	Anomaly covers slope below Zone 'I' drill intersections.
'D' & 'E'	Extends along northwest trend of mineralization geochem, magnetometer and EM anomalies.
'F' through 'J'	Five geochem anomalies trend parallel to - and upslope (upsection) from Zone 'J' copper-bearing greenschists.
'K'	Cover extension of Zone 'J' in scree-covered area.
'L'	Possible stratigraphically lower zone below Zone 'J'.

The geochemical anomalies in combination with Cassiar and Atlas Explorations geophysical data clearly delimit and define a 1.5 km long northwesterly trending belt of cupriferous iron formations and greenschists. The 1981 geochemical results of Figure 20 clearly show that the sulphide and oxide facies mineralization continues northwesterly to the Zone 'J' cupriferous greenschists.

GEOCHEM (COPPER) ANOMALIES - KONA MAIN AND WEST ZONE (cont'd.)

In most cases, the copper mineralization shows a good response to magnetometer, EM and geochemical surveys (Figure 19). The Zone 'E' massive sulphide outcrops and drill hole intersections show as geochemical anomaly 'A'. Cassiar magnetometer anomaly #1 covers the Zone 'E' massive sulphides and extends southwestward over DDH #1. Diamond drilling at DDH #1 (Figure 12) did not go deep enough to intersect the massive sulphide zone. Geochemical anomalies 'B' covers the forested slope near Showing 'M', anomaly 'D' covers the alpine area towards Zone 'J' and anomaly 'C' extends downslope from Zone 'I' and 'K'. In these areas, magnetometer EM anomalies generally coincide with geochemical anomalies and the cupriferous host rocks. Potential diamond drill targets as extrapolated from Cassiar and Atlas experience should be considered for the EM anomalies near Showing 'M'.

Geochemical anomalies 'F' through 'J' mark the trend of cupriferous greenschists parallel to and stratigraphically higher than Zone 'J'. The geological cross-section Figure 8 clearly shows the stratigraphic position of these showings. Geochemical anomaly 'K' covers a scree area near a pyritic gossan and extends Zone 'J' to the west. The geochemical anomaly 'L' lies stratigraphically below Zone 'J' and coincides with the only Pb/Zn geochemical anomalies.

On the southern grid extension near Fyre Lake, aside from a copper anomaly along the lakeshore, the results were not significant. Coincident but low Pb/Zn anomalies lie upslope to the east. The copper anomaly may be near the site of the 1967 Atlas drilling.

The newly discovered mineral occurrences on the KONA Property, new geochemical data and a reinterpretation of prior drill results using current geologic concepts regarding massive sulphide ores demonstrate that additional work on the KONA Claim Group is clearly warranted.

GEOCHEM (COPPER) ANOMALIES - KONA MAIN AND WEST ZONES (cont'd.)

Morin (1981), on the basis of a field and geochemical study of the Klondike schist-hosted, massive sulphide deposits near Fyre Lake, concluded that the deposits were of primary volcanogenic origin, similar to the Besshi type of Japan. These massive sulphide deposits owe their origin to exhalative volcanic emanations introduced through a basaltic sea floor and capped by sulphide and/or silicate facies iron formations. The inversion of a sulphide and oxide facies on the KONA Property probably reflects a later tectonic event.

CONCLUSIONS WITH ECONOMIC CONSIDERATIONS

Zone 'E', a massive pyrite deposit, contains drill indicated reserves of 200,000 tons at a grade approximating $55.00 Cdn. tonne gross metal value (@ Cu = $2.20/kg, Ag = $0.64/g, and Au = $22.50/g and Zn - $0.88/kg U.S.). The deposit, a flat-lying uniform near surface body, would appear to lend itself to ready extraction.

Zone 'K', a cupriferous iron formation 200 m to the west of Zone 'E', appears from limited drilling to contain an equivalent tonnage of similar grade mineralization.

Zone 'I', while only penetrated by two drill holes, is indicated to contain extensions of the same mineralization some 300 m to the north. Although the intervening area between the drilled zones is unexplored, geophysical and geochemical evidence indicates a continuity of general zones. Hence, it appears reasonable to conclude that the central valley floor on the KONA Property may be underlain by several million tonnes of mineralizaed iron formation.

The 1981 Basin Project geochemical survey over the 'J' Zone shows a further continuity of similar mineralization 1300 m to the north. This correlation should increase threefold the potential of the Property.

CONCLUSIONS WITH ECONOMIC CONSIDERATIONS (cont'd.)

Additional exploration potential for massive sulphide deposits in Klondike schists also exists along the anomaly trend to the south and east of the drill-established mineralization (Figure 20). Indeed, based on present geological models these directions may contain the most promising prospects for higher grade massive sulphide deposits (figure 7).

Much of the area discussed is at present untested. Based upon present knowledge, however, these exploration potentials appear worthy of ongoing exploration work. To this end, the following program is recommended:

RECOMMENDATIONS

The KONA Claim Group contains two essentially distinct types of mineralization - high-grade massive sulphides and a lower-grade cupriferous iron formation. The first objective obviously should be potential extensions to the massive pyrite at Zone 'E'. In addition, consideration should be given to areas proximal to known outcrops of the underlying mineralized silicate iron formation and associated greenschists. In this regard, the following program is proposed for the 1982 field season:

PHASE I

a) A determination of the most appropriate and most feasible geophysical methods to locate potential extensions of the massive sulphide deposit.

b) Establishment of a grid system and a geophysical survey as deemed necessary over:

   (i) areas upstream from Zone 'E' in the southeastern corner of the cirque

   (ii) the till covered central valley floor bounded by Zone 'E', 'K' and 'I'.

PHASE II A program of diamond drilling designed to test the potential grade and extent of mineralization within areas of interest (anomalies) selected from the Phase I Program.

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STATEMENT OF COSTS

Assays and Geochem	$ 244.25
Camp Maintenance	14.50
District Phone Expediting	55.39
Maps, Printing and Drafting	366.51
Property Acquisition and Option Payments	4,841.50
Rotary Wing - Helicopter	2,854.00
Salaries - Regular	6,506.24
Salaries - Prospector Payments	2,000.00
Surveys - Geochemical	3,000.00
Transportation - Misc.	133.29
Administration Fee	263.50
	$ 20,279.18

I hereby certify that to the best of my knowledge and belief the Statement of Costs contained in this report is true.

W. James Crawford.

W. JAMES CRAWFORD

STATEMENT OF COSTS (cont'd.)

LIST OF EMPLOYEES AND DAYS WORKED:

	NO. OF DAYS WORKED	DATES WORKED	TOTAL
JOHN D. GUILD (Geologist) 13291 Woodcrest Drive Surrey, BC V4A 2X3	8	Sept. 3-9, 11, 13/80	
	4	Oct. 23, 27, 28, 30/80	
	1	Nov. 3/80	
	1	Feb. 26/81	
	2	July 5, 8/81	
			16
W. JAMES CRAWFORD (Geologist) 803 - 2020 Bellevue West Vancouver, BC V8V 1B7	10	Sept. 1-8, 11, 13/80	
	19	Oct. 1-3, 6-9, 14-17, 20-23, 28-31/80	
	12	Nov. 3-7, 10, 12-14, 17, 18, 24/80	
	1	Dec. 16/80	
	1	Sept. 4/81	43
DAVID HARDING (Drafting) 993 Broughton Street Vancouver, BC	(HOURS) 76.5	Oct. 1,2, 6, 10, 16, 17, 20-22, 27-31/80	
	135	Nov. 3-7, 10, 12-14, 18-21, 24-28/80	
	79.5	Dec. 1-5, 8-12, 15, 16/80	
			36 1/2 (approx. days)
JANE GAHAN (Drafting) General Delivery Ft. Smith, NWT	1/2	Dec. 11/80	1/2
JOHN S. BROCK (Consulting) 1027 - 470 Granville Street Vancouver, BC V6C 1V5	2	Nov. 5, 24/80	2
KETZA ENTERPRISES LTD. (Contractor: Geochem. Survey) Ross River, YT YOB 1S0	15	(Two men, 7 1/2 days each)	15
			113

TABLE 1

CASSIAR - SAMPLE RECORD

SHOWING	TYPE	WIDTH METRES	Cu %	A. oz/ton (g/t)	Au oz/ton (g/t)	Zn.%	Pb.%	DESCRIPTION
11	grab		2.08	0.26 (8.91)	0.005 (0.17)			Grab samples
11	grab		1.57	0.36(12.34)	0.005 (0.17)			from 2m diameter
11	grab		1.18	0.10(3.43)	0.16 (5.49)	1.11		sulphide float boulder
13	grab		-	0.86(25.49)	Tr -	0.4	2.9	Disseminated galena
D	float		3.56	0.08(2.74)	0.06 (2.06)	1.20		Pyrite & chalcopyrite
E	float		-	0.16(5.49)	0.01 (0.34)	Tr		Massive pyrite
E	float		5.10	0.64(21.94)	0.16 (5.49)			chalcopyrite in massive sulphide
E	chip	15.5	2.30	0.40(13.72)	0.18 (6.17)			massive pyrite & chalcopyrite
E-4	float		5.53	0.02(0.69)	0.04 (1.37)			Chalcopyrite
F	float		0.01	- -	Tr -			Pyrite in schist.
G	float		0.60	- -	Tr -			Pyrite & chalcopyrite in schist
H	float		1.84	- -	Tr			Disseminated chalcopyrite
E	chip	2	0.05	0.18(6.17)	0.06 (2.06)			trench at D.D.H. 9 to 14.
E	chip	3	1.12	0.10(3.43)	0.05 (1.71)			
E	chip	3	0.45	0.06(2.06)	0.03 (1.03)			
E	chip	2	0.90	0.10(3.43)	0.02 (0.69)			From 28 m trench in massive sulphide at D.D.H. #12
E	chip	3	1.12	0.06(2.06)	0.04 (1.37)			to D.D.H. #11
E	chip	3	0.97	0.10(3.43)	0.03 (1.03)			
E	chip	3	0.45	0.12(4.11)	0.02 (0.69)			
E	chip	3	0.30	0.06(2.06)	0.01 (0.34)			
E	chip	3	0.37	0.06(2.06)	0.01 (0.34)			
E	chip	2	0.30	0.06(2.06)	0.01 (0.34)			
E	chip	3	0.22	0.04(1.37)	0.01 (0.43)			
E	chip	3	4.78	0.44(15.09)	0.12 (4.11)			From trench in massive sulphide Near DDH #1
E	chip	3	3.58	0.26(8.91)	0.08 (2.74)			
E	chip	3	0.37	-	0.02 (0.69)			Near DDH #6

Copper Anomaly	Copper Location	Copper Peak Value	Geophysical Coincidence	Topographic features
(A)	Line 4-12S, 18E	3500 ppm	Cassiar magnetometer anomaly #1	over known sulphides in creek of Zone 'E' plus gossans, open to southeast.
(B)	Line 20-6N-6E	340 ppm	Cassiar magnetometer and EM anomaly #4.	a south-sloping forested hillside between Zone 'I' and showing 'M'.
(C)	Line 12N-6S,4E	3400 ppm		western slope, in forest below Zones 'I' 'F' and 'K' also area of drainage accumulation.
(D)	Line 28-20N,4E	+ 480 ppm	Some magnetometer and EM anomaly coincidence)	South facing slope above showing 'M' in scree and below showings 'F', 'G', and 'H' in tundra on ridge.
(E)	Line 28-12N, 6W	640 ppm	Partial magnetometer anomaly coincidence	

TABLE 2

WELCOME NORTH - SAMPLE RECORD

SHOWING	SAMPLE NO	TYPE	WIDTH METRES	Cu %	Ag oz/ton	(g/t)	Au oz/ton	(g/t)	Zn %	Pb %	DESCRIPTION
E	69253B	grab		3.62	0.42	(14.40)	0.050	(1.71)	0.46	0.01	Kona
E	69254B	core		0.794	0.03	(1.03)	0.003	(0.10)			Magnetite
E	69255B	core		0.898	0.09	(3.09)	0.019	(0.65)			Sulphide
E	3411	grab		0.47	0.15	(5.14)	0.020	(0.69)			Massive pyrite
E	3412	grab		0.06	0.26	(8.91)	0.030	(1.03)			Massive pyrite
E	3413	grab		0.14	0.18	(6.17)	0.030	(1.03)			Massive pyrite
I	69215B	grab		2.200	0.13	(4.46)	0.010	(0.34)			Kona West
I	3474	chip	6.7	0.38	0.02	(0.69)	0.002	(0.07)	0.03	40.01	Silicate iron formation
L	3395	grab		0.03	2.77	(94.98)	0.002	(0.07)	0.97	0.62	
L	3396	grab		0.03	2.22	(76.12)	0.002	(0.07)	0.63	0.51	Muscovite schist with fine grained mineralization in quartz bands.
L	3397	grab		0.37	1.74	(59.66)	0.002	(0.07)	0.93	0.57	
L	3398	grab		0.19	0.88	(30.17)	0.002	(0.07	0.43	0.24	
J	3389	grab		1.96	0.10	(3.43)	0.020	(0.69)			Relatively high grade chalcopyrite in greenschist
J	3390	grab		2.96	0.12	(4.11)	0.010	(0.34)			
J	3391	grab		0.63	0.05	(1.71)	0.002	(0.07)			
J	3392	grab		0.17	0.05	(1.71)	0.002	(0.07)			Lower grade chalcopyrite in greenschist
J	3394	grab		0.09	0.05	(1.71)	0.002	(0.07)			
J	3395	grab		3.56	0.16	(5.49)	0.020	(0.69)			Chalcopyrite bands in sheared granodiorite

TABLE 3

ZONE 'E' DIAMOND DRILL HOLE RESULTS

(weighted average, by relative lengths of intersections)

DIAMOND DRILL HOLE	HOLE DEPTH (M)	MINERALIZED INTERVAL (M)	THICKNESS (M)	% Cu	Ag oz/ton (g/t)	Au oz/ton (g/t)	% Zn	% Pb	DESCRIPTION
ZONE 'E' CASSIAR ASBESTOS PACKSACK DRILL HOLES.									
1	12.2	0.3 - 6.8	6.5	0.85	0.24 (8.23)	0.025 (0.86)	1.54		
2	7.3	0,73	7.3						No recovery
3-1	7.3	0.73	7.3						Some core
3-2	7.3	2.1 -7.2	5.1	1.14	0.37 (12.69)	0.033 (1.13)	1.38		Some core
4	6.1	caved	5.4						No core
6-1	4.2	caved	-						
6-2	11.2	0 -8.2	8.2	0.77	0.19 (6.51)	0.013 (0.45)	0.64		
7	12.2	2.3 - 6.0	3.7						
		0 - 9.1		0.86	0.15 (5.14)	0.021 (0.72)	1.61		
8	5.1	0-5.1	5.1	-	-	-			No core
9	9.4	0.6 -4.5	3.9	0.82		0.025 (0.86)	-		
10	15.2	10.7 -15.2	4.5	0.86	0.08 (2.74)	0.020 (0.69)	1.18		
11	12.2	0.5 -5.7	5.2	1.81	0.25 (8.47)	0.039 (1.34)	1.44		
12	12.5	0-11.1	11.1	0.96	0.22 (7.54)	0.015 (0.51)	0.47		
13	7.3	0-6.3	6.3	0.92	0.09 (3.09)	0.032 (1.10)	0.87		Rods stuck?
14	10.0	0-4.8	4.8	1.20	0.16 (5.49)	0.040 (1.37)	0.35		
15	10.9	2.1 - 9.0	6.9	1.28	0.08 (2.74)	0.030 (1.03)	1.50		
16	14.0	-	-						
18	12.2	-	-						
CASSIAR ASBESTOS AX DRILL HOLES									
A	15.5	-	-						All casing
B	14	-	-						All casing
C	51.3	3.0 -8.8	8.8	0.96	0.06 (2.06)	0.010 (0.34)	0.39		
D	61.9	9.1 -15.5	6.4	1.33	0.06 (2.06)	0.021 (0.69)	1.09		
E_1	29.2	27.4 -29.2	1.8						Az 230° @ -70°
E_2	36.7	22.4 -30.0	7.6	0.79	0.09 (3.09)	0.012 (0.41)	0.89		
F	51.5	7.9 -15.2	7.3	1.17	0.03 (1.03)	0.011 (0.38)	0.73		Az 195°@ -60°
G	59.7	5.7 -9.1	3.4	1.07	0.27 (9.26)	0.015 (0.51)	1.63		
H	68.6	-	-						
I	61.0	-	-						
M	92.5	-	-						
Weighted Average for Cassiar packsack and AX drill holes.			99.7M	1.01% Cu	0.14 oz/ton (4.80) Ag	0.021 oz/ton Au (0.72)	0.95% Zn.		

TABLE 4

ZONES 'K' & 'I' DIAMOND DRILL HOLE RESULTS, CASSIAR ASBESTOS & ATLAS EXPLORATIONS PACKSACK & AX DRILL HOLES.

DIAMOND DRILL HOLE	HOLE DEPTH (M)	MINERALIZED INTERVAL (M)	THICKNESS (M)	% Cu	Au oz/ton	g/t	Ag oz/ton	g/t	% Zn	% Pb.	DESCRIPTIONS
ZONE 'K' CASSIAR PACKSACK DRILL HOLES											
19	12.2	2.2 - 12.2	10.0	1.22	0.15	(5.14)	0.008	(0.27)	1.0		
20	9.4	-	-								
21	10.0	-	-								
22	6.4	3.1 - 6.4	3.3								
24	8.8	7.3 - 8.8	1.5	1.05	0.04	(1.37)	0.01	(0.34)	1.0		
ZONE 'K' CASSIAR AX DRILL HOLES											
0	11.5	2.4 - 11.5	9.1	-	-		-		-		Caving
P	21.9	16.5 - 21.9	5.4	-	-		-		-		Caving
ZONE 'K' ATLAS AX DRILL HOLES											
66.3	71.0	16.2 - 28.4	12.2	0.57	0.15	(5.14)	0.01	(0.34)			
66.4	125.9	-	0								
			41.50M	0.88% Cu	0.06	(2.06)	0.007 oz/ton	Au(0.24)	1.0% Zn		
ZONE I ATLAS AX DRILL HOLES											
66-1	187	9.1 -15.5	6.4	0.26	0.25	(8.57)	Tr				
66-2	102.5	-	-								
66-5	15.5	-	-								
66-5A	71.3	10.1-14.4	4.3	Tr	0.18	(6.17)	Tr				
			~~6.4M~~	0.26 %Cu.	0.25	oz/ton Ag.	(8.57)	Tr.Av.			

TABLE 5

BARRINGER MAGENTA LIMITED
OFFICES & MINERALS
LABORATORY
3750 - 19th ST. N.E. SUITE 105
CALGARY ALBERTA T2E 6V2
PHONE (403) 276-9701
TELEX 03-827584

BARRINGER MAGENTA

AUTHORITY: B. MACDONALD

27-OCT-81
PAGE 1 OF 9
WORK ORDER # 034W-81

WELCOME NORTH MINES,
1027 470 GRANVILLE ST.,
VANCOUVER, B.C.,
V6C 1V5

FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
8+50N			
00+00E	140.	22.	14.
00+50E	155.	26.	42.
01+00E	120.	28.	46.
01+50E	97.	25.	49.
02+00E	39.	27.	43.
02+50E	87.	25.	52.
03+00E	43.	23.	37.
03+50E	130.	36.	44.
04+00E	125.	37.	32.
04+50E	39.	29.	39.
05+00E	130.	33.	41.
05+50E	60.	31.	47.
06+00E	54.	23.	39.
06+50E	18.	27.	38.
07+00E	75.	25.	46.
07+50E	91.	26.	43.
08+00E	53.	28.	36.
08+50E	44.	29.	46.
09+00E	69.	31.	70.
09+50E	47.	37.	78.
10+00E	37.	34.	68.
00+50W	250.	26.	48.
01+00W	265.	37.	100.
01+50W	140.	24.	73.
02+00W	145.	23.	70.
02+50W	115.	42.	63.
03+00W	56.	34.	51.
9+75N			
00+00E	180.	32.	90.
00+50E	265.	35.	65.

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AUTHORITY: B. MACDONALD

27/OCT/81

WORK ORDER # 054W-81

WELCOME NORTH MINES,
1027 470 GRANVILLE ST.,
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V6C 1V5

FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
9+75N			
01+00E	360.	37.	74.
01+50E	365.	23.	54.
02+00E	83.	33.	51.
02+50E	74.	26.	47.
03+00E	38.	27.	44.
03+50E	55.	28.	45.
04+00E	61.	47.	88.
04+50E	72.	33.	55.
05+00E	49.	28.	49.
05+50E	55.	36.	50.
06+00E	52.	28.	39.
06+50E	51.	26.	46.
07+00E	34.	23.	47.
07+50E	68.	27.	48.
08+00E	12.	10.	21.
08+50E	63.	28.	56.
09+00E	155.	35.	57.
09+50E	71.	32.	68.
10+00E	49.	36.	65.
00+50W	165.	34.	61.
01+00W	82.	33.	74.
01+50W	230.	34.	89.
02+00W	120.	43.	95.
02+50W	110.	35.	71.
03+00W	35.	37.	62.
11-N			
00+00E	185.	47.	81.
00+50E	69.	35.	58.
01+00E	96.	38.	57.
01+50E	105.	33.	54.

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AUTHORITY: B. MACDONALD

WELCOME NORTH MINES,
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FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
11-N			
02+00E	110.	31.	54.
02+50E	86.	36.	46.
03+00E	155.	48.	55.
03+50E	135.	44.	53.
04+00E	245.	46.	72.
04+50E	290.	43.	68.
05+00E	54.	27.	36.
05+50E	53.	23.	34.
06+00E	57.	24.	33.
06+50E	54.	31.	34.
07+00E	66.	32.	50.
07+50E	53.	34.	62.
08+00E	57.	37.	63.
08+50E	135.	34.	61.
09+00E	140.	32.	54.
09+50E	155.	50.	97.
10+00E	47.	27.	56.
00+50W	245.	25.	48.
01+00W	93.	24.	49.
01+50W	140.	37.	84.
02+00W	140.	43.	92.
02+50W	150.	47.	100.
03+00W	305.	56.	83.
12+25N			
00+00E	94.	27.	45.
00+50E	205.	35.	120.
01+00E	1200.	38.	115.
01+50E	650.	45.	82.
02+00E	450.	40.	75.
02+50E	325.	49.	62.

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AUTHORITY: B. MACDONALD

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WELCOME NORTH MINES,
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FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
12+25N			
03+00E	275.	39.	54.
03+50E	110.	42.	55.
04+00E	165.	36.	60.
04+50E	220.	29.	58.
05+00E	155.	33.	62.
05+50E	300.	31.	60.
06+00E	175.	29.	49.
06+50E	135.	31.	38.
07+00E	140.	30.	53.
07+50E	190.	33.	56.
08+00E	74.	32.	31.
08+50E	75.	28.	30.
09+00E	180.	27.	35.
09+50E	215.	35.	48.
10+00E	205.	30.	52.
00+50W	180.	26.	49.
01+00W	335.	45.	88.
01+50W	110.	35.	75.
02+00W	58.	25.	84.
02+50W	87.	32.	76.
03+00W	67.	32.	68.
13+50N			
00+00E	180.	36.	105.
00+50E	185.	35.	115.
01+00E	255.	34.	95.
01+50E	225.	36.	86.
02+00E	330.	34.	90.
02+50E	120.	33.	74.
03+00E	105.	32.	58.
03+50E	180.	36.	110.

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WORK ORDER # 034W-81

WELCOME NORTH MINES,
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FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
13+50N			
04+00E	130.	28.	46.
04+50E	115.	31.	37.
05+00E	46.	41.	43.
05+50E	43.	45.	39.
06+00E	77.	42.	44.
06+50E	64.	23.	26.
07+00E	105.	27.	34.
07+50E	120.	26.	37.
08+00E	190.	29.	42.
08+50E	61.	31.	34.
09+00E	58.	30.	27.
09+50E	33.	33.	26.
10+00E	44.	27.	27.
10+50E	65.	28.	31.
11+00E	53.	42.	52.
11+50E	44.	34.	38.
12+00E	52.	36.	53.
12+50E	59.	37.	69.
13+00E	58.	44.	95.
14+75N			
00+00E	93.	38.	63.
00+50E	120.	32.	68.
01+00E	160.	33.	70.
01+50E	260.	27.	71.
02+00E			
02+50E	300.	144.	450.
03+00E	290.	147.	475.
03+50E	125.	141.	165.
04+00E	130.	160.	180.
04+50E	215.	85.	105.

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WELCOME NORTH MINES,
1027 470 GRANVILLE ST.,
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FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
14+75N			
05+00E	260.	37.	87.
05+50E	165.	123.	180.
06+00E	170.	126.	175.
06+50E	93.	28.	41.
07+00E	88.	25.	39.
07+50E	105.	24.	44.
08+00E	105.	22.	38.
08+50E	74.	24.	36.
09+00E	94.	25.	34.
09+50E	86.	27.	37.
10+00E	29.	20.	28.
10+50E	24.	14.	29.
11+00E	29.	18.	43.
11+50E	33.	17.	42.
12+00E	46.	25.	41.
12+50E	59.	28.	42.
13+00E	55.	26.	47.
13+50E	63.	27.	43.
14+00E	52.	141.	120.
14+50E	38.	52.	75.
15+00E	36.	33.	66.
16+00S			
00+00W	34.	46.	135.
01+00W	35.	78.	130.
02+00W	19.	84.	130.
03+00W	18.	50.	100.
04+00W	17.	87.	110.
05+00W	15.	143.	165.
06+00W	24.	93.	190.
07+00W	27.	84.	240.

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FINAL REPORT

G E O C H E M I C A L L A B O R A T O R Y R E P O R T

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
16+00S			
08+00W	28.	145.	220.
09+00W	37.	63.	170.
10+00W	39.	57.	105.
11+00W	26.	36.	85.
12+00W	25.	42.	97.
13+00W	27.	46.	120.
14+00W	25.	40.	50.
15+00W	19.	42.	74.
16+00W	21.	95.	170.
17+00W	29.	59.	86.
18+00W	25.	93.	150.
19+00W	28.	80.	140.
20+00W	56.	45.	115.
21+00W	14.	37.	64.
22+00W	12.	42.	73.
20+00S			
00+00W	24.	89.	115.
01+00W	25.	40.	120.
02+00W	27.	88.	110.
03+00W	18.	39.	77.
04+00W	24.	40.	79.
05+00W	23.	27.	64.
06+00W	22.	25.	69.
07+00W	13.	26.	70.
08+00W	15.	27.	86.
09+00W	10.	24.	82.
10+00W	17.	38.	97.
11+00W	9.	18.	39.
12+00W	10.	14.	38.
13+00W	98.	33.	38.

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WELCOME NORTH MINES,
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FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
20+00S			
14+00W	85.	20.	42.
15+00W	54.	37.	63.
16+00W	26.	80.	130.
17+00W	28.	57.	115.
18+00W	15.	105.	87.
19+00W	155.	62.	120.
20+00W	110.	56.	105.
21+00W	23.	35.	44.
22+00W	21.	32.	37.
24+00S			
00+00W	38.	98.	165.
01+00W	39.	54.	185.
02+00W	21.	91.	120.
03+00W	19.	56.	120.
04+00W	25.	55.	130.
05+00W	30.	50.	130.
06+00W	15.	38.	94.
07+00W	21.	86.	125.
08+00W	16.	21.	73.
09+00W	20.	35.	78.
10+00W	24.	17.	37.
11+00W	23.	16.	26.
12+00W	19.	34.	65.
13+00W	23.	37.	76.
14+00W	20.	47.	73.
15+00W	17.	50.	84.
16+00W	14.	32.	46.
17+00W	16.	33.	45.
18+00W	19.	36.	44.

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WELCOME NORTH MINES,
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FINAL REPORT

GEOCHEMICAL LABORATORY REPORT

SAMPLE TYPE:
SOIL

SAMPLE #	CU PPM	PB PPM	ZN PPM
24+00S			
19+00W	21.	41.	45.
20+00W	155.	85.	115.
21+00W	160.	97.	125.
28+00S			
01+00W	21.	53.	115.
02+00W	21.	19.	96.
03+00W	28.	60.	125.
04+00W	23.	95.	150.
05+00W	56.	70.	170.
06+00W	49.	91.	150.
07+00W	67.	52.	175.
08+00W	81.	96.	155.
09+00W	13.	39.	69.
10+00W	11.	29.	56.
11+00W	13.	33.	58.
12+00W	10.	19.	66.
13+00W	8.	20.	51.
14+00W	12.	45.	90.
15+00W	18.	31.	37.
16+00W	9.	9.	24.
17+00W	7.	11.	23.
18+00W	14.	12.	30.
19+00W	13.	8.	25.
20+00W	5.	3.	14.

CERTIFICATE

I, W. James Crawford, do hereby certify that:

1. I am a geologist employed by Welcome North Mines Ltd., with offices at 1027 - 470 Granville Street, Vancouver, BC, V6C 1V5.

2. I am a graduate of:

The University of British Columbia	B.A.Sc. Geology
The University of Washington	M.S. Geology and Phd. Geology

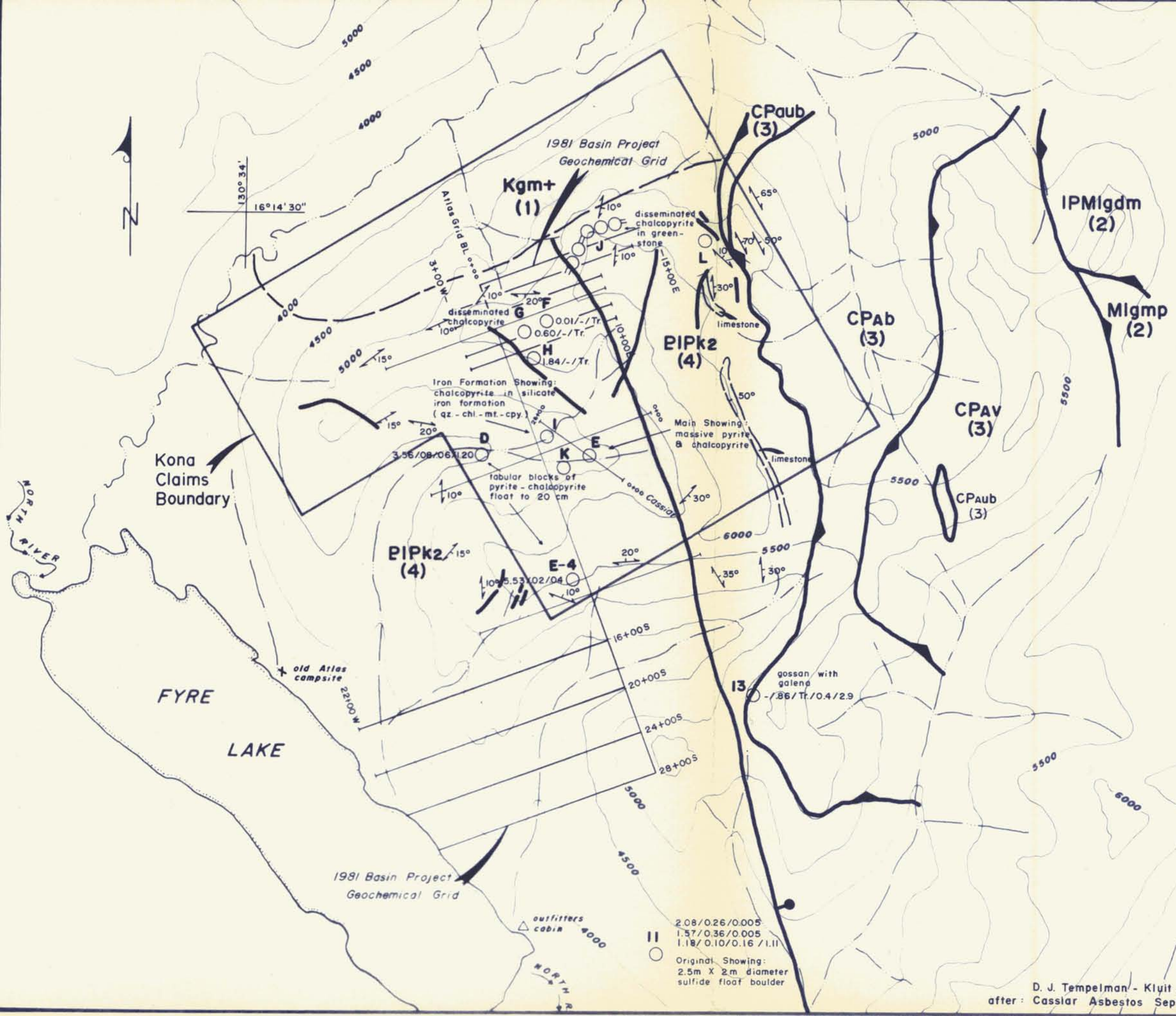
3. I have practiced my profession since 1959, mainly in the Yukon.

4. This report is based on my geological field work on the KONA Claims, reconnaissance prospecting of the adjacent Simpson Ranges and assessment report filed by Cassiar Asbestos and Atlas Explorations.

W. James Crawford.

W. JAMES CRAWFORD

Vancouver, BC
November 17, 1981



CRETACEOUS

Kgm+ (1) quartz monzonite

ALLOCHTHONOUS UNITS

Simpson Allochthon

IPMlgdm(2) granodiorite

Mlgmp(2) quartz monzonite

Anvil-Campbell Allochthon

CPAb (3) basalt

CPAv (3) greenstone

CPAub (3) ultramafic rocks

Nisutlin Allochthon

PlPk2 (4) chlorite schist, quartz-sericite schist and greenstones

Values given in:
Cu. % / Ag. oz./T. / Au. oz./T. / Zn. % / Pb. %

- contours (500 ft. intervals)
- creek
- mineralized showings
- trust fault
- normal fault (down dropped block)
- geologic contact

D. J. Tempelman - Kluit, G.S.C., O.F. 486
after: Cassiar Asbestos Sept. 1961, W. Plumb

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

MINERAL OCCURRENCE LOCATIONS, AREA GEOLOGY & ASSAYS

Scale 1 : 31,680	Date: OCT. 1980	N.T.S 105G/1,2
Revised Nov.'81 W.J.C.	By: W.J.C. / d.h.	Fig. 3

N

Line 0+00 (Atlas)

ZONE "E"
massive pyrite with limonite gossan cap in main showing area

iron oxide capping

TRENCH "B"

chlorite schist

coarse float porous vuggy replacement float

chlorite schist

iron oxide capping

TRENCH "D"
1.0m band porous vuggy quartz

schist scree

iron stained fractured schist

TRENCH "C"
0.4m pyrite

interbedded chlorite and sericite schist

schist scree

schist scree

interbedded chlorite & sericite schist

chlorite schist

chlorite schist

chlorite schist

chlorite schist

66-1

66-2

66-3

66-4

66-5A

silicate iron formation and chlorite schist covered by glacial till

Alluvial fan

ZONE "K"

ZONE "I"

sericite schist

silicate iron formation

sericite schist

Cassiar Baseline 305°

28+00

0+00

1435 1450 1465 1480 1495 1510 1525 1540 1555 1570 1585

LEGEND:

- Contour (meters)
- Creek
- Outcrop
- Trench
- Geologic contact
- Fault
- Diamond drill hole
  - Cassiar (packsack) 1961
  - Cassiar (AX) 1961
  - Atlas Explorations 1966
- Mineralization encountered

after: Cassiar Asbestos Development Map to Sept. 12, 1961.
Atlas Explorations, T. L. Sadler - Brown, July 1966.

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

GEOLOGY & DIAMOND DRILL HOLES

ZONES E, K & I

Scale 1:2,500	Date: NOV. 1980	N.T.S. 105 G/1,2
Revised:	By: W.J.C./d.h.	Fig. 7

POTENTIAL EXPLORATION AREAS

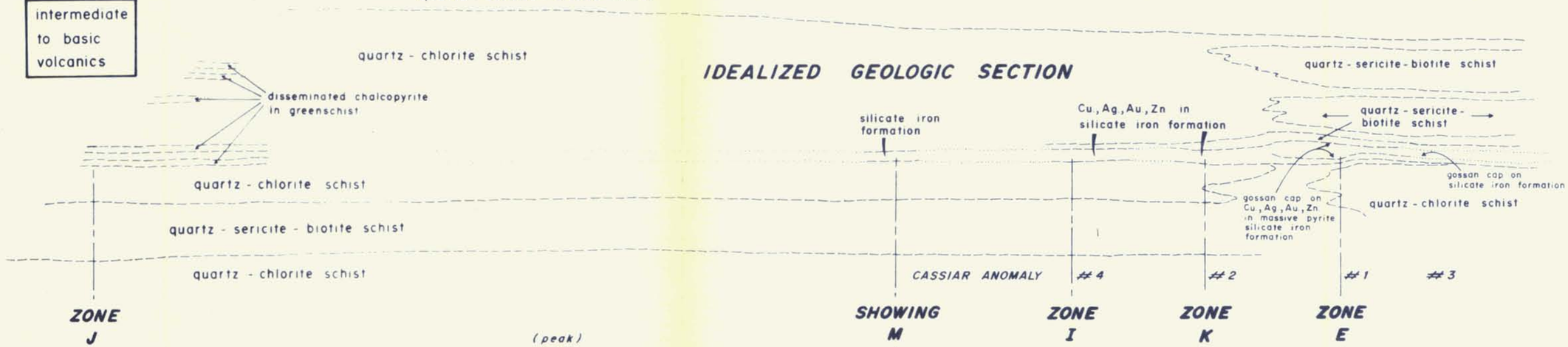
disseminated chalcopyrite in greenschist | *Cu, Ag, Au, Zn in silicate iron formation* | *Cu, Ag, Au, Zn in massive sulphides*

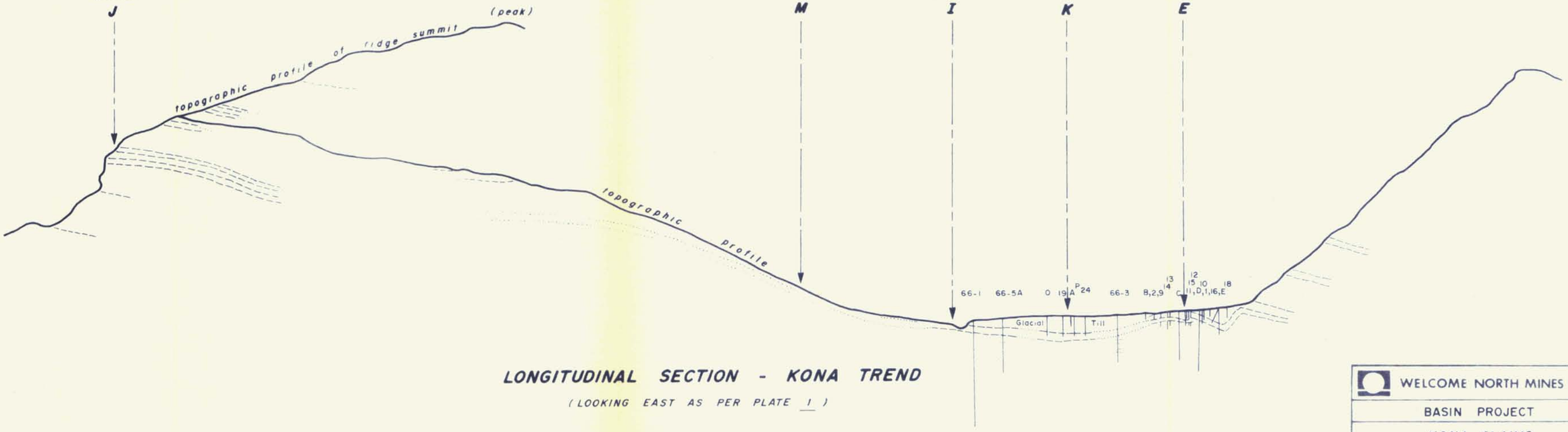
quartz - sericite - biotite schist

intermediate to basic volcanics

intermediate to acidic volcanics

IDEALIZED GEOLOGIC SECTION





LONGITUDINAL SECTION - KONA TREND

(LOOKING EAST AS PER PLATE 1)

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

KONA TREND

SECTIONAL GEOLOGY

Scale 1 : 5,000	Date NOV. 1980	NTS 105G,H
Revised	By W.J.C./d.h.	Fig 8

Cassiar Baseline

× 12+00

× 11+00

× 10+00

× 9+00

× 8+00

× 7+00

1480

1465

N

"E" Zone - Anomaly # 1

B

C

D

E2

E1

F

G

1

2

3

4

6-2

7

8

9

10

11

12

13

14

15

16

18

~60

~70

75°

25°

150°

50°

40°

70°

160°

contorted schist

iron oxide stained schist & blocks of sulphide

unstained schist talus

iron oxide capping

chlorite schist

massive pyrite in D.D.H. trench

chlorite schist

rusty weathering chlorite schist

iron oxide capping

2.0m massive pyrite boulder

pyrite

covered

leached porous quartz

3.0m massive pyrite block

chlorite schist

Waterfall

pyrite laminations

iron oxide gossan along river

covered

massive pyrite outcrop

sericite schist

dark green chlorite schist

broken iron oxide gossan

after: Cassiar Asbestos - to Sept. 12, 1961

LEGEND

- Contour (metres)
- Outline of creek bed
- Geologic contact
- Out of Cassiar composite magnetometer and E.M. anomaly
- Trench
- Cassiar AX diamond drill hole
- Cassiar packsack diamond drill hole
- Mineralization encountered

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

ZONE "E"

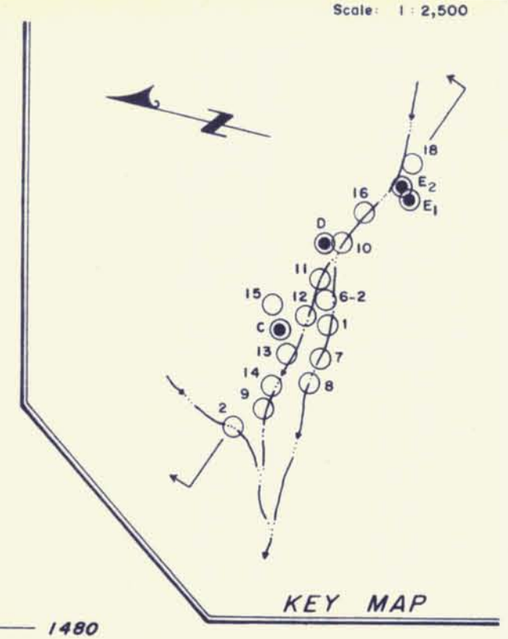
GEOLOGY & DIAMOND DRILL HOLES

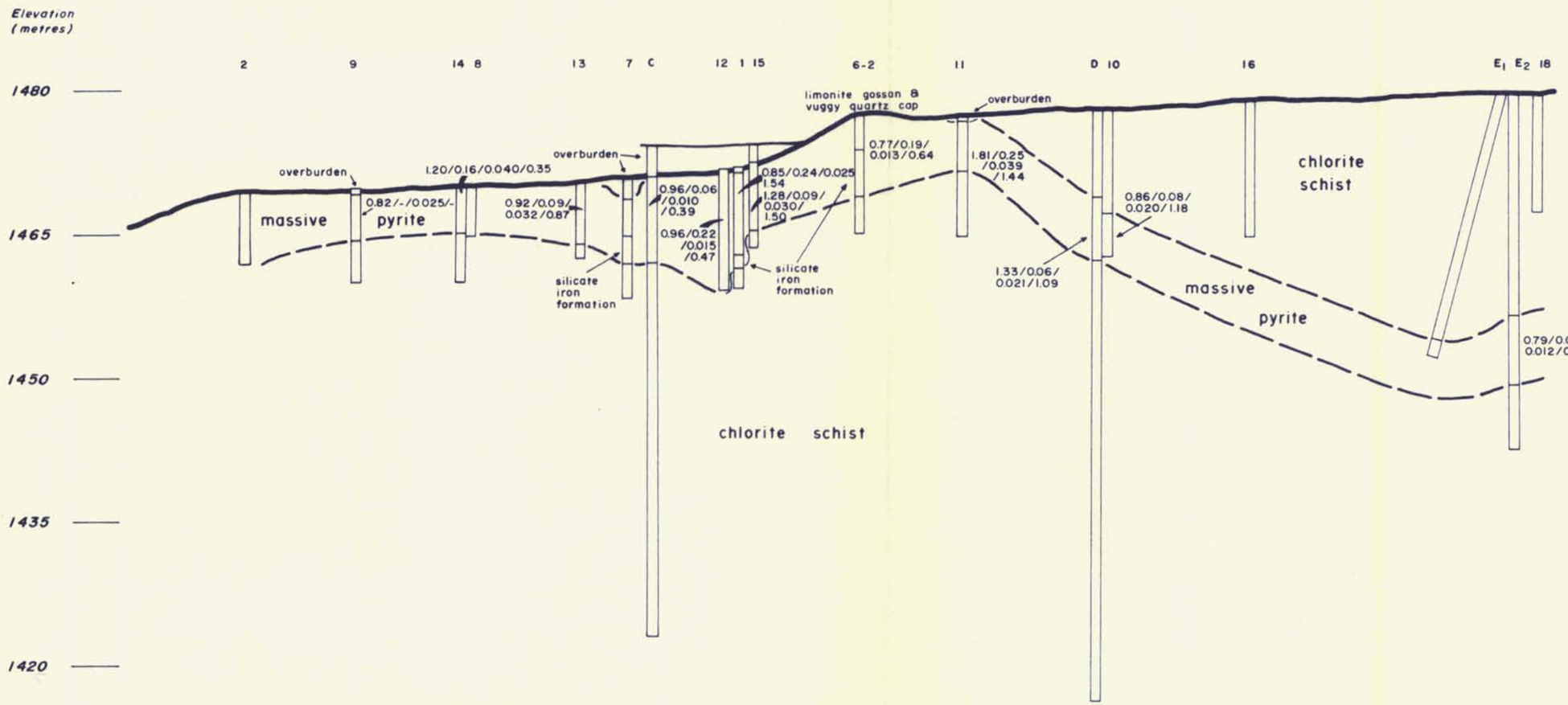
Scale 1 : 500	Date: NOV. 1980	N.T.S. 105G/1,2
Revised:	By: W.J.C./d.h.	Fig. 10

DIAMOND DRILL HOLE SECTION

NORTH VIEW

Scale: 1 : 2,500





NOTE

Values given in
Cu. % , Ag. oz./ton , Au. oz./ton , Zn. %
(weighted average , by relative lengths of intersections)

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

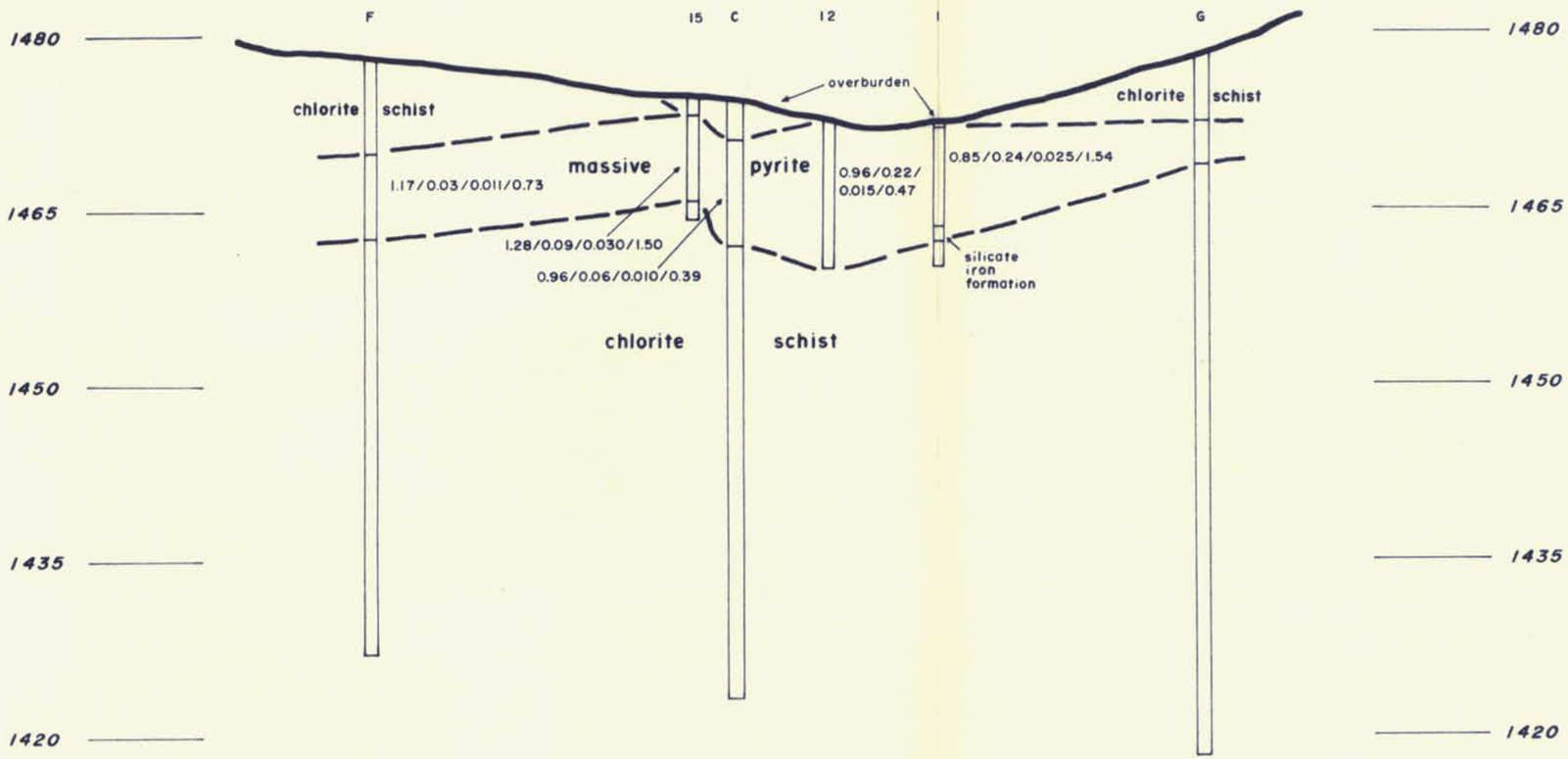
ZONE "E"

LONGITUDINAL SECTION

Scale 1 : 500	Date: OCT. 1980	N.T.S. 105G/1,2
Revised:	By: W.J.C./d.h.	Fig. 12

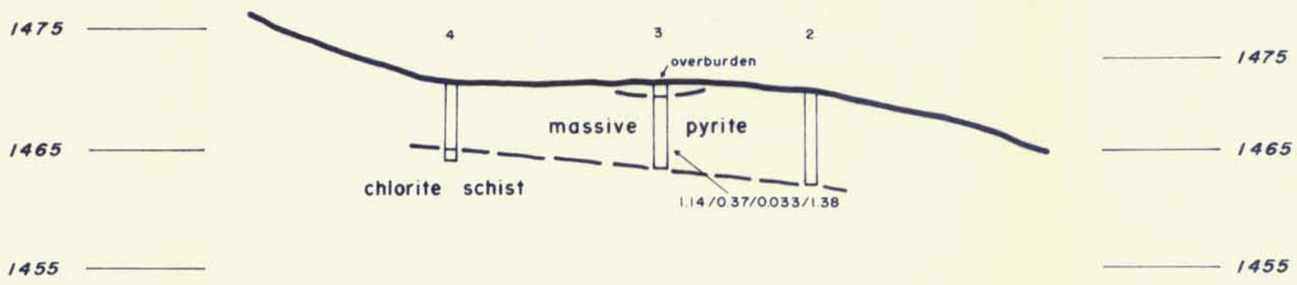
DIAMOND DRILL HOLE SECTION

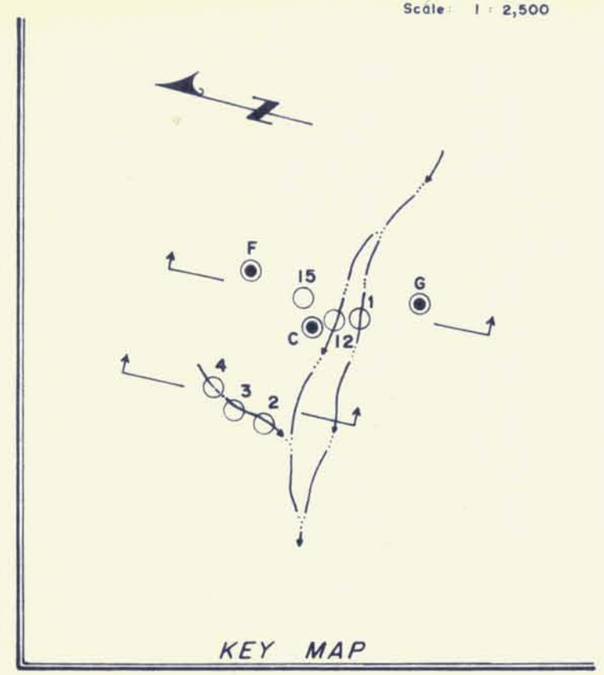
EAST VIEW



DIAMOND DRILL HOLE SECTION

EAST VIEW





NOTE:

Values given in

Cu. %, Ag. oz./ton, Au. oz./ton, Zn. %

(weighted average, by relative lengths of intersections)

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

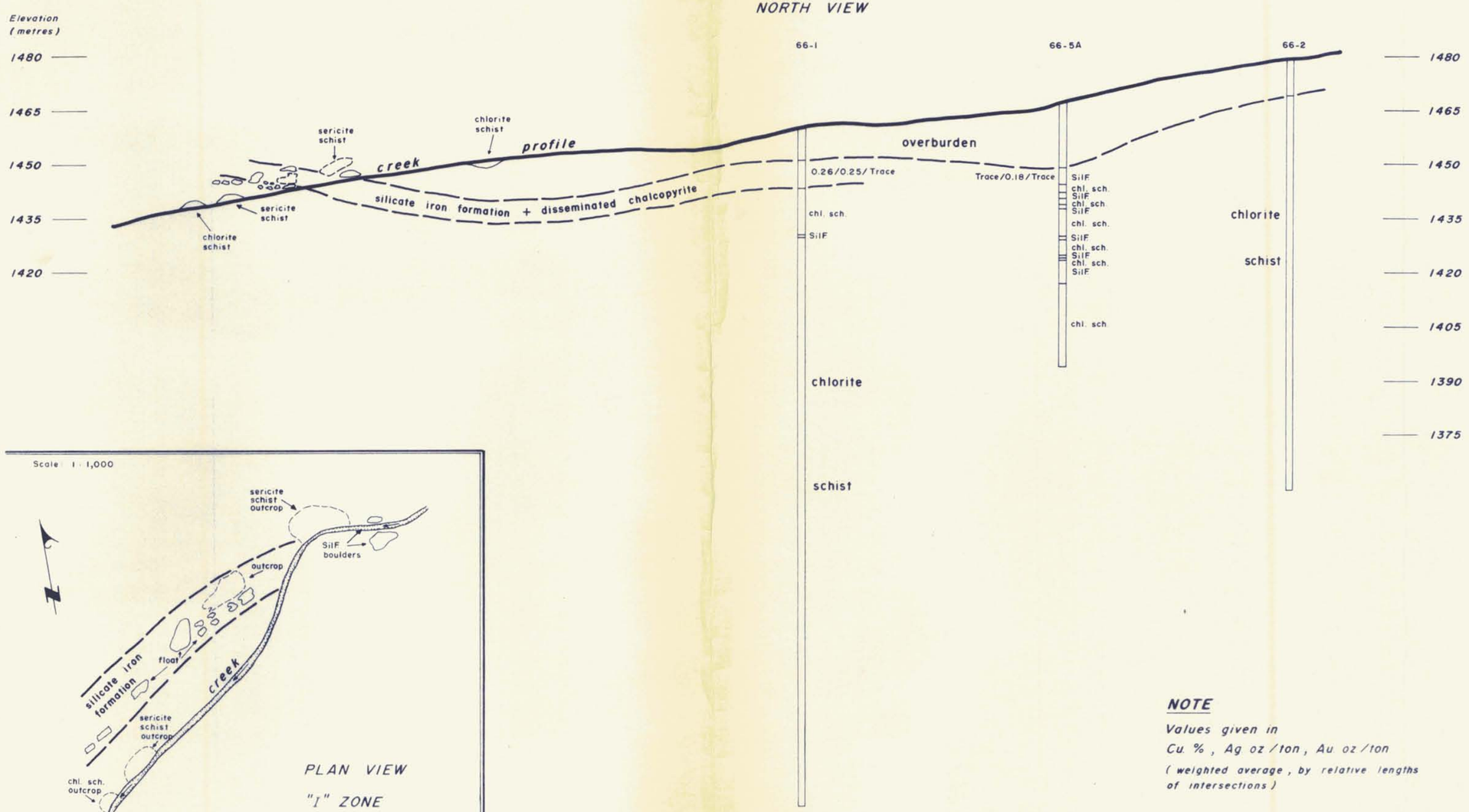
ZONE "E"

CROSS - SECTIONS

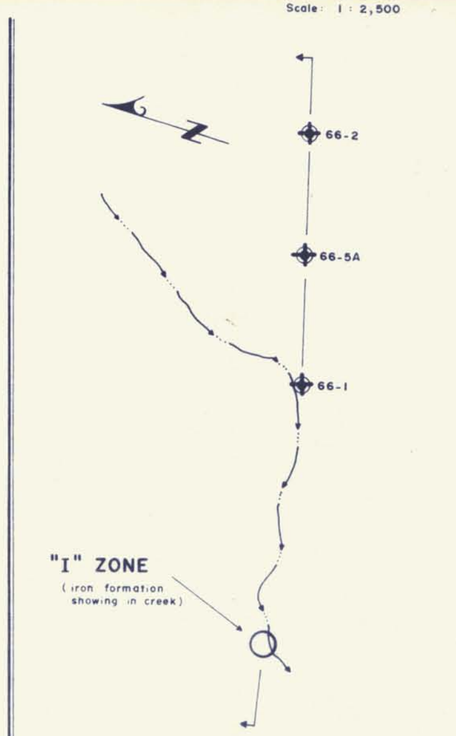
Scale 1 : 500	Date OCT. 1980	N.T.S. 105G/1,2
Revised:	By: W.J.C. / d.h.	Fig. 13

DIAMOND DRILL HOLE SECTION

NORTH VIEW



Scale 1 : 2,500



KEY MAP

Scale 1 : 1,000

PLAN VIEW

"I" ZONE

NOTE

Values given in

Cu. % , Ag. oz/ton , Au. oz/ton

(weighted average , by relative lengths of intersections)

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

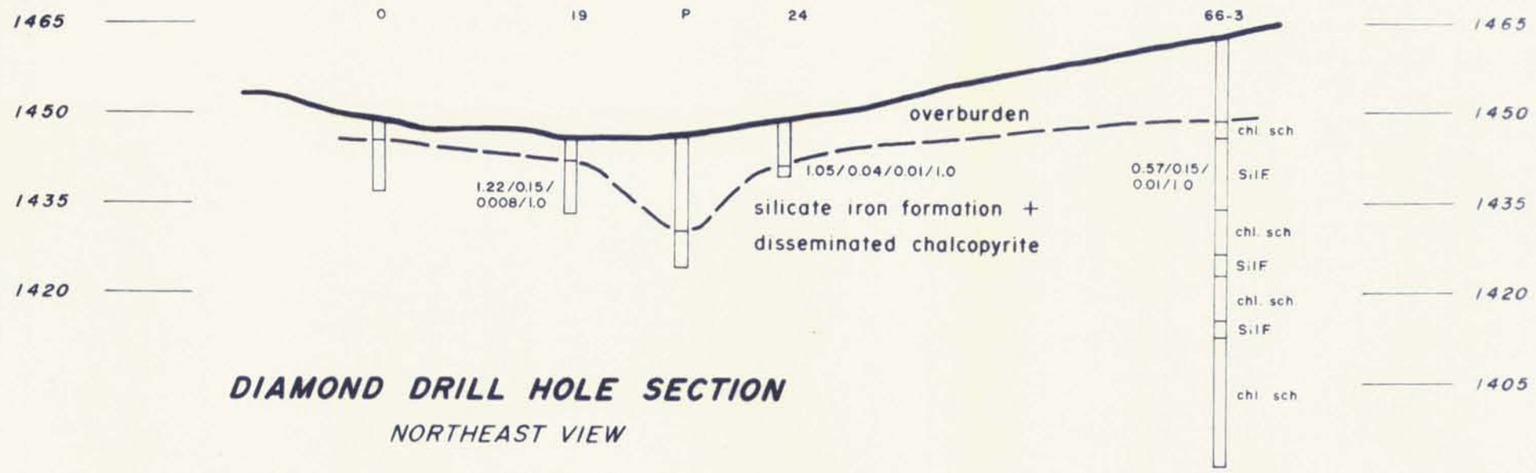
ZONE "I"

CROSS - SECTION

Scale 1 : 1,000	Date NOV. 1980	N.T.S 105G/1,2
Revised	By W.J.C./d.h.	Fig 16

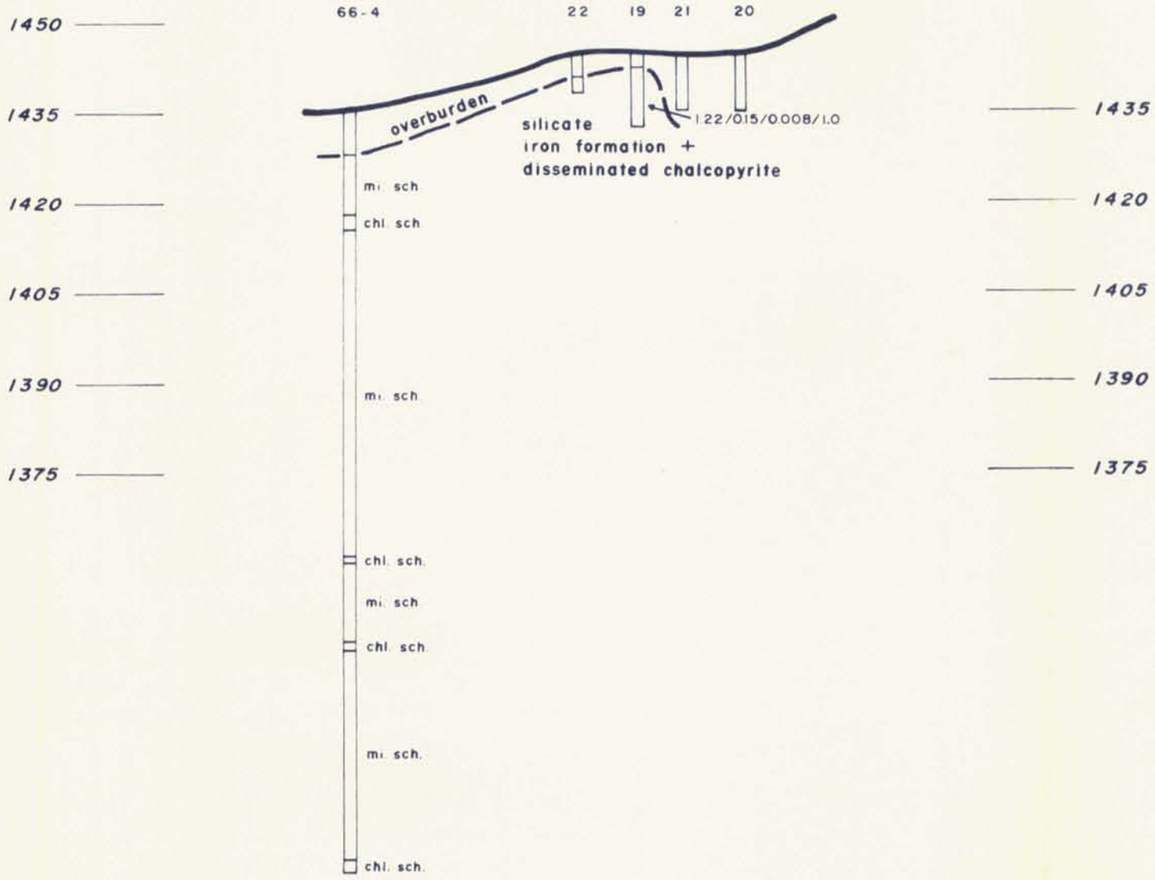
DIAMOND DRILL HOLE SECTION

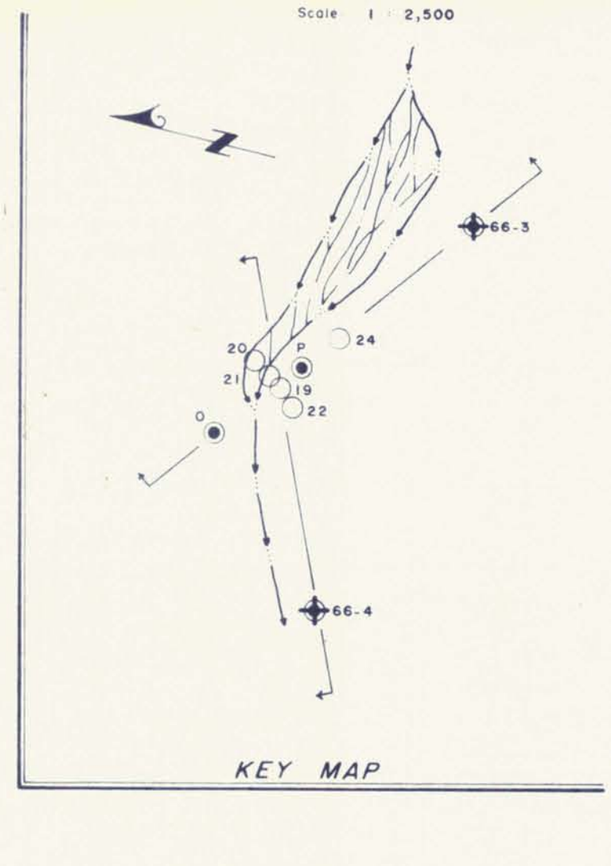
NORTHWEST VIEW



DIAMOND DRILL HOLE SECTION

NORTHEAST VIEW





KEY MAP

Geologic contact

Cassiar AX diamond drill hole

Cassiar packsack diamond drill hole

Atlas diamond drill hole

SilF - Silicate iron formation

chl. sch - Chlorite schist

mi. sch. - Mica schist

NOTE:

Values given in
Cu. %, Ag. oz./ton, Au. oz./ton, Zn. %
(weighted average, by relative lengths of intersections)

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

ZONE "K"

CROSS - SECTIONS

Scale 1 : 1,000	Date NOV. 1980	N.T.S. 105G/1,2
Revised:	By: W.J.C./d.h.	Fig. 17

36 N 32 N 28 N 24 N 20 N 16 N 12 N 8 N 6 N 4 N 2 N 0+00 2 S 4 S 6 S 8 S 10 S 12 S 16 S

"J" ZONE

"E" ZONE
Anomaly # 1

Anomaly # 3

0+00 Cassiar Baseline

"M" SHOWING

"K" ZONE
Anomaly # 2

"I" ZONE
Anomaly # 4

28+00

Atlas Baseline 0+00 340°

20 E 10 E 10 W

LEGEND:

- Outline of anomaly
- Creek
- Magnetometer (about + 59,000 gammas)
- E M
- Diamond - drill hole (Cassiar AX)
- (Atlas)

after : Sheridan - Kelk Machiphase E M Survey, July 1961
Cassiar Asbestos Magnetometer Survey, July 1961

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

CASSIAR ASBESTOS CORPORATION

MAGNETOMETER & EM SURVEYS

Scale 1 : 5,000	Date OCT. 1980	N.T.S 105G/1,2
Revised	By W.J.C./d.h.	Fig 18

KONA CLAIMS BOUNDARY

1981 Basin Project Geochemical Grid

L

J (cpy)

F

G

H

E (py & cpy)

I (Silt & cpy)

K

D

E-4

Atlas Grid 0+00

0+00

Cassiar BL

16+00 S

20+00 S

24+00S

28+00 S

22+00W

12

13

11

5000

5500

6000

4500

4000

1500

North River

FYRE LAKE

1981 Basin Project Geochemical Grid

LEGEND:

- Contours (feet)
- Creek
- Mineral occurrence
- Aeromagnetic anomaly
  - 4,000 gammas
  - 3,900 gammas
  - 3,800 gammas

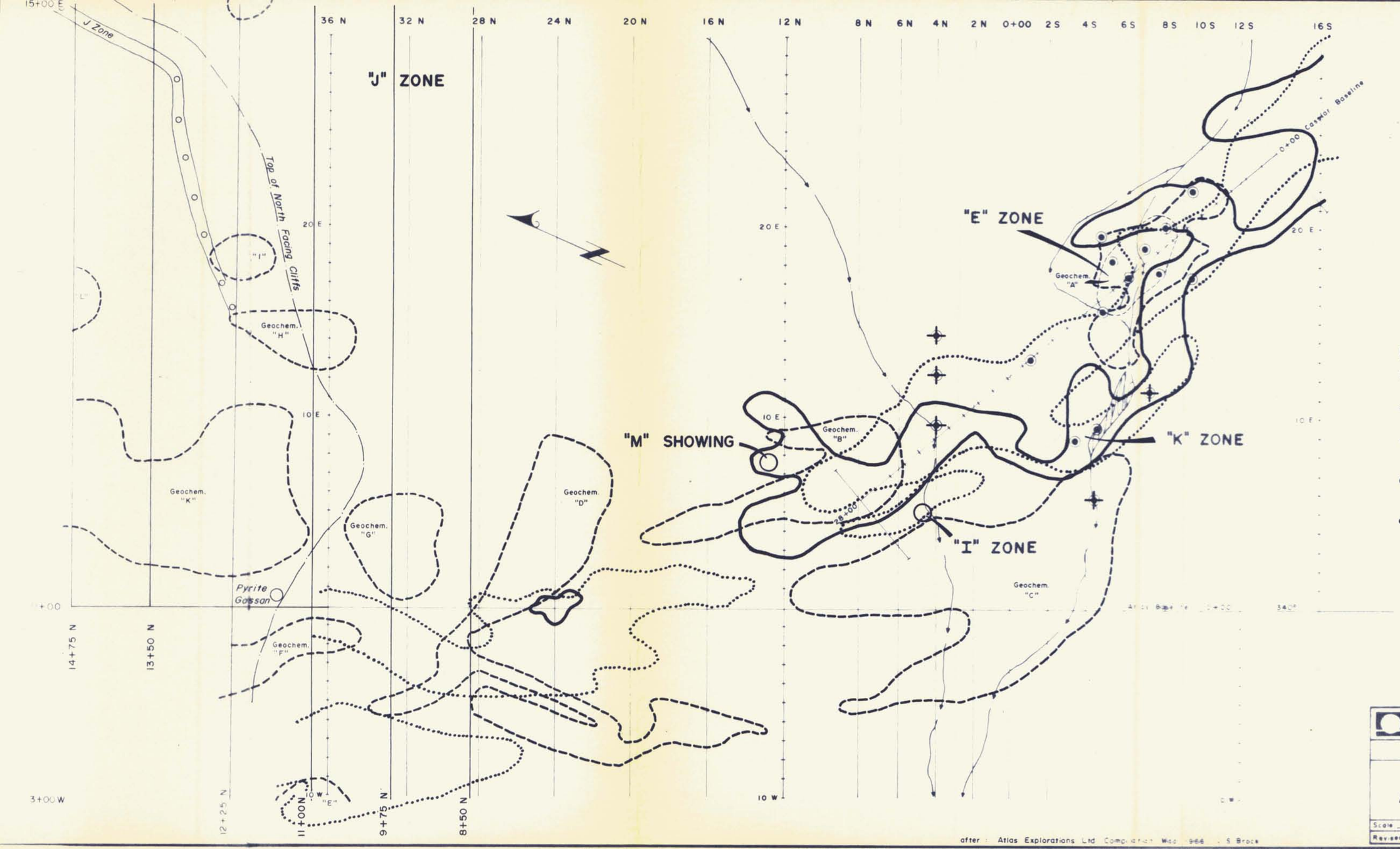
after Atlas Explorations Ltd. 1981

WELCOME NORTH MINES LTD.

BASIN PROJECT

ATLAS EXPLORATIONS LTD.
FYRE LAKE AREA
AIRBORNE MAGNETOMETER & EM SURVEYS

Scale 1 31,680	Date NOV. 1980	NTS 105G/12
Revised Nov. 81 W.J.C.	By W.J.C./d.h.	Fig. 19



after : Atlas Explorations Ltd Compilation Map 1980 , S Brock

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

ATLAS EXPLORATIONS LTD.

MAGNETOMETER, EM and GEOCHEMICAL SURVEYS

Scale 1 5,000	Date OCT. 1980	NTS 105G/12
Revised Nov.'81 W.J.C.	By W.J.C./d.h.	Fig 20

LEGEND

Cu	>300 p.p.m.	———
	>200 p.p.m.	———
	>100 p.p.m.	———
Pb	>75 p.p.m.	·····
Zn	>175 p.p.m.	— — —
	>125 p.p.m.	— — —

WELCOME NORTH MINES LTD.
BASIN PROJECT

KONA PROPERTY – WEST
ZONE J

GEOCHEMISTRY – Cu, Pb, Zn

N.T.S. 105 G/2

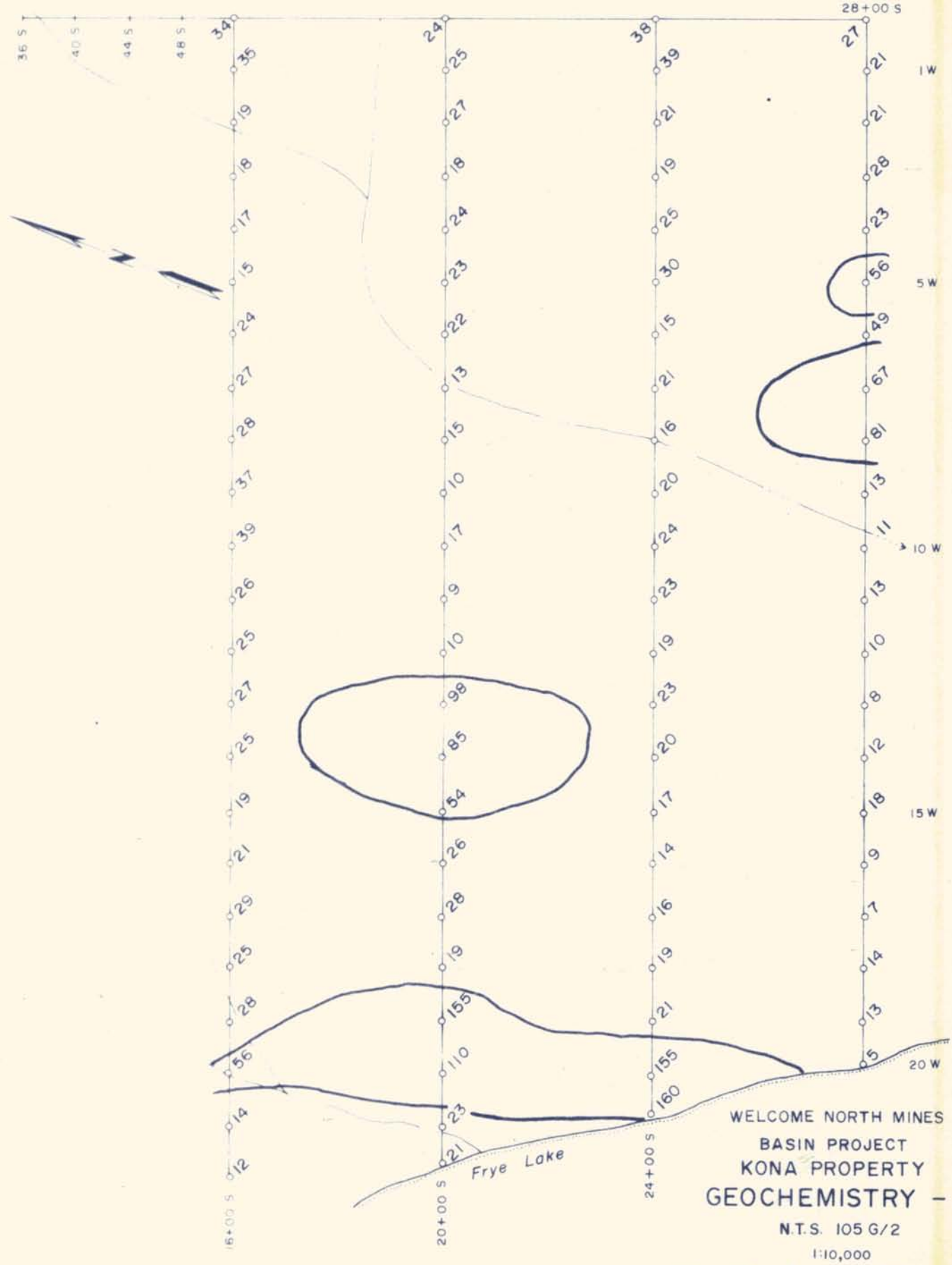
1:5000

10 5 0 5 10 15 20

Scale in Meters

NOVEMBER 1981

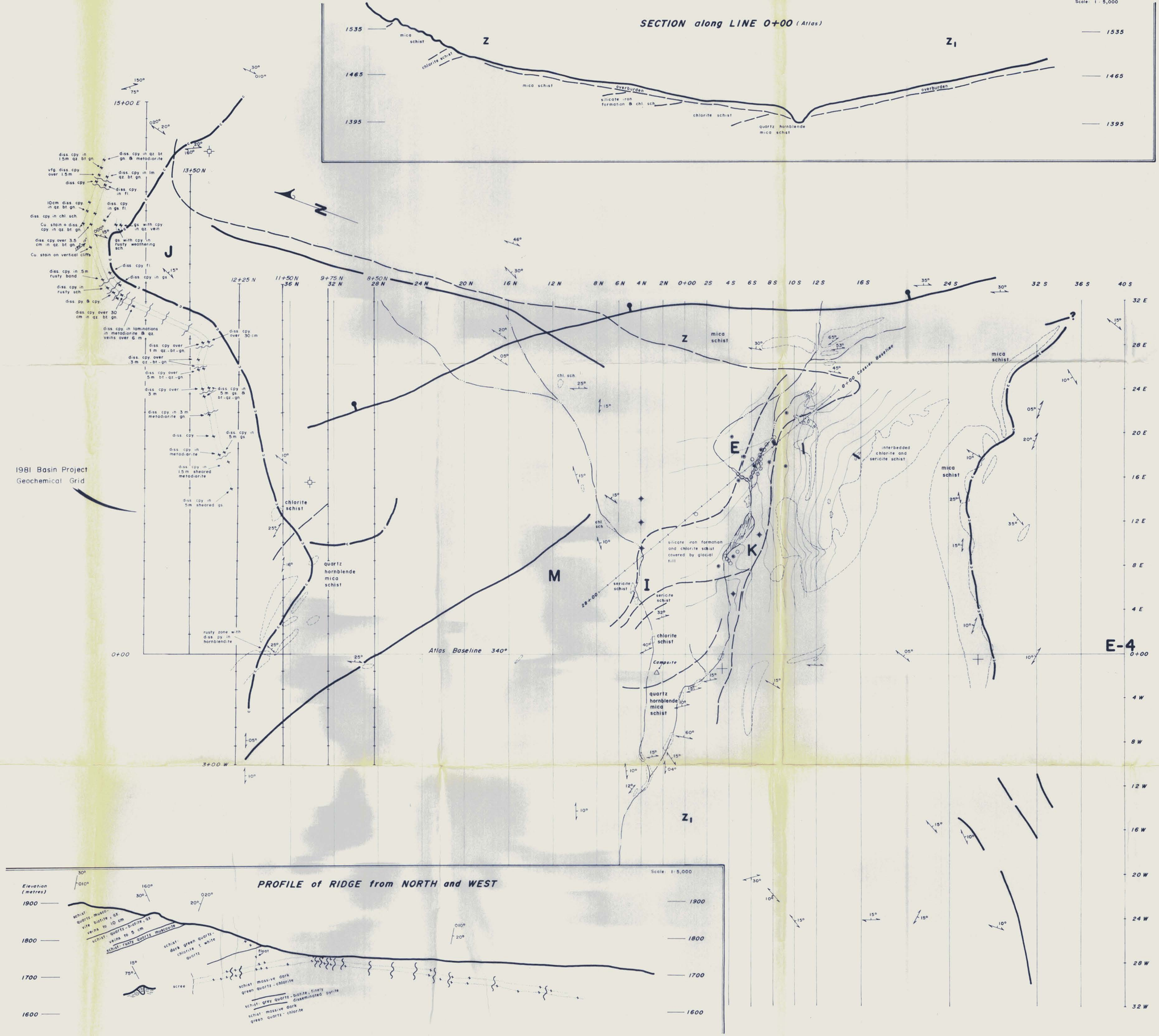
FIGURE 21



OCT. 27, 1981

FIGURE 22


36 S
40 S
44 S
48 S
28+00 S
1W
5W
10W
15W
20W
16+00 S
20+00 S
24+00 S
Frye Lake
46,135
78,130
84,130
50,100
87,100
143,165
93,190
84,240
145,220
63,170
57,105
36,85
42,97
46,120
40,50
42,74
95,170
59,86
93,150
80,140
45,115
37,64
42,73
89,115
40,120
88,110
39,77
40,79
27,64
25,69
26,70
27,86
24,82
38,97
18,39
14,38
33,38
20,42
37,65
80,130
57,115
105,87
62,120
56,105
35,44
32,37
98,165
54,185
89,120
56,120
55,130
50,130
38,94
86,25
21,73
35,78
17,37
6,26
34,65
37,76
47,73
50,84
32,46
33,45
36,44
41,45
65,115
97,125
53,115
19,96
60,125
95,150
70,170
91,150
52,175
96,155
39,69
29,56
33,58
19,66
20,51
45,90
31,37
9,24
11,23
12,30
8,25
3,14
WELCOME NORTH MINES
BASIN PROJECT
KONA PROPERTY
GEOCHEMISTRY – Pb, Zn
N.T.S. 105 G/2
1:10,000
200 100 0 200 400
Scale in Meters
Pb > 75p.p.m.
Zn > 125p.p.m.
> 175p.p.m.
OCT. 27, 1981
FIGURE 23



LEGEND :

- Contours
- Outcrop
- Trench
- Geologic contact
- Minor fault
- Dropped fault
- Horizontal bedding
- Lineation
- Schistosity
- Crest of ridge
- Kona claim post
- Mineral showing
- Trend of mineralization

Diamond drill hole:

- Cassiar (packsack) 1961
- Cassiar (AX) 1961
- Atlas Explorations 1966

- Mineralization encountered

090920

WELCOME NORTH MINES LTD.

BASIN PROJECT

KONA CLAIMS

GEOLOGIC COMPILATION MAP

Scale: 1 : 5,000	Date: NOV. 1980	NTS 105G/1,2
Revised: Nov. 1981 W.J.C./p.p.	By: W.J.C. / d.h.	Plate 1