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ANNUAL PROGRESS REPORT

EXPLORATION LICENCE 15/73,

HATFIELD RIVER

for 12 months ending June 25, 1976.

COMINCO EXPLORATION PTY. LTD.

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CONTENTS

		Page
I.	INTRODUCTION	1
	1. Summary	
	2. History	
	3. Tenure	
	4. Topography, Services	
	5. Objectives	2
II.	WORK PROGRAMME	2
	1. Survey	
	2. Geological Mapping	
	3. Geochemistry	
	4. Geophysics	3
	5. Diamond Drilling	4
III.	DISCUSSION OF RESULTS	
	1. Geology	5
	2. Geochemistry	11
	3. Geophysics	14
IV.	TECHNICAL CONCLUSIONS AND RECOMMENDATIONS	15
V.	EXPENDITURE	16
VI.	ATTACHMENTS - See separate folder for maps	17
VII.	REFERENCES	18

I. INTRODUCTION

1. Summary

This report describes surface exploration, including diamond drilling, carried out during the 1975/76 summer season.

Geological mapping, soil geochemistry and IP featured as prime techniques in the exploration of three areas of interest within the licence.

Two diamond drill holes at one of these localities encountered pyrite-barite mineralisation with traces of galena and sphalerite.

Mapping substantially improved the understanding of local stratigraphy, but also demonstrated a need for extended reconnaissance to guide continued exploration in this and adjacent properties. Several soil geochemical anomalies were located which require closer examination.

2. History

Property history is described in Skey (1975) with relevant information also supplied by Webster (1975) and Skey, Young and Webster (1975).

3. Tenure

E.L. 15/73 is held by Cominco Exploration Pty. Ltd. on behalf of the Abex joint venture. Licence expiry date is June 25, 1976 and it may be renewed at six monthly intervals.

4. Topography, Services

The northern half of the licence covers an undulating plateau of Tertiary basalt. The southern half is dissected by west draining tributaries of the Pieman River; the eastern boundary in part approximates the watershed between these streams and tributaries of the Mackintosh River, a main branch of the upper Pieman.

The western boundary is substantially along the Murchison Highway, the major access route of western Tasmania.

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5. Objectives

The two inter-related objectives of the programme were the definition of the stratigraphy and the examination of three areas already known to be of interest, viz. Mt. Charter pyritic volcanics, the black shale/ andesite contact, and an area of altered andesites mooted as a possible site for the Que River mill.

II. WORK PROGRAMME

1. Survey

11.1 km of new grid was added to earlier stadia grid by compass and chain methods corrected for slope. Line spacing is either 200 or 100 metres.

2. Geological Mapping

Grid mapping at 1:2,500 scale totalled approximately 20 line kilometres. Several creeks were also traversed. Most data were plotted at 1:2,500 scale (Plates QR81, B C D L M N P). Data plots at 1:10,000 scale (Plates DT61, A B D) were used to produce interpretive maps.

Hand specimens are collected intensively; 30 were thin sectioned and described by consulting petrologists, with subsequent check examination by CEPL staff. Reports are appended (' II). Numbers on fact geology maps refer to specimens in storage.

3. Geochemistry

i) Soils

1190 C Horizon soil samples were collected at 10m or 20m intervals on cut lines. Sample depths varied to 150cms. After drying and sieving to minus 80 mesh, 5 gram samples were digested in perchloric acid and analysed by AAS for copper, lead and zinc. Results of these and previous analyses are presented on Plates Mac45 - 47, A B C D L M N P.

Contour levels for all data were selected by inspection. A statistical approach has since been initiated. This approach does not affect reporting of results to date but is significant in formulating future programme proposals.

ii) Streams

a) Silt: 10 samples from the Mt. Charter area were collected. All were analysed for copper, lead and zinc, and nine for barium. Minus 40 mesh silt was selected for copper, lead, zinc analysis by AAS. 0·5 gram samples digested in perchloric acid were used. Barium and associated analytical group elements Yttrium, Strontium and Titanium were semi-quantitatively analysed by emission-spectroscopy. Barium values in excess of 1% were re-analysed by semi-quantitative XRF. Data are supplied on Plates DT65, A B D; DT60, A B D; and DT64, A, which incorporate previous CEPL work.

b) Humus: Plates DT66, A B record those results with apparent exploration significance arising from the analysis of stream transported humus. These samples were collected by Chemlabs/ Technical Services Tas. on behalf of Aberfoyle Management Pty. Ltd. as part of a preliminary environmental impact study related to the Que River project. Of the 20 sites sampled, 10 are within this licence. Analyses were by AAS.

c) Water: Consultants Chemlabs also collected stream water. Samples were filtered and filtrate and residue analysed separately by AAS. Data are included in Appendix I, together with unplotted humus results.

4. Geophysics

The airborne geophysical survey of 1975 (Webster, 1975) indicated e.m. anomalies within E.L. 15/73 which warranted ground follow-up. Two attempts were made to locate these anomalies, both of which failed due to equipment malfunction and adverse conditions. A survey grid or traverse line has been established in the inferred anomaly position and will be geophysically evaluated when weather conditions are favourable.

The ground geophysical programme in E.L. 15/73 has been confined to the IP technique, both in reconnaissance and detail work, after surveys with numerous techniques at Que River. It was illustrated in this work that IP was the only geophysical technique that could detect and delineate the Que River ore bodies.

The reconnaissance programme comprised traversing with 100m dipoles along lines spaced 1,000m apart. This work was correlated with a coincident geochemical soil sampling programme to define anomalous zones for detailed follow-up. The Mt. Charter and Murchison Highway areas were thus outlined.

The detailed IP programme was designed to delineate pyritic "host rock" trends and detect localised mineral zones within these trends. This work mainly consisted of 25m dipole traversing, along lines spaced either 100m or 200m apart. The IP detail data have been transferred to plan presentation by averaging the first three (dipole) separation data for both resistivity and frequency effect, and contouring, as presented in Plans HT15 B C and HT16 B C. This plan format permits ready correlation of IP anomalies and trends with geology and geochemistry.

A total of 10 km of 100m dipole traversing was undertaking plus 12 km of 25m detail traversing, as indicated on accompanying plans QR88 A, B.

5. Diamond Drilling

Three holes were drilled within the licence. The first, in October-November, 1975, was to test mineral potential and ground conditions for foundation studies in an area under consideration as a mill site for the Que River ores. This hole was located with engineering purposes paramount and did not represent an adequate test of soil geochemical values in the area. More recent surface work has provided more attractive targets 300-400m to the south.

Two holes were drilled at Mt. Charter as part of the planned exploration programme. No core was submitted for assay; however it is intended to take contiguous 3m ground core samples for geochemical assessment from MC 1.

Hole	Date Commenced	Coordinates E	N	RL	Dip	Azimuth	Length	Core Size
QR72(D)	31/10/75	4425	7610	710m	43°	099°m	111.4m	NQ
MC 1	12/2/76	4290	4800	N/A	45°	098°m	195.5m	NQ/BQ
MC 2	23/2/76	4290	4600	N/A	45°	099°m	187.4m	NQ/BQ

After logging, the geology was plotted at 1:500 scale on plates QR47/76C, HT1/46, HT1/48. Logs are supplied in Appendix III.

III. DISCUSSION OF RESULTS

1. Geology

An interpretation of the fact geology is given on plates DT62, A B D.

Two distinctive volcanic suites, one intermediate to basic, the other intermediate to acid, are separated by a black slate-mica sandstone formation intruded in one locality by Jurassic (?) dolerite. Prior to discussion of stratigraphy and structure individual lithologic groups are described.

Lithologies

i) The Tertiary basalt has a red brown weathered surface, is dark green on fresh surfaces, and occasionally exhibits crude columnar jointing. The northern half of the licence area is comprised of this unit, which has no base metal potential but is regarded as a possible source of aggregate for Que River development work.

ii) Dolerite/diorite: Fresh green diorite to dolerite outcrops between the Murchison Highway and Mt. Charter summit. A number of smaller outcrops, rubble, and some highly weathered basic dikes in highway cuttings and elsewhere suggest a substantial plug-like intrusion. Interpreted age is Jurassic.

iii) Western acid/intermediate suite: This suite is comprised of fine acid (dacite to rhyolite) lavas and tuffs, also lithic crystal tuffs and agglomerates, occasionally with black slate xenoliths, of distinctive and typical light grey to cream colour where weathered. Fresh surfaces are mid to dark grey, and often vitreous in appearance Small (<1mm) quartz phenocrysts can commonly be seen. These lithologies correspond with Episode III of Freytag (1975) and are of interpreted Cambrian age. Summary group name is Rhyolitic-Dacitic Volcanics (RDV).

iv) Que River Slates and mica sandstone. The character of the slates within the licence area is consistent; all are black, with laminar bedding apparent where cleavage is weak. Pyrite, and possible graphite, may account for the airborne electromagnetic anomalies. A restricted lahar or breccia occurs adjacent to the andesitic volcanics. Agnostid trilobites found near the Que River road bridge, were considered by Gee *et al* (1970) to demonstrate a late Middle Cambrian age.

Dark greenish brown massive sandstone, weathering to light grey, is common south of 5400N (local coordination) on the Murchison Highway and predominant south of Mt. Charter. Grain size of the quartz and quartzite (Pre Cambrian?) debris ranges up to 2mm, but is most commonly 0.5mm. Other debris is chert, black shale, rare biotite, and characteristic muscovite.

Other sediments in this group, not examined in detail, include grey cherts, cherty shales and feldspathic greywackes, all occurring near the Murchison Highway vicinity 3400N.

v) Andesite Suite. This group, termed Andesitic Pyroclastics (AP), was previously known as Dacitic Volcanics (DP) - (refer Skey, Young and Webster (1975)). The dominant lithology is feldspar porphyry lithic tuff ranging to agglomerate, often interpreted to be a lava flow breccia. Fresh colour is green, due to weak pervasive chlorite with distinctive white feldspar phenocrysts, and common, but less apparent, pyroxene or hornblende phenocrysts. Weathered surfaces are generally cream to white and may be studded with quartz eyes due to the deuteric infilling of vesicles (≤2mm) or matrix cavities. Other lithologies comprise coarse feldspar pyroxene and/or hornblende porphyry lavas, feldspar crystal tuffs and rare intrusions Composition assessed from thin section examination is in the range andesite to basalt, with deuteric silification.

The contact with the black shales is often marked by a colour change to grey and the occurrence of coarse carbonate amygdales up to 1cm in diameter, or the development of scoria.

Grey chert layers, typically 1 to 5 cms thick, occur within the andesites. These cherts are most common adjacent to the black shales.

vi) Intermediate to acid volcanics. (Pyritic Pyroclastics - PyP). Feldspar porphyry lavas and fragmentals, cream to blue-grey in colour, with intense carbonate and sericite alteration and variable pyrite from 2 - 80%, characterise this group. They are similar in these respects to the host rocks of the Que River ore lenses. These lithologies occur at Mt. Charter, near the Murchison Highway immediately beneath the Que River slates, and at scattered localities within the andesitic pile.

Drill hole MC2 provided an insight into the possible origin of these volanics. This hole intersected varieties of andesitic and dacitic lavas and fragmentals, which appear to be intermediate in character, between distinctive members of the andesitic pyroclastic group and the pyritic pyroclastic group (plates HT1/46, HT1/48 and Appendix III). Further, some deep drilling at Que River has indicated the possibility that pyritic pyroclastics are (in part) alteration products of andesitic volcanics. Suggestions by consulting petrologists that the host rock suite at Que River is a distinctive horizon of intermediate to acid volcanics within a major andesite pile may be only partially correct.

vii) Non pyritic acid lavas. Of far less volumetric occurrence within this licence than within the adjacent Mackintosh property are pale brown to red-brown fine grained dacitic feldspar porphyry lavas.

Cambrian Stratigraphy

Accepting that the Que River Slates face west, the lithological descriptions above represent a crude stratigraphic column, with further andesitic volcanics occurring below the level of the altered pyritic pyroclastics. Within this licence a fairly simple west facing sequence is hence interpreted. Dips in the black slates near Mt. Charter of 45 to 55° west were not confirmed by drill hole geology at Mt. Charter, where subvertical cleavage is dominant. Future drilling may clarify the issue if the pyritic rocks are shown to have a distinctive stratigraphic component and are not solely the result of post- or syn-depositional

alteration. Unfortunately the black shale/andesite contact in the Mt. Charter area is not regarded as typical, in that no vesicular or scoriaceous andesites have been located. Further, the area is distinguished by sharp south-easterly trending contact suggestive of a fault.

Debris of chert within the micaceous sandstones overlying the andesites of Mt. Charter is similar to chert layers within the uppermost andesites elsewhere. An erosional contact is thus a possibility, at least on a local scale.

A careful examination of the relationship between black shale, sandstone, and rhyolitic/dacitic volcanics was not made. Interbedding and interfingering suggest that they be regarded as one Formation. Local unconformities and disruptions of volcanic origin may be interpreted from the observation of shale xenoliths in the volcanics.

Structure

Between 6400N and 8400N an undisturbed shale andesite contact dipping west at 25 to 40^{o} is indicated. A gentle synclinal structure in the shales and overlying acid volcanics is present north of 8000N and straddlin the highway. The presence of shale at depth was confirmed by reconnaissanc 100m spread IP. This syncline trends north-east - south-west, but is terminated to the north by apparent east-south-easterly anticlinal cross folding demonstrated by deformation in the shales exposed in the Que River and tributaries.

South of 6400N there is a small lobe-like structure, located by mapping and confirmed by IP. It is not known if this feature is a fold or fault phenomenon. Possibly supporting the latter are photo and geophysical linea

In the Mt. Charter area, the shale/andesite contact is regarded as defined by a south-south-easterly trending fault as argued previously.

Further mapping would be required south-west of Mt. Charter to resolve the apparently complex minor folding in the shales and acid volcanics, indicated by dip orientations measured in Highway outcrops.

Data presented in the Mackintosh (E.L. 2/70) report will be construed to demonstrate that the Que River pyritic zone occurs in the centre of a north-north-east (025° magnetic) trending antiform (Plate DT63) and that the pyritic horizon is part of a west facing limb.

Fault structures indicated by photo, geophysical, geochemical and geological linears in both E.L. 15/73 and 2/70 may be resolved into two sets trending 045 to 065 (A) and 315 to 335 (B) degrees magnetic. As shown on Plate DT62A it is suspected that the Mt. Charter and Que River pyritic suites were contiguous, with fault displacement of the former to the south-west. This supposition requires set (B) to be later than set (A) to produce the straight shale/andesite contact west of Mt. Charter.

The paucity of mapping data does not enable a conclusion to be made about the significance of gentle dips measured in sandstones south of Mt. Charter.

Cleavage and equivalent weaker foliation is widely present. Strong platy cleavage is common in the Que River slates, often, but not invariably, parallel to strike. The trend varies from west of north to the south of 5000N to north-east elsewhere. Deformation of cleavage by later faulting and/or minor folding is indicated by roadside outcrops near 6600N and east of the highway on line 6200N.

Alteration

This is divisible into two types; firstly, the effects of low grade regional metamorphism giving rise to weak development of chlorite after pyroxene and/or hornblende in the andesites, and local (?) graphite in the black shales, with recrystallisation of pyrite; secondly, carbonation, sericitisation and silicification associated with vulcanicity and more particularly with ferrous and base metal mineralisation.

The latter type predominates in areas described above where feldspars and tuffaceous debris were converted to a sericite-carbonate mixture with probable later silicification. Massive chlorite development is rare and is restricted to narrow bands of less than 20 cms as observed in drill core

Weaker carbonate veining and patchy pervasive carbonate-silica alteration occurs in the area 7000N to 7500N near 4700E (old mill site area) and in massive andesitic fragmentals on the southern slopes of Mt. Charter. As previously commented, drill hole MC2 intersected alteration varieties showing stages intermediate to weakly chloritic andesitic agglomerates and thoroughly sericitised and carbonated pyritic pyroclastics.

This intense alteration is considered to be an integral part of the sulphide mineralisation process.

Deuteric silicification of andesitic pyroclastics is quite common. Quartz (particularly chalcedony) filled vesicles, tension gashes and pervasive silicification of matrix material were commonly observed.

Mineralisation

Sulphide mineralisation is divided into four types:

a) Disseminated pyrite, locally recrystallised, occurring in black shales, e.g. Murchison Highway 4800N.

b) Semi-massive bedded (recrystallised) pyrite within layered bedded cherts, typically occurring close to the andesite/shale contact, e.g. 6800N, 3500E.

c) Disseminated pyrite within andesites; base metal sulphides, sphalerite, galena and chalcopyrite occur in some areas of amygdaloidal lavas and carbonate veining, e.g. old mill site (7200N, 4300E), Mt. Charter south (4200N, 4200E).

d) Disseminated to massive pyrite, disseminated sphalerite, galena and rare chalcopyrite, occur within intensely carbonated, sericitised lavas and pyroclastics. Richly pyritic, lithic fragments, occurring within the altered sequence, indicate that mineralisation occurred contemporaneously with vulcanism. The two significant areas with this style are Mt. Charter north, (Plates HT1/46, HT1/48), and also adjacent to the Murchison Highway, 6400N, 3150E.

One of the attractions of the Mt. Charter area was the reported occurrence of a barite prospect. This was eventually located on the steep (45^{o}) east slope of Mt. Charter. Several small pits and trenches and a larger

cut approximately 15 ft. deep are shown on Plates DT61 A and QR81 C. A vein approximately 70 cms thick occurs, with widespread float on both sides of the watershed. Barite veining is common in drill core from MC 1 and MC 2, though no zones greater than 10 cms of massive barite were found.

2. Geochemistry

i) Soils

Contour levels for all data determined by inspection of values plotted on 1:2,500 scale plans are as follows:

Copper	100 ppm	200 ppm		
Lead	250 ppm	500 ppm	1000 ppm	2000 ppm
Zinc	200 ppm	400 ppm		

The statistical study referred to in II.3.i served at this stage only as a check on the selection of contours by inspection. This study indicated the need for computer processing of data to enable a greater variety of techniques to be applied and for human errors in data handling to be eliminated. At this time, selection of threshold values from cumulative frequency curves did not represent a significant advance over contouring based on inspection of plans.

Specific Soil Anomalies

A comprehensive assessment of anomalies with consideration of geophysical and geological data has not yet been completed. It is proposed that this work occur during the winter and spring (of 1976). General comments on individual areas follow:

a) "Old Mill Site" Zone, 7000N - 7400N, 4300E - 4500E.

Work was undertaken to eliminate the possibility of the existence of mineral potential in this area, which had been selected as a possible mill site for Que River. Anomalous values of copper, lead and zinc were located; and, whilst these values are not specifically coincident and although IP produced only resistivity lows, it is essential that the anomaly be understood. The geology from both mapping and drilling, appears to be partly carbonated andesitic pyroclastics with some disseminated galena, sphalerite and chalcopyrite, similar to the Kimber Trench area within ML 3M/75.

It is possible that other zones of a similar nature occur undetected within the andesitic volcanics. One drill hole to test the most intense soil metal values will be proposed.

b) Murchison Highway Zone. The soil sampling programme was promoted by the occurrence of pyritic chert, and traces of base metal sulphides in vesicular volcanics. Two separate anomalies are distinguishable; lead-zinc values related to the pyritic chert and vesicular andesites, and trace (?) copper-zinc values over the black slates. The interpenetrating lobes of volcanics and shale defined by mapping now require detailed correlation with geochemistry (and geophysics) to identify sites for limited check trenching or drilling. The target ore mineralisation in this type of situation may occur at the volcanic shale contact, difficult to detect by IP, and possibly not outcropping.

c) Andesite-shale contact towards Mt. Charter. Lead values of up to 3,000 ppm with supporting zinc form a distinct zone of approximately 400m strike. Spot values occur to the south-east and merge with the 'Mt. Charter north' zone.

The strong trend apparent in this anomaly, parallels the shale contact (fault?) but the anomaly is within the andesites. Additional goechemistry and geophysics are desirable, assisted by detailed geological mapping (= trenching) to detect alteration styles.

d) Mt. Charter North Zone. Intersecting linear trends, south-east north-west and north-south result in an anomaly with arcuate contours. This bifurcating anomaly with lead values commonly exceeding 500 ppm appears transgressive to the geology, but shows similarities to the contoured IP data. A fold structure has not been considered from a geological viewpoint, but may be a possibil

Soil sampling in this area was intensive and drilling has confirmed pyritic volcanics. It is doubted that closer sampling is worthwhile. Continued exploration in this area requires comprehension of stratigraphy aided by geophysics where appropriate.

e) Mt. Charter South. This anomaly, dominated by zinc, with many values in the range 500 to 2,300 ppm, was located late in the season and follow-up gridding and sampling cannot be carried out until weather conditions improve. Outcrop is sparse to non-existent, however, disseminated galena was observed associated with carbonate veining in massive andesitic fragmentals. Lead soil values attain 1,000 ppm maximum. Though remote, access is good in dry weather and trenching would be an inexpensive method of acquiring geological data.

f) 5600N, 4700E. This two line lead anomaly (maximum 1,450 ppm) has a much greater breadth (200m) and strike (600m) in terms of zinc values. Intermediate lines 5500N and 5700N did not improve the anomaly but fragmented it. The grid lines have yet to be mapped. On the basis of adjacent mapping, however, the lithologies are interpreted to be andesitic pyroclastics. Anomalies of this type and in this rock group should await conclusive results from more accessible similar situations (e.g. old mill site, Kimber Trench).

ii) Streams

Of the ten silt samples analysed for base metal content, only one, draining Mt. Charter North, responded with anomalous lead, 420 ppm. There are low order copper and zinc soil anomalies in the area, but no high lead values. The relatively high mobility of copper and zinc may account for their low stream values whilst the relatively immobile lead is assumed to have a very localised source, not detected by soil sampling.

Barium analyses of 9 samples indicated that scanning by emission spectroscopy may be useful as a guide to attractive geological environments in the absence of base metal tracers. Extension of this reconnaissance survey to other areas of known pyritic pyroclastics is recommended.

Examination of Chemlabs analyses of stream-borne humus, indicate that copper, lead, zinc, iron and manganese reflect values obtained from mineral sediment material. Both sets of results appear to derive from the footwall volcanics rather than from the ore itself.

The strongest metal values in both humus and sediment occur in east draining creeks. However, the one stream which traverses known ore (the central stream) has, in general, lowest relative values. It is concluded that for practical purposes methods other than stream geochemistry are essential for defining potential ore grade as against halo mineralisation.

Metal values in both stream humus and silt are of equivalent order so that selection of method depends on convenience of collection, processing and analysis. There appears to be no justification for discontinuing minus 40 mesh mineral sediment sampling for geochemical reconnaissance, in favour of humus sampling. Mineral sediment samples are more readily collected, dried and analysed, and a substantial volume of data is already available.

Future environmental control programmes testing water and humus could be expanded to permit assessment of down stream dispersion and apparently abnormally high sulphur and low pH values in the Hatfield licence.

Water samples are not considered useful for exploration purposes because of the highly variable dilution related to the heavy fluctuating rainfall.

3. Geophysics

The reconnaissance IP traversing within E.L. 15/73 has successfully delineated the gross lithological units, thus assisting geological mapping in an area of poor outcrop. The results show the structural dislocations along the strike length of the black shale, indicating areas of interest, i.e. the "Murchison Highway" area and the Mt. Charter area.

Several IP traverse lines have crossed the black shale unit and indicated quite variable response, as inferred from the airborne e.m. data. Some traverse lines recorded extremely low resistivity levels (10 ohm.m) for the black shales whilst only moderately low levels (20-60 ohm.m) were apparent on other lines. The frequency effect response is also variable, with few discrete anomaly patterns, but rather a broad zone of high background. The latter phenomenon may be an artificial product of the extremely low voltage levels being recorded.

Detail IP survey grids have been established at:

i) Murchison Highway area,
ii) Mt. Charter,
iii) Mill site.

The IP and resistivity contour plans for the Murchison Highway and Mt. Charter areas (HT15, B C and HT16, B C) show marked discontinuities in the linear trend of the black shale unit. Paucity of data along this rock unit preclude assessing the uniqueness of these zones. Fill-in traverse lines and additional traverses along the extension of this trend will be recommended for next season.

The anomalous IP zone at Mt. Charter appears to represent the intersection of the north-south trending "host rock" unit and the anomalous zone to the east of the north-west - south-east trending black shale. The frequency effect data was predicted to reflect only disseminated pyritic mineralisation, from an empirical relation established at Que River.

At the Murchison Highway anomalous zone the black shale unit appears to be folded, as evidenced by a marked thickening to a broad zone (~300m) of low resistivities (<30 ohm.m) and moderately high frequency effect values (>5%). The contrast between the black shale and andesitic pyroclastics is evidenced by a marked resistivity gradient and a discrete frequency effect anomaly, of magnitude 10 to 17%. These amplitudes are not seen elsewhere at the black shale contact. In addition, the strongest p.f.e. values occur on 5th and 6th separation, indicating a non-outcropping source.

IV. TECHNICAL CONCLUSION AND RECOMMENDATIONS

A reconnaissance programme was substantially completed. The gross stratigraphy is now well defined, however, detailed stratigraphy and structure within the most prospective lithologies are still obscure. This due to the poor outcrop, the lack of distinctive lithological units and the varying effects of hydrothermal alteration.

Stream sediment geochemistry continues to be a useful indicator of disseminated mineralisation pointing to areas requiring detailed soil programmes.

Several soil geochemical and induced polarisation anomalies are now in various stages of development. The Mt. Charter North area was diamond drilled and disseminated pyrite mineralisation with traces of base metals is of continuing interest. Consideration will be given to geophysical methods of greater depth penetration. Detailed mapping in the area is necessary.

Two localities will be the subjects of specific recommendations for detailed examination by trenching and/or diamond drilling; these are the Murchison Highway area, and the Old Mill Site area. The former is a complex zone of shales and volcanics; the latter a zone of altered intermediate pyroclastics with traces of disseminated base metal sulphides.

Other soil geochemical anomalies require closer spaced soil sampling, mapping and induced polarisation survey.

Reconnaissance mapping and sampling of the northern half of the shale/andesite contact is recommended since line spacing is currently 1 km. (The Que River ore zone has a strike length of approximately 800m).

Relative merits of target areas will be considered with a view to establishing priorities for further work. Improved methods of geochemical data assessment are commended to be incorporated in this and other field programmes. To this end, it is proposed to store all data in a manner suitable for computer processing.

V. FINANCE

Expenditure on Exploration Licence 15/73, Hatfield, for the past 12 months is as follows:

Geology	$11,531
Survey	26,188
Geophysics	30,975
Geochemistry	17,479
Diamond Drilling	31,482
Sundries	3,050
Tenure	137
	$120,842

Note: Costs for diamond drilling hole QR72(D) were paid from Que River Project not Hatfield Project.

VI. ATTACHMENTS

VOL II

		Scale
Plates	QR 81 B,C,D,L,M,N,P. Mackintosh-Hatfield area, Surface Outcrop Geology	1:2,500
	DT 61 A,B,D. Mackintosh-Hatfield area, Surface Outcrop Geology	1:10,000
	Mac 45-47 A,B,C,D,L,M,N,P. Mackintosh-Hatfield area, C Horizon Geochemistry	1:2,500
VOL III	DT 65, A,B,D. Mackintosh-Hatfield Area, Stream Sediment Locations	1:10,000
	DT 60 A,B,D. do. (results copper, lead, zinc)	1:10,000
	DT 64 A. do. (results barium)	1:10,000
	DT 66 A,B. Mackintosh-Hatfield Area, Stream Humus	1:10,000
	DT 62 A,B,D. Mackintosh-Hatfield Area, Preliminary Interpretive Geology	1:10,000
	DT 63 Mackintosh-Hatfield Area, Interpretive Cross Section 5395000N (AMG Coord.)	1:10,000
	HT 15, 16 B,C. Contours of averaged frequency effect and averaged resistivity	
	HT 1/46 Cross Section 4600N	1:500
	HT 1/48 Cross Section 4800N	1:500
	QR 47/76 Cross Section 7600N	1:500
	QR 88 A,B. Plan showing IP coverage Mackintosh-Hatfield area	
	QR 84 Geological legend.	

Appendix I Chemlabs Report: Analysis of Stream Water and Stream Transported Humus.

II Petrological Reports by I.R. Pontifex and Assoc. and Central Mineralogical Services Pty. Ltd. (H.W. Fander, D. Cowan).

III Diamond Drill logs, DDH's MC1, MC2, QR72(D).

VII. REFERENCES

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Submitted: _____

for E.H. Skey
Project Geologist.

and _____

S.S. Webster
Geophysicist.

Endorsed: _____

L.V. Gentle
Chief Geologist.

EHS, SSW:KMW
25/6/76.

020

456021

APPENDIX I

TABLES OF WATER AND STREAM HUMUS ANALYTICAL RESULTS

021

Hatfield.

APPENDIX I. Copy of Chemlabs Report - Technical Services Tasmania Pty. Ltd. 11th November 1975.

456022

THE ANALYSIS OF WATER SAMPLES

	Site No. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
pH	7.7	5.9	4.9	5.1	5.0	6.5	7.5	5.3	4.4	4.3	6.1	7.0	7.2	6.3	7.2	6.2	4.6	6.8	6.8	6.9
Dissolved Oxygen (% saturation)	98	96	96	98	92	98	98	99	92	95	90	97	90	92	98	96	98	97	97	98
Turbidity (Jackson Units)	13	73	80	13	20	15	7	12	17	23	40	400	57	87	37	42	250	95	17	20
total	13	73	80	13	20	15	7	12	17	23	40	400	57	87	37	42	250	95	17	20
filtrate	13	42	55	13	15	5	3	2	8	6	3	60	2	5	12	11	35	22	4	0
Total residue (mg/l)	52	107	89	16	72	56	88	71	51	60	60	186	128	118	50	48	269	45	94	66
non-filtrable residue	11	18	26	14	14	18	23	15	10	18	23	74	107	88	27	6	202	22	20	14
filtrable residue	41	89	63	2	58	38	65	56	41	42	37	112	21	30	23	42	67	23	74	52
Total sulphur (mg/l)	2.4	1.2	1.9	0.9	0.5	0.3	1.6	1.2	0.9	0.8	1.7	0.5	2.5	0.8	0.7	0.8	1.5	1.9	0.3	0.7
Fluoride (mg/l)	(all <0.01)																			
Cadmium (µg/l)	(all <0.5)							0.4												
soluble	(all <0.5)																			
insoluble	nd	nd	nd	0.2	0.3	nd	nd	0.4	0.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cobalt (µg/l)	(all <5)																			
soluble	(all <5)																			
insoluble	nd	nd	nd	nd	nd	0.1	0.4	nd	nd	0.1	0.1	0.8	0.5	0.2	0.5	0.5	0.3	0.4	nd	0.1
Copper (µg/l)	22	29	29	9	27	13	13	49	73	22	9	16	7	2	6	11	8	13	12	4
soluble	21	27	26	7	25	12	11	48	69	19	7	4	4	2	3	8	2	7	9	3
insoluble	1.4	1.5	2.7	1.7	2.3	1.4	2.3	1.2	3.7	3.4	2.0	12	3.3	1.6	3.4	3.3	7.6	5.7	2.9	0.9
Iron (µg/l)	804	2,260	3,070	824	849	379	367	881	2,520	2,300	3,120	11,360	2,060	3,130	1,420	1,870	3,060	3,610	396	184
soluble	410	1,220	2,080	578	667	167	56	733	2,320	1,940	1,940	4,400	211	956	911	1,000	2,180	1,300	189	100
insoluble	394	1,040	990	246	182	212	311	148	200	363	1,180	6,920	1,850	2,170	511	870	882	2,310	207	84
Lead (µg/l)	21	15	13	12	<5	5	~4	<5	8	22	24	<5	~14	~10	19	~10	~23	<5	<5	<5
soluble	8	8	13	8	5	<5	<5	<5	8	15	15	<5	<5	<5	5	<5	<5	<5	<5	<5
insoluble	13	7	nd	4	nd	nd	4	nd	nd	7	9	nd	14	10	14	10	23	nd	nd	nd
Mercury (µg/l)	0.1	0.1	nd	0.2	0.3	0.1	0.2	0.1	0.2	0.2	0.2	0.7	0.1	0.2	0.3	0.2	0.5	0.2	0.1	0.2
soluble	0.1	0.1	nd	0.1	0.2	0.1	0.2	nd	0.2	0.1	0.2	0.7	0.1	0.2	0.3	0.2	0.2	nd	0.1	0.2
insoluble	nd	nd	nd	0.1	0.1	nd	nd	0.1	0.1	0.1	nd	nd	<0.1	nd	nd	nd	0.3	0.2	nd	<0.1
Nickel	(all <5)																			
soluble	(all <5)																			
insoluble	(not detected)																			

...Continued

022

456023

The Analysis of Water Samples (Page 2)

Belenium (µg/l)	(all <1)																		
Silver (g/l)	(all <1)																		
soluble	(all <1)																		
insoluble	(not detected)																		
Zinc (µg/l)	12	124	20	11	14	8	58	56	38	26	48	67	25	26	13	6	60	11	18	13
soluble	10	123	19	10	13	7	54	56	38	25	46	63	13	8	10	4	42	8	17	10
insoluble	2.0	1.4	1.0	0.7	0.6	1.1	3.6	nd	nd	1.2	2.1	4.6	12	18	2.7	2.0	18	3.3	0.9	2.9
nd : not detected																				

023

Copy of Chemlabs Report - Technical Services Tasmania Pty. Ltd.

456024

THE ANALYSIS OF HUMUS SAMPLES (Expressed On Dry Weight Basis)

	Site No. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Fluoride (µg/g)	(All <0.1)																			
Total Sulphur (µg/g)	824	107	183	142	76	36	286	143	81	77	161	39	293	35	68	65	138	182	42	63
Arsenic "	0.7	0.6	3.3	0.3	0.9	0.4	0.2	0.6	0.8	0.9	1.8	0.1	0.6	0.2	2.5	2.8	0.6	3.3	1.4	1.1
Cadmium "	0.2	0.4	0.4	0.5	0.3	1.1	0.5	0.3	0.6	0.3	0.2	0.9	0.9	0.4	nd	nd	nd	nd	0.5	0.3
Chromium "	20	4.7	2.2	7.6	4.4	18	28	36	35	6.6	5.0	4.2	16	5.9	4.3	1.9	4.1	26	14	32
Cobalt "	12	2.9	1.9	2.9	2.7	7.3	26	27	7.6	1.2	1.1	1.1	185	16	1.5	1.7	1.6	6.7	7.0	15
Copper "	9.5	12	5.0	9.5	9.1	10	17	24	33	19	69	29	25	16	10	6.8	4.1	16	13	15
Iron (%)	2.86	1.34	0.83	1.01	1.16	1.79	1.53	3.49	4.35	0.91	6.92	3.41	3.64	3.42	1.67	0.61	0.34	1.61	2.20	3.03
Lead "	52	21	16	17	30	39	19	343	121	263	484	249	250	113	227	93	6	127	46	89
Manganese "	326	63	28	44	37	286	543	1,530	164	26	86	99	10,900	1,340	90	21	15	293	448	786
Mercury "	0.04	0.06	0.04	0.11	0.10	0.07	0.06	0.12	0.09	0.19	0.50	0.30	0.09	0.15	0.06	0.06	0.06	0.07	0.05	0.04
Nickel "	15	11	4.8	2.4	4.1	9.3	19	10	8.4	1.1	nd	2.8	11	3.3	2.2	0.3	nd	8.3	7.2	15
Selenium "	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	<0.1	0.1	<0.1	0.1	0.2	0.1	0.2	0.1	0.1
Silver "	0.2	0.5	0.5	1.0	0.7	0.7	0.3	0.7	0.8	0.7	0.9	0.4	0.9	nd	0.2	nd	0.2	nd	0.3	nd
Zinc "	37	13	5.6	23	11	68	83	160	128	21	19	123	167	46	64	5.8	4.5	39	70	181

nd: not detected

024

6000N 3660E

456025

166530: Flow banded tuff-lava of trachyandesite to rhyodacite composition; extensively clouded by sericite-limonite alteration products

Field comment: fragment from coarse agglomerate with rare banded fragments. Nature of banding in this sample?

In thin section, this rock is seen to have a fairly distinctive (porphyritic) flow layering, characteristic of a lava, however the composition of individual layers is sufficiently variable, between trachyandesite and rhyodacite that it seems likely that there is also a pyroclastic component; i.e. the rock is a tuff-lava.

Phenocrysts consist of euhedral to subhedral plagioclase (30%), smaller chlorite pseudomorphs after hornblende (7-10%). The plagioclase crystals are densely clouded by limonitic clays, many show relict zoning. Minor subrounded and corroded quartz phenocrysts (5-7%) occur in some layers.

Other coarse components consist of poorly defined vesicles, commonly strung out in layered domains, and vague inter layered cavities, all filled by clouded micro-crystalline to chalcedonic quartz (20-30%). This is deuteric silicification.

These components are scattered with generalised, common flow orientation, through a clouded matrix of similarly oriented potash felspar microlites, clouded by clay and chlorite alteration products.

The distribution and abundance of the highly potassic groundmass is highlighted by staining.

025

6000N 3660E

456026

166530: Flow banded tuff-lava of tracyandesite to rhyodacite composition; extensively clouded by sericite-limonite alteration products

Field comment: fragment from coarse agglomerate with rare banded fragments. Nature of banding in this sample?

In thin section, this rock is seen to have a fairly distinctive (porphyritic) flow layering, characteristic of a lava, however the composition of individual layers is sufficiently variable, between trachyandesite and rhyodacite that it seems likely that there is also a pyroclastic component; i.e. the rock is a tuff-lava.

Phenocrysts consist of euhedral to subhedral plagioclase (30%), smaller chlorite pseudomorphs after hornblende (7-10%). The plagioclase crystals are densely clouded by limonitic clays, many show relict zoning. Minor subrounded and corroded quartz phenocrysts (5-7%) occur in some layers.

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These components are scattered with generalised, common flow orientation, through a clouded matrix of similarly oriented potash felspar microlites, clouded by clay and chlorite alteration products.

The distribution and abundance of the highly potassic groundmass is highlighted by staining.

026

456027

5720N 3700E

166584: weakly porphyritic, rhyodacite, deuterically silicified; clouded by indefinite argillic alteration products

Field comment: occurs in andesite pile of agglomerate and/or lava breccias, within 200 m of overlying black shale; reason for pink color?

Prior to petrographic examination, staining of this offcut indicates a homogeneous, extremely fine grained potassic groundmass.

In thin section, phenocrysts up to 1 mm in maximum dimension consist of plagioclase (20%), orthoclase (?10%), corroded single quartz crystals (3-5%), chlorite replicas after hornblende (10%). Irregular pseudovesicular segregations of late magmatic quartz (20-25%) ± accessory spherulitic epidote are also widespread.

These components occur in a groundmass of extremely fine, clouded potash felspar intimately mixed with micro-mottled quartz. Accessory altered magnetite crystals are scattered. The characteristic clouding by ?iron oxide "dust" gives rise to the reddish color.

The rock has a gross rhyodacitic composition, even though much of the quartz appears to be a late magmatic silicification, rather than primary quartz crystal phenocrysts. This, and its highly potassic groundmass classifies the rock as acid rather than intermediate, and certainly more acid than the agglomerate in which it is reported to occur.

3400N 2400E

156038: very fine, acid (notably potassic) vitric crystal tuff

This is a homogeneous, very fine grained (0.15 mm) rock. It consists largely of a loosely packed aggregate of fine quartz grains (20%) which are generally angular (broken), but some are subrounded; shard-like individuals (20-25%) of diffuse, microcrystalline devitrified glass, and fine angular (broken) crystals of plagioclase (?10%) and potash felspar (?15%).

These components have a generalised common alignment and are evenly distributed through a turbid, diffuse matrix of ?clays, and/or cryptocrystalline material which gives a strongly positive reaction to sodium cobaltinitrite stain, indicating a highly potassic composition.

Fine turbid granules of secondary titania minerals (?pseudobrookite) (5-7%) and accessory small grains of pyrite and/or marcasite are disseminated.

The rock is interpreted as an acid tuff, qualified by "crystal" by virtue of abundant quartz and plagioclase grains which seem most likely to be of direct volcanic derivation, although some may be "normal" clastic detritus of alternate origin. Also it is qualified by "vitric" by virtue of the shards and apparent potassic glass alteration products forming the matrix. It is conceivably related to the crystal tuffs referred to in the covering notes.

028

456029

3400N 2550E

156039: diffuse, clouded cryptocrystalline mass of silica and potassic (?felspar); no diagnostic textures but conceivably an original acid glass

This is an extremely fine grained, quite massive rock, with a very vague, diffuse, streaky fine layering. Staining of the offcut indicates a very fine and somewhat mottled distribution of potassic material forming an estimated 15-20% of the rock (seen under binocular microscope).

In thin section it is seen to consist of a clouded mass of essentially cryptocrystalline silica, which according to staining, is intimately mixed with potassic (?glass or felspar). There are no diagnostic micro-textures. The fine size, and diffuse turbid nature of the bulk of the rock prevents a positive identification.

Fine (0.1 mm) grains of quartz (7-10%), fine granules of limonite (3-5%) and limonitised secondary titania material (3-5%) are randomly disposed.

The petrographic evidence is insufficient to positively identify this rock type. Comparisons with 156038 indicate that it is more-or-less equivalent to the matrix in that rock and thus may be interpreted to represent acid glass alteration products. Quite conceivably it may be an original, homogeneous, glassy lava which would agree then with the field interpretation given in the covering notes.

U29

456030

Hatfield River
3400N 3575E

155095: silicified rhyolite lava

Phenocrysts in this rock (0.2 to 2 mm) consist of euhedral plagioclase crystals (10-15%), subrounded and embayed single quartz crystals (7-10%). Irregular patches of microcrystalline epithermal-type quartz mosaic (25-30%) up to 3 mm are also present.

These components are randomly dispersed through a diffuse microcrystalline groundmass of essential quartz (?tridynite-cristobilite) and potash felspar in which turbid material including minor clay-sericite outlines irregular spherulitic and variolitic textures characteristic of volcanic glass.

There is little doubt that this is a rhyolite lava, modified by late-stage volcanic exhalative silicification, which confirms the field interpretation. There is no petrographic evidence for its reported dyke-like mode of occurrence.

There is no evidence of a breccia.

3650E 3400N

L66566: very extensively silicified, vesicular and weakly porphyritic, rhyodacitic lava

Most of this rock consists of a diffuse mottled, microcrystalline aggregate of quartz, with a cristobilite texture crowded with ultra fine sericite. Replicas of small euhedral plagioclase phenocrysts, and clumps of these (10-15%), preserved in clay-sericite, and smaller (0.3 mm) primary quartz phenocrysts (3-5%) are scattered.

Irregular cavities, apparently primary vesicles, are also scattered throughout this quartzose matrix, and almost invariably they are filled by fibrous chalcedonic silica, varying to microcrystalline mosaic.

The quartz filled vesicles and plagioclase replicas have a vaguely layered distribution, probably reflecting a primary flow structure.

The rock is a very extensively silicified, weakly porphyritic felsic lava. Although the number of primary quartz phenocrysts is very small there are sufficient (together with more abundant plagioclase phenocrysts) to indicate a probable acid rhyodacitic, or possible intermediate lava, rather than a basaltic lava (which is a possible alternative suggested in the covering notes). Also there is no evidence of a basaltic texture, or of relict mafic components.

3965E 3400N

166567: (graphitic) muscovite quartz, argillaceous, and silty, very fine sandstone

This is a homogeneous, sedimentary rock in which bedding is indicated by fairly regular but very slight variations in the size of detrital quartz grains, around 0.15 mm, also by the common orientation and variable concentration of detrital muscovite.

Subangular to subrounded quartz grains form about 35% of the rock, detrital muscovite about 15% and detrital "argillite grains" (7%) conceivably after felspar, and these form a fairly loosely packed aggregate within a largely indeterminate argillaceous matrix of clay-sericite.

The matrix also contains very fine (0.15 mm) flakes and/or minute lenses of almost certain graphitic, and some limonitic, argillaceous material (7-10%); no doubt of the same black shale facies noted in the covering letter. Accessory fine tourmaline and trace minute pyrite is also present.

The detrital muscovite probably derived from a metamorphic provenance, however such a provenance is by no means proven to be the only source for this sediment.

4130E 3400N

166568: muscovite, lithic quartz sandstone with minor wisp-like fragments and flakes of chlorite, ferruginised argillite and black shale

This is a fairly massive to vaguely bedded sedimentary rock composed essentially of a random, fairly tightly packed aggregate of variable clastic detritus, ranging in size from 0.05 to 0.5 mm with minor ferruginised argillaceous fragments up to 1 x 3 mm. The components are:-

single quartz crystal grains	50%
detrital muscovite	7-10%
(chloritised) biotite wisps	5-7%
quartzose lithic fragments	15-20%
fragments of ferruginised argillite	10%
fragments of ?graphitic shale	5-7%

The quartz grains are variably angular to subrounded. Most are stressed and contain extremely fine opaque "dust"; they seem to be of plutonic or metamorphic origin. The detrital muscovite is randomly disposed and essentially the same as in 166567.

The chloritic wisps appear to be after detrital biotite (although certainly this is not a common detrital mica). The clouded deformed lenses, small wedges and flakes of ferruginised sericitic argillite and the smaller ?graphitic shale chips and flakes, most likely derive from a mutually related argillite facies, also probably related to similar components in 166567 and the "black shale" noted in the covering letter.

The quartzose lithic fragments appear to represent very fine metaquartzite, lesser siliceous siltstone and/or chert. These are not apparent in 166567. Limonite is ubiquitous along intergranular boundaries.

033

456034

9050N 4300E

15866?: vesicular basalt; extensive pervasive carbonate alteration and subordinate related silicic alteration; accessory disseminated pyrite.

This rock has the essential texture of a vesicular basalt, although its primary mineralogical composition is extensively altered. An original felted mass of plagioclase microlites still form a minor part of most of the rock but this is dominated by fine diffuse carbonate and less quartz more-or-less continuous throughout interstitial areas, also partly replacing the microlites. The carbonate commonly coalesces into mottled patches.

Original vesicles (15 - ?0%) measuring up to 1.5 mm, and several primary fracture-voids are filled by carbonate, less commonly together with quartz, and exclusively by quartz. Rare plagioclase phenocrysts are pseudomorphed by quartz micro mosaic.

Accessory very fine pyrite (1 - 2%) is disseminated.

9070N 4680E

155071 : fine massive crystal tuff of andesitic to dacitic composition; extensive silicic and carbonate alteration.

This rock consists of a fairly homogeneous, extremely fine aggregate of diffuse microcrystalline quartz mosaic (of probably secondary origin), intimately mixed with an extremely fine, random shredded network of sericite, patches of carbonate and minor chlorite, and containing disseminated fine single quartz crystal grains (7 - 10%), and some of these have embayed margins.

Irregular (? fractured) plagioclase crystals (7%), and possible hornblende crystals, up to 3mm across, are almost completely replaced by these components, which in turn are largely leached out. Very irregular patches of carbonate (15%) clouded with earthy limonite ± sericite are randomly scattered.

The rock offers no textural evidence diagnostic of an extrusive (or intrusive) igneous rock. Objectively it may be interpreted as a crystal tuff, extensively silicified and carbonatised. The comparison of the rock, with the matrix in the quite definite lithic tuff in sample 155073 tends to confirm its pyroclastic genesis.

9370N 3630E

155057 : andesite breccia (fragments similar to 155052); silicic alteration in fragments; interfragmental areas extensively silicified.

This massive silicified rock is seen on a sawn surface and in thin section to have a coarse fragmental texture. Angular blocks of variably altered, and commonly vesicular, andesite form a random, loosely packed aggregate in a matrix composed of fine andesite detritus mixed with material much the same as forming 155054, and with introduced quartz.

Most andesite fragments are quite felsic, and many contain minor to subordinate clinopyroxene (as in 155052). Vesicles, interstices in the ground mass, random voids, and rare plagioclase phenocrysts are replaced by hydrothermal quartz. Trace extremely fine pyrite occurs in some.

Interfragmental areas, including the matrix, are extensively invaded and replaced by epithermal quartz mineralization, carrying accessory coarse epidote and (? prehnite).

036

456037

5000N 2800E

99401: micro dolerite; enriched in interstitial chlorite otherwise unaltered (c.f. 155055)

Field Comment: Possible Jurassic dolerite.

This rock has a micro, subophitic texture, and consists mainly of a fine (0.2 mm) aggregate of randomly interlocking plagioclase laths, intimately intergrown with augite crystals of similar size and abundance. Minor, coarser crystals of augite are evenly distributed.

Minor (15 - 20%) "patches" of chlorite are also evenly scattered, some of these may pseudomorph hornblende but most are essentially interstitial, probably alteration products after residual basic glass. Trace fine Fe - Ti oxides are disseminated.

A localised domain in this rock as described consists of incipient spinifex textured plagioclase and pyroxene groups within a chloritic (? altered glass) matrix. This appears to be a quick chilled xenolith which has the same primary composition of the host rock.

The rock is a micro dolerite enriched in interstitial chlorite. It has essentially the same composition and primary composition as 155055, except it is not silicified.

SiO_2	50.2	MnO	0.18
Al_2O_3	11.5	Cr_2O_3	0.15
Fe_2O_3	9.6	LOI	4.38
MgO	11.6	Total	100.0
CaO	8.2		
Na_2O	2.6		
K_2O	1.0		
TiO_2	0.46		
P_2O_5	0.12		

Analysis by ACS Laboratory Adelaide.

037

456038

5020N 2750E

99402: pyroxene micro dolerite, vaguely layered and weakly foliated due to shear and/or intrusion alignment; silicic alteration of the pyroxene and sericitic alteration of plagioclase complete (sheared and altered equivalent of 99401, possibly also of 155055)

This rock appears to have a similar primary composition to 99401 (thus also to 155055), but it has a slightly different texture in that the component minerals show a vague common orientation. Also the rock is far more extensively altered than those two samples.

Original crystals of pyroxene (20%) average size 0.3 mm, are completely pseudomorphed by microcrystalline quartz mosaic. These are evenly distributed with vague common alignment through a microcrystalline ground mass of mainly plagioclase laths, completely replaced by sericite, and intimately intergrown with clouded chloritic clays, presumably derived from primary ground mass mafic components. Fine discontinuous foliae outlined by limonite indicate a largely tectonic (shear) component in the layering.

7400N 3730E

94540 : andesitic lavas showing minor enrichment in carbonate and probably deuteric quartz and chloritic alteration in the groundmass; narrow fracture zone through the lava has been selectively silicified

Most of this rock has the homogeneous texture and composition of a microporphritic intermediate lava. A textural discontinuity is manifest as a sharp contact with a silicified volcanic fragmental rock along the margin of the thin section, and in the limited size of the sample this is interpreted as fracture through the lava (although alternatively it is possible that both domains represent large fragments of lava in contact within a coarse pyroclastic.)

The dominant lava consists of a felted mass of intimately intergrown plagioclase microlites, with interstitial chlorite and subordinate clouded quartz of glassy and/or deuteric alteration. Small euhedral crystals of plagioclase are scattered more or less along flow planes through the groundmass. Accessory chloritised hornblende crystals are also present.

The lava is characterised by diffuse patches of carbonate (15-20%) up to 3 mm across randomly scattered as more or less metasomatic segregations, rather than pseudomorphically replace primary minerals as in some other rocks in the suite. (They may be compared to the mode of occurrence of carbonate in 94522.)

The margin of fragmental rock referred to above consists of fragments having the same composition as the lava described, in a secondarily silicified volcanic matrix. This silicification commonly pseudomorphs plagioclase crystals.

7400N 3850E

94541 : intermediate, microporphyritic lava, completely pervasively silicified with associated extensive argillic alteration, and minor metamorphic recrystallisation

This rock has a homoheneous composition and texture indicative of a lava rather than a tuff; it has however been completely silicified. It consists of a diffuse microcrystalline aggregate of stressed quartz, intimately mixed with an essentially equal abundance of (?chloritic) clays and minor shredded streaks of sericite along an incipient foliation. These components almost certainly represent secondary, hydrothermal alteration of the primary groundmass.

Minor (10-15%) virtual cavities through the rock are variably partly filled by clays or chalcedonic silica, and the outline of these indicates that they were originally plagioclase phenocrysts.

Accessory secondary iron-titania replicas are disseminated.

The rock is an original lava. The complete absence of primary quartz phenocrysts, and similarity in texture to other lavas in the suite indicates that it probably had an intermediate (andesitic composition), however extensive pervasive silicification and moderate metamorphic recrystallisation largely conceals its primary composition and texture.

040

456041

7430N 3900E

94542 : vesicular pyroxene basalt, fairly extensive chloritic and silicic alteration, probably essentially of deuteric origin, including filling of vesicles by quartz

This is a vesicular and microporphyritic basaltic lava. The groundmass consists of an extremely fine and densely clouded felted mass of saussuritised plagioclase laths with more or less interstitial chlorite and cryptocrystalline silica.

Former euhedral phenocrysts of original pyroxene (20-25%) are pseudomorphed by chlorite and chloritic clays ± minor leached and altered (?sideritic) carbonate. Somewhat lesser phenocrysts of almost certain plagioclase are pseudomorphed by clays and/or cryptocrystalline silica.

Subrounded vesicles, up to 2 mm, commonly with vaguely scalloped margins generally have a margin of cryptocrystalline silica and are filled by coarser deuteric quartz mosaic. The enrichment of quartz therefore (in this case in amygdales) is consistent with quartz enrichment and/or replacement to varying degrees in other samples described above.

94519 Glassy, basaltic flow breccia; with extensive pervasive siliceous and minor carbonate-chlorite potash deuteric mineralisation.

This rock has a heterogeneous breccia texture with highly irregular domains of clouded, altered, very vesicular basalt composition (40-50%), randomly disposed with roughly common orientation through a patchy matrix of altered rather siliceous glass.

The basalt fragments are different from the basalt in 94516 and 18 mainly in that it lacks pyroxene phenocrysts. Also the groundmass is less homogeneous, consisting of plagioclase microlites, flow oriented through a matrix of basic glass, and crowded with abundant vesicules, variably filled by glass alteration products, microcrystalline quartz, carbonate and rare chlorite. These latter components are inherent to the host basaltic lava, and essentially of deuteric origin. Carbonate rarely, pseudomorphically replaces minor plagioclase.

The rock matrix between the fragments consist of a confused mixture of diffuse quartz mosaic -- after siliceous glass commonly showing flowage structures, also minor potash felspar, plagioclase microlites and uralitic alteration products. This material commonly grades in to the ground mass of the rock fragments. Irregular patches of carbonate and accessory epidote crystals are also present.

This is a glassy, basaltic flow breccia; with extensive pervasive siliceous and minor carbonate-chlorite- potassic deuteric mineralisation. Vesicles and the glass content in the rock are so abundant, to indicate transition to a pumice.

042

4560

4700E 6450N

148941 Porphyritic, vesicular, quite visceous, plagioclase augite basalt; plagioclase phenocrysts pseudomorphed by clay-sericite saussurite.

This is a highly porphyritic and vesicular basaltic lava in which the primary ground mass was quite visceous, indicated by extensive flow-elongation of many vesicles.

Euhedral crystals of clinopyroxene (15-20%) average size 0.5mm, and crystals of calcic plagioclase (25-30%) of generally larger size are evenly distributed with similar orientation through a dark clouded ground mass. The ground mass consists of ultra fine, flow textured plagioclase and pyroxene microlites almost certainly with interstitial glass, but the exact composition is difficult to ascertain due to clouding by glass alteration products, secondary titania material, apparent saussuritic and uralitic minerals.

Vesicles (10-15%) are elongate in the plane of primary flow, some are extensively drawn out to some 6mm long. They are filled by deuteric chlorite, lesser quartz and carbonate, with a rim of microcrystalline quartz.

Plagioclase phenocrysts are virtually completely replaced by clouded (hydrothermal) clay-sericite, minor chlorite and saussurite. Pyroxene phenocrysts are unaltered.

This rock is very similar to 94518 and a more vesicular equivalent to the fragments in 94516.

3680E 6400N

(94518) Weakly vesicular basaltic lava, porphyritic in calcic plagioclase; deuteric enrichment and replacement by quartz lesser epidote then chlorite and potash felspar.

This is a porphyritic basaltic lava fairly similar to 94516 (fragments), 94518 and 148941; although it contains less pyroxine phenocrysts, less vesicles than 94518 and 148941; and more epidote alteration of plagioclase.

Euhedral phenocrysts of original basic plagioclase (25-30%), and original apparent hornblende (3-5%) are evenly distributed with generalised common orientation through a microcrystalline ground mass. The plagioclase phenocrysts are variably replaced by epidote, quartz, lesser carbonate, sericite, potash felspar and chlorite, all fairly characterisite, deuteric alteration products.

The ground mass has a relict flow textured felted texture, with abundant minute plagioclase microlites. It is almost completely replaced by clouded quartz, uralitic alteration products, minor potash felspar (5-7%), saussuritic alteration products, and secondary titania minerals.

This is a vesicular basaltic lava enriched and mineralised in vesicles, veins, and replacement of plagioclase in characteristic deuteric phases of quartz epidote chlorite and potash felspar (listed in decreasing order of abundance). It thus has essentially the same genesis as other basalts in the suite, but a slightly more felsic and less mafic primary composition.

044

456045

4550E 6400N

94537 Breccia of glassy clinopyroxene basalt, with variable concentration of vesicles, and abundance of glassy fluidal textures; a probable pyroclastic breccia, possible flow breccia.

This rock consists of a fairly tightly packed aggregate of irregular basaltic lava fragments up to 20mm. These fragments, and the matrix have a similar gross mineralogical composition, they are therefore difficult to distinguish between, and from the matrix. Petrographically they are distinguished by variations in texture, mainly manifest in the variation in abundance and "streaking-out" of vesicles.

There is insufficient evidence to positively identify the rock as a flow breccia (as in samples above) or as a volcanic breccia in a pyroclastic sense. The latter interpretation is favoured however.

Most fragments are similar to the clinopyroxene basalt of the type forming fragments in 94516 and the lava of 94513; i.e. with generally unaltered euhedral phenocrysts of augite (15-20%) and altered plagioclase (10-15%) scattered through a fluidal textured, felted ground mass of altered plagioclase microlites, pyroxene and interstitial glass in varying proportions. Some pyroxene shows patchy alteration to green hornblende.

Glass clearly dominated the ground mass in many fragments, which now consists of devitrified and cloudy hydrothermal alteration products, with relict micro-spherulitic, and streaky almost eutoxitic (i.e. ignimbritic) textures. Larger, flow elongated vesicles filled by chlorite and with devitrified glassy margins are common in some fragments.

U45

456046

4400N 4500E

Rhyolitic glassy lava, extensive argillic alteration and minor quartz-sericite, streaky layers are manifestations of late magmatic hydrothermal alteration

This is an extremely fine grained homogeneous rock consisting mainly of a cryptocrystalline to microcrystalline mosaic of quartz with patchy intimately mixed, ultra fine clays, potash felspar and minor sericite. Rather irregular but relatively discrete patches of clay (12-15%) measuring up to 1 mm are evenly disposed with a generalised common orientation reflecting a vague banding or layering. These seem to mainly pseudomorph felspar crystals, although the wavy elongate shape of some suggest they replace lithic (? or glass) fragments.

Streaky parallel, vein-like layers of microcrystalline (?epithermal) quartz occur in the same plane as the suggested banding noted above. Minor sericite (and/or pyrophyllite) accompanies this quartz. Argillic alteration is more intense along the margins of the quartz layers than in other parts of the rock.

This is a rhyolitic volcanic rock, there are no properties really diagnostic of a tuff or lava, the homogeneous streaky nature suggests it is a lava rather than a tuff however.

4150N 2720E (Murchison Highway)

183175A: oligoclase aplite (?breccia), extensively silicified groundmass

Field comment: aplitic quartz (?) porphyry, probably part of a dike or plug, surrounded by lithology 183175B

Euhedral plagioclase crystals of oligoclase composition (15-20%), average size about 1 mm are randomly disposed as individuals and in small clumps through a somewhat patchy, microcrystalline groundmass.

The groundmass consists of diffuse quartz micromosaic intimately intergrown with a similar abundance of clouded plagioclase. Plagioclase predominates in areas immediately surrounding the phenocrysts, with clearer areas of mainly quartz mosaic between--suggesting late phase permeation of silica into a more-or-less autobrecciated rock, characteristic of a small high level intrusive into a restricted space.

This groundmass plagioclase appears to be largely replaced by primary, fibrous-chalcedonic silica, however this is on such a subtle, fine scale that it is difficult to ascertain the extent of this silicification.

047

456048

4150N 2720E (Murchison Highway)

183175B: slightly mafic aplite; small intrusive with drag-flow texture in a groundmass which is also silicified and chloritised

Field comment: 2m from 183175A; horizontally foliated (?flow banded) felspar porphyry plug

The size abundance and distribution of plagioclase phenocrysts through this rock, and the patchy, silicified largely felspathic groundmass is similar to 183175A. However a prominent wavy, chloritic foliation through the groundmass, and to a lesser extent the presence of several quartz phenocrysts indicate some difference to 183175A.

The euhedral plagioclase phenocrysts, scattered as individuals and clumps, are fairly densely clouded by clay-sericite. The groundmass immediately surrounding these consists mainly of microcrystalline plagioclase mosaic. As noted, accessory, small rounded and embayed crystals of quartz are scattered.

The majority of the groundmass consists of quartz micromosaic drawn out in direction of "flow", which is emphasised by intimately intergrown wavy streaks of chlorite.

There is no evidence to confirm that this is primary (extrusive), flow, in fact some discrete areas of quartz mosaic, with the contained chlorite streaks, appear to pseudomorphically replace a former prismatic mineral (?hornblende).

Objective evidence, combined with knowledge of 183175A, indicates that this rock is a variant of the aplite in 183175A, possibly transitional to porphyritic dacite. It was most likely intruded into a confined space with frictional drag causing elongation "flow" in the groundmass, which was also subject to quartz-chlorite, deuteric alteration during its final stages of crystallisation.

048

Hatfield.

456049

PETROLOGICAL DESCRIPTIONS

Central Mineralogical Services - W. Fander	155139
	40
	141582
	83
	84
	85
	141172

042 CENTRAL MINERALOGICAL SERVICES PTY. LTD. Date 13th June 1975 456050

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
155139
Argillised, vesicular, porphyritic ? leuco-andesite.

Job No. CMS76/6/7 Date Received: 6/6/75

Reference Order No. 6844

Sample No. 155139

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 16786

a. Hand Specimen:

Grey, fine grained vesicular rock.

K stain test negative.

b. Microscopic:

6560N 3200E

This rock is thoroughly argillised, and the sole basis for interpretation is the presence of relict textures. Thus an accurate classification is not possible.

The fresh rock was porphyritic, and its composition was in the range trachyte-andesite, more likely near the andesite end. The phenocrysts were feldspar (? high temperature sanidine-anorthoclase) and pyroxene; the feldspar is altered to clay and microcrystalline quartz, and the pyroxene to greenish serpentinuous material.

The groundmass must have consisted almost entirely of fine, matted, flow orientated feldspar crystals, and thus the rock as a whole was strongly feldspathic.

Spherical amygdales containing quartz and chlorite, are quite common throughout. Their perfectly spherical shape indicates that this rock was some distance from a contact.

The rock is tentatively classified as a porphyritic leuco-andesite.

H. W. Fander, M.Sc.

050

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 13th June 1975 456051

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
155140
Amygdaloidal porphyritic pyroxene andesite (mineralised).

Job No. CMS 75/6/7 Date Received: 6/6/75

Reference Order No. 6844

Sample No. 155140

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.**

a. *Hand Specimen:* Creek near Murchison Highway, N of 6400N

Greenish, fine grained amydgaloidal and porphyritic rock.

K stain text negative.

b. Microscopic:

6550N 3300E

This is a fresh, porphyritic pyroxene-andesite, amygdaloidal and containing traces of sphalerite (in the amygdales), pyrite and chalcopyrite.

The phenocrysts are pyroxene and calcic oligoclase; pyroxene is abundant (15-20%) as perfectly formed augite crystals, often in small clusters, but plagioclase phenocrysts are rare. The groundmass is strongly ;flow-orientated, consisting of small plagioclase laths, fine interstitial pyroxene and devitrified interstitial glass.

Small and large, generally irregularly-shaped amygdales are common, and contain a variety of secondary or deuteric minerals. These are chlorite, quartz, epidote and pumpellyite. Patches of sphalerite (up to 0.5mm) occur in some amygdales, with rare chalcopyrite (0.15mm). Veinlets of fine pyrite cut the rock.

The sulphides are clearly of deuteric origin.

H. W. Fander, M.Sc.

REPORT CMS 75/S/32

Petrological Descriptions

S.W. Corner Hatfield Licence

141582 Weakly Fe-stained weathered, porphyritic ? rhyolite, K stain positive.

TS 17455 This is a devitrified and somewhat weathered porphyritic rhyolite.

Cavities (250μ-2mm) after random prismatic feldspar phenocrysts are disseminated throughout. These features are weakly limonite-lined and some carry a little indeterminate feldspar evidently orthoclase on the basis of relict twinning. They are accompanied by sporadic heavily resorbed quartz phenocrysts (max. 800μ).

The groundmass is weakly kaolinised generally and locally leached and cavernous. It consists mainly of felsitic-anhedral alkali feldspar (mean 50μ) with relicts of finer random microlitic feldspar and subordinate (? weakly recrystallised) essentially unstressed felsitic-anhedral quartz. Quartz phenocrysts have microscopic pegmatitic selvedges, features fairly typical of devitrified rhyolites.

Accessory/trace constituents comprise leucoxenised/oxidised primary opaques and a little zircon. Apart from weathering effects the rock is unaltered.

S.W. Corner Hatfield Licence

141583 Green-brown altered ? rhyolite, K stain positive.

TS 17456 A devitrified and altered glomeroporphyritic sodi-potassic rhyolite. This rock is relatively quartz-deficient and not far removed from quartz-trachytic composition.

Phenocrystal albite laths (mean 300μ) are common and these features are frequently clustered into glomerophenocrysts (mean 1mm). In contrast quartz phenocrysts are virtually absent apart from rare corroded grains (max.500μ). Rare pyroxene phenocrysts were present on the basis of semi-pseudomorphous patches of chlorite (max.350μ); there was possibly also a little phenocrystal hornblende.

The groundmass is similar to that of 141582 but coarser grained and quartz deficient. Random alkali feldspar microliths (<10-30μ) are common and these are contained in anhedral K feldspar (50-150μ) with subordinate similarly textured quartz (max.350μ). Accessories are leucoxenised/oxidised opaques and apatite.

Plagioclase throughout the rock is variably altered to ultrafine random sericite not infrequently accompanied by chlorite. Secondary patches (to 2mm) of an to euhedral quartz and random to radiating chlorite are disseminated throughout and some of these features are vesicle fillings.

Rarely patches of limonite are associated. These contain rare relics of pyrite although the limonite appears to be largely derived from chalcopyrite.

S.W. Corner Hatfield Licence

141584 Pale brown altered porphyritic ? dacite, K stain negative.

TS 17457 This is a devitrified and sericitised, porphyritic dacite.

Extensively sericitised plagioclase phenocrysts (300μ-1.5mm sporadically clustered to 3mm) are common, more or less evenly distributed throughout the rock and randomly orientated. These features are accompanied by thinly dispersed resorbed quartz phenocrysts (max.500μ).

The groundmass consists of typically felsitic quartzofeldspathic material (mean 30μ) with a mesoscopic perlitic texture throughout. The feldspar is weakly to extensively sericitised and some perlite "cells" (mean 300μ) are completely replaced by chalcedony partly crystallised as anhedral quartz.

Sericite (largely illite) is weakly but variably Fe-stained. Accessory leucoxenised/limonitised opaques are present. There is no evidence of sulphides.

S.W. Corner Hatfield Licence

141585 Pinkish grey fragmental ? dacite, K stain weakly positive.

TS 17458 This is a devitrified sodic rhyolitic tuff lava.

The rock consists essentially of disseminated corroded grains (200μ-1.5mm) and phenocrystal clusters of albite with thinly dispersed corroded quartz phenocrysts enclosed in anhedral/semi-interlocking quartz and albite in varying proportions and grainsize. Vague angular-subangular fragments are seen ranging in diameter from about 1mm to 2cm and outlined partly by faint relict internal flow banding. These features are typically at least slightly coarser grained than the enclosing texturally and compositionally similar matrix. Overall, the relict fabric, largely obscured by devitrification, is typical of tuff lavas.

Relatively minor accessory zircon and leucoxenised opaques are present. Feldspar crystals are weakly sericitised and irregular secondary patches of sericite are disseminated throughout the groundmass/matrix. Some of the quartz present is secondary although silicification overall is not marked. There are rare stressed discontinuous quartz veins. Traces of secondary cloudy ? rutile occur and these are occasional completely oxidised pyrite crystals (max.200μ).

3230N 3850E

141172 Pinkish brown ? rhyolite, K stain negative.

TS 17459 This is a devitrified and sericitised, rhyolitic ignimbrite.

Moderately sericitised albite crystals (100-700μ) and relatively minor resorbed quartz crystals are disseminated throughout. Accompanying these are rare patches of secondary Fe-stained albite with outlines suggestive of altered sandine-anorthoclase crystal (? sodi-potassic rhyolite).

The matrix consists of felsitic material extensively altered to random ultrafine sericite with subordinate patchy Fe-stained albite and a little quartz. A disrupted relict flow fabric is more or less pervasive throughout and this reflects lineated (eutaxitic) shards (mean 25μ) which were clearly welded.

Accessory leucoxenised-limonitised opaque particles are present. There are also thinly disseminated oxidised pyrite skeletal subhedra (max.100μ). The pinkish colour (hand specimen) partly reflect s secondary Fe-staining but particularly the fine grained albite pigmented with virtually submicroscopic Fe-oxide particles.

456055

APPENDIX III

Diamond Drill Logs - Holes MC1 and MC2, QR 72D.

Commaco

DRILL HOLE RECORD

EL 15/73

Location Mt. Charter **Property** Hatfield River **District** Tasmania, Australia **Alt./R.L.** N/A **Hole N°** MC 1

Commenced 12/2/76 **Completed** 21/2/76 **Core size** NQ to BQ to EOH **Co-ordinate** 4800N, 4290E **Date**

Objective To test the central culmination of an IP (fe) anomaly in attractive volcanics. **% Recovery** **Bearing (M)** 099° **Logged**

Grid bearing (M) 8°45' **Dip** 45°

SURVEY DATA				GRAPH DERIVED DATA						REMARKS
DEPTH	DIP	BEARING(M)	INSTRUMENT TYPE	DEPTH	DIP	BEARING(M)	NORTHING	EASTING	ALTITUDE	
0	45	099	Clinometer, tube compass	0	45	99	4800	4290.00	0.00	Collar survey checked
32	42	110	Eastman SS	25	43	105	4798.97	4302.93	-17.36	
50	40	105	"	50	40	102.5	4797.34	4236.57	-33.92	
80	36	104	"	75	37	101	4796.33	4346.10	-49.48	
116	30	100	"	100	33	99.5	4795.80	4366.56	-63.81	
151	26.5	104	"	125	29	97	4795.99	4387.96	-76.68	
176	19.5	98.5	"	150	26.5	99	4796.28	4410.08	-88.32	
				175	20	96	4796.79	4433.00	-98.17	
				195.50	10	93.5	4798.18	4452.67	-103.46	

456056

056

Dominco

DIAMOND DRILL LOG

Hole N° MC 1 Page N° 1

Feature : Bedding, Foliation, Fragment - size & shape 0%, Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456057

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
		PyPi Mid to light grey, locally bleached (weathered) fine grained dacite or rhyolite lava. Flow banding is wary, typically 30° to subparallel to the core axis. Intermittent fragmental texture is interpreted as lava-breccia (e.g. 5.30 to 6.40)			Pyrite 507% as veinlets, and occasional irregular clots of massive fine aggregates.
3.00					
1.55	5	Foliation is typically 30° to core axis is weak and is dominated by irregular fracturing marked by quartz veining (<3mm) and pyrite veinlets. Possibly silicified and sericitised.			
2.95					
0.65					
2.30	10				
1.00					
	12.60	Sheared grey lithic tuff with sericitised (pale green), blue grey, and pyritic fragments.			Note pyrite rich fragments
2.00					
	15			14.96	Massive vein pyrite 70%
2.40	15.17	?DTL >PyPi Light grey to buff locally greenish grey, feldspar porphyry lava. Pale green sericitised phenocrysts to 1mm occur densely in a sericite-carbonate rich matrix. A strong foliation (streaking of feldspar) is developed at 30-40° to the core axis. The unit is very massive (forms a marked topographic ridge), and is the typical Mt. Charter rhyolite as dacite feldspar porphyry lava.		15.36	Veinlets and disseminations of pyrite occur throughout averaging 5%, possibly 7% locally.
1.65					
1.70	20				
2.50					
3.10		5 cm			
	25				

057

Cominco

DIAMOND DRILL LOG

Hole N° MC 1 Page N° 2

Feature : Bedding, Foliation, Fragment - size & shape 0% ; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456058

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
1.00		Occasional quartz veins occur at 90° to the foliation.			
2.30		Rare narrow (<10cm-20cm) zones of agglomerate may be flow tops - viz. 26.90, 30.00.			Pyrite continues 5% as veinlets and disseminated crystals (< 1mm).
3.00	30				
3.00					Vein pyrite averages 10% associated with narrow irregular quartz veins.
	35				
3.00	35.80	PyPi Lithologically identical to adjacent units but dominated by lithic tuff to agglomerate, with massive sericitisation of some fragments, carbonation of others. Foliation is 40° to core axis.			Pyrite veining parallels foliation at 25-30° to core axis, 5-7%.
3.00	40				
1.25					
1.80		5 cm			
	43.75	Feldspar porphyry lava continues, pale cream, greenish to buff, light grey.			
3.00	45	Foliation (streaking of feldspars) is 50° to core axis, some colour banding may be flow banding.			
3.00		Irregular fractures are lined with pyrite and quartz.			
	50	Below 53m irregular silica filled.			

Cominco

DIAMOND DRILL LOG

Hole No [illegible] Page [illegible]

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault (F), Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456059

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
3.00		Zones may be matrix silification coincident with lava solidification, as previously rare breccia and agglomerate zones may be flow tops. Bleaching and oxidation has occurred adjacent to some fractures.			Veinlets and rare massive veins of pyrite.
3.00	55	This lava is massive and is only along irregular fractures.			Pyrite 5%
2.75					
	60				
3.05					
3.10					
	65				
3.00		Irregular quartz veining is present throughout, traces of barite become apparent below 65m.			Pyrite 5%
3.05		The unit continues as massive feldspar porphyry lava, with occasional narrow, (10-20cm) zones of breccia (agglomerate).			
	70				
1.00					
2.00					
	75				

5 cm

J59 Cominco

DIAMOND DRILL LOG

Hole N° MC 1 | Page N° 4

Feature : Bedding, Foliation, Fragment - size & shape 0%; Shearing, Fault F, Vein c carbonate q quartz

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456060

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
3.00	77.00				
3.00		Lithologically identical with above but more heavily veined with quartz and barite, the latter locally 10%. Base metals are also evident.			Pyrite 5-7%, trace disseminated galena and sphalerite, particularly with barite veining.
3.00	80				
3.00		84-85m, distinct banding (<1mm) which may be bedding. This unit may in part be a bedded fine tuff. Barite layers or veins occur parallel to this foliation; pyrite silica and barite veins also occur at all angles and cross cut each other.			
3.00	85	Barite veining is possibly later than sulphide and silica, but this may be a post depositional remobilisation.			
3.00	90				Traces of sphalerite and galena with pyrite veinlets, also with barite veins.
3.00		Lithology is feldspar porphyry lava, possibly crystal and fine tuff locally. Foliation now 60° to core axis.			
3.00	95				
		5 cm			
	97.55				
	97.85	Finely bedded barite 70° to core axis			Fine pyrite with barite.
0.60		Major quartz vein 40 cms —	q		
1.95		Pale grey to cream, sericitised carbonated (?) feldspar porphyry lava.			
	100				

060 Cominco

DIAMOND DRILL LOG

Hole N° MC 1 Page N° 5

Feature : Bedding, Foliation, Fragment - size & shape 0%; Shearing, Fault F, Vein c carbonate q quartz

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456061

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
		Rare barite-carbonate(?) veining. Foliation is 50° to core axis.			Traces of galena sphalerite in barite veins.
3.00	103	Zone of intense (25%) barite veining(?) lithology as above, feldspar porphyry lava or tuff.			Disseminated pyrite, galena, sphalerite (locally 2-3%, combined sph. galena)
	104				
3.05	105	As above, less intensely veined with barite (5-10% of total), the lava is locally brecciated (probably tectonic deformation? rather than autobrecciation?). Foliation, vein orientation and fracturing tends to be 50-60° to core axis.			
3.00					
	110				Disseminated sphalerite and galena throughout, with pyrite veining 5-7% locally 10%.
2.90					
	112.60	Lithic tuff becoming agglomerate below 117.50m approx. Texture locally destroyed by sericite alteration, and quartz-carbonate veining.			
	115				
3.00					
		Foliation locally strong at 40-45° to core axis.		116	Pyrite 3-5%, no apparent sphalerite or galena, except with barite at 119m. (10cm zone)
3.20					
		5 cm			
	120				
3.00		Barite veining is common to 114m, then more rarely and with quartz-(carbonate?) below approx. 116.80m. Massive 10cm barite band (foliated or bedded at 119m).			
	123.06				
3.00		Fine grained feldspar porphyry lava(?) veined by barite and pyrite.			
	125				

061

Cominco

DIAMOND DRILL LOG

Hole N° MC 1 Page N° 6.

Feature : Bedding, Foliation, Fragment - size & shape 0%; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456062

CORE REC'D	DEPTH m	GEOLOGY
3.00	128	Barite veining common towards end of unit.
3.05	130	Lithic tuff; greento cream sericite-carbonate(?) rich fragments, occur in a grey matrix. Scattered fragments of light grey lava. Foliation (cleavage) is 45° to core axis, the sericitic fragments have a characteristic shredded appearance. Barite veins and bands are present throughout. Zones up to 10cm of massive barite with foliation (?bedding or recrystallisation) parallel to the cleavage.
2.85		
3.00	135	Later quartz-carbonate veins up to 10cm are typically perpendicular to the cleavage?. These massive veins are concentrated between 133m and 137.20m
3.00		
	139.30	
3.00	140	Pale blue-grey agglomerate of fine-grained dacitic(?) feldspar porphyry lava. Sericitisation of feldspar is apparent, but the bulk of the rock has a siliceous aspect. The fragments are generally light grey, the matrix dark blue grey. There are rare quartz veinlets only.
	143.85	
3.00	145	Sheared, yellow cream to light grey lithic tuff-agglomerate to agglomerate mixture of yellowish and light grey fragments occur in a grey matrix, much veined by quartz and variable quantities of barite.
1.60		5 cm
1.30		Alteration is sericite-carbonate(?)—silica(?) Cleavage is 55 to 60° to core axis. Shearing is most intense between 146.68
	150	

VISUAL LOG: TRACE, COMMON, ABUNDANT, MASSIVE

DEPTH m	MINERALIZATION
127.35	Pyrite 10% as massive irregular veins, commonly with massive barite. Disseminated sphalerite and galena occur, particularly with barite or quartz veins. Sulphide contact declines to 5-7% (pyrite).
135.20	Pyrite 3 5% as veins and disseminated quartz.
	Pyrite continues 305% as fine stringers and disseminated euhedral or sub-hedral crystal (<1mm) in the rock matrix.
	Rare disseminated sphalerite and galena.

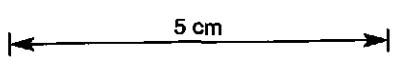
Cominco

DIAMOND DRILL LOG

Hole N° MC 1 Page N° 7

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : 456063 — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
2.55		and 152m with much broken core and probable faulted zones.			
3.05		Between 152m and 161.08, the rock is competent, with yellow sericite-carbonate rich fragments after feldspar porphyry (to 5cm) and a mid to dark grey matrix. Foliation (cleavage) continues at 60° to core axis but is not as marked a parting as previously.			Pyrite increase to 7-10% as narrow veinlets (≤5mm), as halos to rock fragments and as disseminated crystals.
	155	There are occasional barite veins parallel to the foliation.			
3.00					
3.00	160				
	161.08	DTL/PyPi			
3.00		Pale grey fine grained lava or tuff. Feldspar phenocrysts (sericitised) and faint crudely lenticular forms (<2mm) visible at x 10 subbest this rock may be an ash flow tuff or tuff-lava. — Dacitic feldspar porphyry (vitric?) tuff-lava. Petrological specimen collected at 187.50m (No. 183301)			
	165				
2.95					
1.80		Zones of foliated uniformly macrotextured rock alternate with zones where close packed fragments are apparent.			Pyrite 5-10%, as veins parallel to the foliation commonly bifurcating. Veins vary from ≤ 1mm to 2-5 cms.
	170	These are typically <2cms but some are up to 10cm.			
3.00		Shapes have been modified by shearing at 70° to the core axis, pyrite veining is quite common.			Pyrite is 40% from 168.40 to 168.90 with barite veins, similarly from 175.29 to 175.92. Elsewhere, vein pyrite without barite locally attains 30%.
					
2.85		Barite veins occur sparsely throughout, but locally attains 5-10% of the total rock, viz 168.40 to 171.40m, and 175.50 to 176m.			
	175				

063

DIAMOND DRILL LOG

Hole N° MC 1 Page N° 6

Feature : Bedding, Foliation, Fragment - size & shape 0.5%; Shearing, Fault F, Vein c carbonate q quartz

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456064

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
				175.29	
				175.92	
				176.00	
3.00		Patchy sericitisation of some fragments occurs below 178.50, imparting a greenish colour to the unit, shearing is more apparent at 60° to core axis.			Pyrite circa 5% as vesicles and disseminated crystals, rare veins to 1cm below 180m.
2.90	180				
	181.35	PyPi Greenish yellow to grey sheared sericite tuff-agglomerate.			
2.95		Cleavage is 65° to core axis.			
		Probably an altered variant of the adjacent rock type.			
	185				
3.00					
	187.04	DTL>PyPi Light grey feldspar porphyry (vitre?) tuff-lava, brecciated, with dark grey colouration along pyritised fractures. Foliation, possibly sheared out flow-banding or tuffaceous bedding is 45° to core axis.		187	Pyrite occurs as veins and as rare disseminated crystal aggregates (≤1mm) typical 3-5%, patchily to 7-10%.
2.80	190				
		Some narrow sericitised zones occur.			
		Petrological specimen at 187.60 (No. 183301)			
3.05					
1.55	195				
	195.5	END OF HOLE			

5 cm

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DRILL HOLE RECORD

Location Mt. Charter **Property** Hat River EL 15/73 **District** Tasmania, Australia **Alt./R.L.** N/A **Hole N°** MC 2

Commenced 22/2/76 **Completed** 27/2/76 **Core size** NQ to 33m, BQ to EOH **Co-ordinate** 4600N, 4290E **Date**

Objective To test base metal soil geochemical anomalies adjacent to a baryte vein in altered volcanics. **% Recovery** **Bearing (M)** 098° **Logged**

Grid bearing (M) 8°45' **Dip** 45°

SURVEY DATA				GRAPH DERIVED DATA						REMARKS
DEPTH	DIP	BEARING(M)	INSTRUMENT TYPE	DEPTH	DIP	BEARING(M)	NORTHING	EASTING	ALTITUDE	
0	45	098	Clinometer, tube compass	0	45	98	4600.00	4290.00	0.00	
43	45.5	104.5	Eastman SS	25	45	100	4599.67	4307.67	-17.68	
79	41.5	103.5	"	50	44.5	100.5	4599.46	4325.42	-35.28	
109	42.5	104.5	"	75	42	99.5	4599.06	4343.62	-52.40	
145	31	97	"	100	42	100	4598.74	4362.20	-69.13	
184	24	99.5	"	125	39.5	97.5	4598.75	4381.13	-85.45	
				150	30	93.5	4599.95	4401.55	-99165	
				175	25	95	4601.68	4423.64	-111.18	
				187.40	24	96	4602.32	4434.90	-116.32	End of hole.

Note: Stadia pick up to collar not done
Collar chained only along cut line.

456065

065

Commco

DIAMOND DRILL LOG

Hole NO MC 2 | Page N 1

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456066

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		AP							
2.00		Oxidised orange, feldspar porphyry agglomerate; original weak chlorite colouration patchily visible. Very broken, rubbly core.							Oxidised
	5								
	10								
SAND COLLECTED NO CORE.		Orange brown feldspathic sand.							
	15								
	20								
		5 cm							
	22.40	Pale grey-green feldspar porphyry agglomerate							
	23.0							23	
1.75		As above but fresher, feldspar porphyry agglomerate. Partly altered andesite, very broken and locally pug. Note substantial core losses.							Pyrite visible 3-5%
	25								

066

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DIAMOND DRILL LOG

Hole N° MC 2 Page N° 2

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456067

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
	25.40	FAULT ZONE. Lithology as above, rubbly core with pug. Locally cleaved at 40° to core axis. Alteration is sericite, so that the typical AP character veers towards PyPi.	BROKEN CORE		
0.90					
2.50	30				
		NQ reduced to BQ at 33.37m.		31.35	Pyrite increases to 5-7- (locally) 10% as disseminated crystals and crystal aggregates.
3.00		Alteration increases below 34m.			
	34.75				
	35	Gradational contact, to PyPi (>AP) sheared sericite rich lithic tuff to agglomerate. Fragmented texture only locally distinct due to cleavage at 25-35° to core axis. Patchy penetative weathering is indicated by brown and light cream zones adjacent to fractures.			
2.00					
1.05					
0.90					
1.20		Occasionally relict features typical of AP group rocks can be seen (feldspar phenocrysts to 2mm, off white in colour) - Particularly 44.10 to 54.10 - with large fragments (to 5 cms)			
	40				
2.30					
1.60					
2.80	45			44.90	Pyrite 15-20%, network of veins and stringers.
		5 cm			Pyrite 10%, locally 15-20 as disseminated crystals, stringers and veinlets.
4.10					
	48.50	Texture as above (agglomerate) but colour is distinctly yellow-green, (due to sulphide?)			
	50				

067

Dominco

DIAMOND DRILL LOG

Hole N° MC 2 Page N° 3

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456068

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
1.75					
0.60					
2.45					
	55				
3.05		5 cm			
	58.40				
2.95		Gradational colour change to light mottled grey, sericite-carbonate altered, sheared agglomerate, with occasional carbonate veins. Cleavage is 30° to core axis.			
	60				
				60.60	
					Pyrite 5%, disseminated crystals and aggregates.
	62.84				
2.95		Agglomerate, - yellow-green fragments in a carbonate-barite(?) bearing matrix; a minor grey chert. Cleavage is 35° to core axis. Fragments display 'spotting' of sericitised feldspars and pyrite crystals.			
	65				
3.00					
	65.70				
3.00		Light grey mottled feldspar porphyry agglomerate, rich in carbonate, with sericite and some silica. The fragmental texture is only just apparent. The spotting, due to feldspar phenocrysts (to 2mm) is quite marked.			
	70				
	71.40				
2.95		Light grey fine grained feldspar porphyry lava. DTL?			
	72.30	PyPi			
		Light to mid grey carbonated lithic tuff to tuff-agglomerate, becoming heavily sericitised downwards, particularly below 73.70.			
				73.50	
					Increase in pyrite to 7%
2.95					
	75			74.70	Pyrite 15% as veins

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DIAMOND DRILL LOG

Hole N° MC 2 Page N° 4

Feature : Bedding, Foliation, Fragment - size & shape 0%, Shearing, Fault F, Vein c carbonate q quartz

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456069

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
		Colour changes to dark grey. Fragments become close packed suggestive of lava-breccia; internally some are light grey, indicating an original DTL character.			and stringers in the (rather limited) groundmass. The sulphide contact is patchily up to 30% and down to 7%.
3.00		Some bleaching(?) occurs adjacent to and within the Fault zone (below) within the light grey fragments sericite feldspar phenocrysts can			
	80			79.94	
	80.48				Trace pyrite only within leached, bleached fault zone.
1.60		FAULTED ZONE, bleached, broken core, intermittently sheared and puggy.	F F F		
1.15		5 cm			
0.60					
	84.30			84.36	
	84	be seen.			Pyrite 3-5% as veinlets (<1mm to 5mm)
2.75		Below the fault zone there is limited sericitisation and chloritisation(?) of a massive nature, succeeded by altered lithic tuff.			
	86.35	PyPi/DTL			
3.15		Light grey feldspar porphyry lava to lava-breccia (locally), with variable carbonation and sericitisation.			
	90	Pyrite veining gives rise to PyP characteristics (blue-grey to white mottling).			
2.85		Bleaching and iron staining is common marginal to fractions.			
		Foliation, indicated by alignment of sheared feldspar and by cleavage (locally) is 30-35° to core axis.			
1.25					
	95	Fracturing and carbonate veining appears random. There is minor barite veining.	Barite		
3.05					
	97.65			97.65	
		Yellow-grey sheared agglomerate or lava-breccia. Schistosity is 45° to core axis. Alteration is sericite rich. Fragments have grey margins, yellow centres. PyPi			Pyrite 7% as matrix stringers.
2.70					
	99.63	PyPi/DTL		99.63	
	100				Pyrite 5% as veins and

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DIAMOND DRILL LOG

Hole No MC 2 Page No 5

Feature : Bedding, Foliation, Fragment - size & shape 0%, Shearing, Fault F, Vein c carbonate q quartz

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456070

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.10		Pale grey, weakly sericitic, siliceous dacitic(?) lava, and lava-breccia, of close-packed fragments. The matrix is veined with pyrite and white carbonate-barite. Foliation is 40° to core axis.							Pyrite continues 3-5% locally 7%.
3.00	105								
0.85									
2.05									
	109.28	PyPi							
	110	Zone of barite-carbonate veining, with ~~traces of sulphide and digested~~ rock.							Trace galena with barite zone.
1.70	110.35	Sericitised, sheared, siliceous, lithic tuff, much veined with carbonate and barite. Cleavage is 40° to core axis.							
0.50	112.40	Yellow-green to grey feldspar porphyry agglomerate, sheared at 35-30° to core axis.							
1.70									
	115								
	115.30	FAULT ZONE, minor pug, broken core, rock type change to mottled grey sheared, sericitised, carbonated agglomerate, probably altered variant of adjacent rocks. Patchy carbonate veining is present.							Pyrite 3-5% locally 7% as stringers and veinlets.
2.30	118								
2.95									
	120	Colour varies from grey to yellow-grey, locally orange. Altered (carbonate?) feldspar phenocrysts (to 2mm) occasionally visible, with some fragments of agglomerates. Core is sheared, rubbly between 123.11m and 126.84m.							
2.50								122.55	Pyrite 2%, disseminated crystals.
		5 cm							
1.60	125								

070

DIAMOND DRILL LOG

Hole Nº MC 2 Page Nº 6

Feature : Bedding, Foliation, Fragment - size & shape 0%; Shearing, Fault F, Vein c carbonate q quartz

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456071

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
1.63	127.93			122.95	Pyrite 5%? with traces of galena.
3.00		Lithic-tuff agglomerate PyPi>AP of dark grey-green feldspar porphyry in a light-grey carbonate rich matrix. Fragments (up to 10cm) are 50% of the rock.			
3.00		PyPi Greenish grey, strongly deformed (sheared) lithic tuff or agglomerate of sericitised feldspar porphyry with narrow barite-carbonate veins. Cleavage is 50° to core axis.		132.40	Pyrite 7-10% as veins and stringers, massive where shown.
2.80	133.20	Cream lava-breccia?lithic PyPi>DTL tuff of carbonated feldspar porphyry, with blue-grey colouration developing along pyritised fractions.			
1.20	135 136.60	Sheared sericitic lithic PyPi tuff, varying to agglomerate. Locally**			
2.00		Zone of FAULTING AND SHEARING. Much cleaved core with some narrow pug zones at 50° to core axis. Refolded cleavage discernable at 144.80.			Pyrite 65-70%.
1.10		** bleached within the faulted zone, with carbonate-barite?? veining irregularly.			
1.40				141.40	Pyrite 2-5%
0.30	143.20				
0.50		Agglomerate - as above, but PyPi>AP fragments are green (sheared chlorite) in a gray matrix, which is variably++			
0.75	144.80	End of faulted zone at 144.80.			
1.20	145	++sheared and sericitised. Yellow narrow carbonate veins are common. Green fragments least sheared show carbonated(?) feldspar relicts.			
2.20		Foliation is 60-65° to core axis.			
3.00	150	5 cm			

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DIAMOND DRILL LOG

Hole Nº MC 4 Page N 1

Feature : Bedding, Foliation, Fragment - size & shape (0%), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456072

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
		150.00 to 152.00m intense carbonate veining.			Pyrite 2%
2.97	152.00	Mid grey strongly sheared, PyPi lithic tuff to agglomerate. Shredded sericite fragments at 75-80° to core axis occur in a light grey matrix. The fragments are pale cream to greenish.			
1.35	154.60	Dark green agglomerate of PyPi/AP patchy leached, carbonated vesicular(?) andesite, with sericitised feldspars. Foliation is 45° to core axis.			Pyrite 2%, patchily 10%
1.05	155				
3.05	158.50	Sericitic fragments in a blue-grey matrix - lithic tuff. Fragments are 25% of total. PyPi/DTL?			
3.10	160	Agglomerate. Pale cream fragments of sericitised, carbonated feldspar porphyry are set in a blue grey matrix of sericitised carbonate. Fragments range from <2mm to 10cms. Folation (alignment of small fragments, and feldspars in large fragments) is 45° to core axis. Specimen at 161m (183302).			
3.04	165				
2.98	165.16	Texture as above, agglomerate, however fragments are dirty-yellow green, and show both green (sericite) and white (carbonate) flecking; and alteration variety of the above unit? Specimen at 167.70m (183303)			
2.97	168.88	Idential with penultimate unit. Agglomerate of pale cream seritic-carbonated feldspar porphyry fragments in a blue grey matrix; less matrix than in previous unit. Pervasive pyritisation along planes parallel to foliation (45° to core axis) gives rise to blue-grey and cream wavy striping of large fragments. Rare barite veins.		168.50	Pyrite 10% as matrix veins and stringers.
3.02	170	5 cm			
	174.65	AP?		174.65	Pyrite not apparent.
	175				

U72

Commonwealth

DIAMOND DRILL LOG

Hole No MC 2 Page No 8

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : 456073 — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.00		Agglomerate, of pale yellow-green carbonated sericitised feldspar-porphyry. Foliation is 45° to core axis, indicated by elongation of fragments and streaking of sericitised feldspars. There is a progressive increase in the number of dark green fragments with white and off white feldspar phenocrysts. These fragments show brown-yellow							
3.00	180	alteration rims and completely altered ghosts of smaller fragments are visible between the larger fragments. The rock would appear to be an andesite feldspar-porphyry agglomerate showing progressively less carbonation down hole.							
3.00									
3.00	185	Specimen at 175m (183304). Specimen at 182.75m (183305) The fragments have smoothed out lines.							
	187.40	END OF HOLE Note: The petrological problem presented by this hole is the difference (if any) between the cream sericitised carbonate rich feldspar porphyry agglomerates and the carbonated andesite feldspar porphyry agglomerates. Specimens sent for thin section 183302 - 183305.							

5 cm

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DRILL HOLE RECORD

Location Que River **Property** Hatfield **District** Tasmania, Australia **Bearing (M)** 99° **Hole No** QR 72 D

Commenced 31.10.1975 **Completed** 5.11.1975 **% Recovery** 72% **Grid bearing (M)** 8.75 **Date** 16.11.1975

Objective To test a Cu, Pb, Zn C horizon soil geochemical anomaly and resistivity low in a proposed mill site area. **Core size** NQ to 111.4 m E.O.H. **Logged** C.H. YOUNG

Co-ordinates 7610N 4425E **Dip** 43° **Alt./R.L.** 710.0

SURVEY DATA				GRAPH DERIVED DATA			CALCULATED CO-ORDINATES			REMARKS
DEPTH	DIP	BEARING(M)	INSTRUMENT TYPE	DEPTH	DIP	BEARING(M)	NORTHING	EASTING	ALTITUDE	
0	43	99	Clino/Compass	0	43	99	7610.0	4425.0	710.0	
28	44	100	Eastman	25	44	99.25	7609.9	4443.1	692.79	Rare disseminated Sph,> Gn has been noted
70	44	98	Single Shot Camera	50	44	99	7609.8	4461.1	675.42	in most of the unweathered rock intersected
				75	44	98.75	7609.7	4479.1	658.06	in this hole and is interpreted through-
				100	44.25	98.25	7609.8	4497.0	640.65	out the deeply weathered sections.
				111.4	44.25	98.25	7609.9	4505.2	632.7	
Note: No survey pick up of hole collar.										

456074

Cominco

DRILL HOLE RECORD

Location Que River **Property** Hatfield **District** Tasmania, Australia **Bearing (M)** 99° **Hole No** QR 72 D

Commenced 31.10.1975 **Completed** 5.11.1975 **% Recovery** 72% **Grid bearing (M)** 8.75 **Date** 16.11.1975

Objective To test a Cu, Pb, Zn C horizon soil geochemical anomaly and resistivity low in a proposed mill site area. **Core size** NQ to 111.4 m E.O.H. **Logged** C.H. YOUNG

Co-ordinates 7610N 4425E **Dip** 43° **Alt./R.L.** 710.0

SURVEY DATA				GRAPH DERIVED DATA			CALCULATED CO-ORDINATES			REMARKS
DEPTH	DIP	BEARING(M)	INSTRUMENT TYPE	DEPTH	DIP	BEARING(M)	NORTHING	EASTING	ALTITUDE	
0	43	99	Clino/Compass	0	43	99	7610.0	4425.0	710.0	
28	44	100	Eastman	25	44	99.25	7609.9	4443.1	692.79	Rare disseminated Sph,> Gn has been noted
70	44	98	Single Shot Camera	50	44	99	7609.8	4461.1	675.42	in most of the unweathered rock intersected
				75	44	98.75	7609.7	4479.1	658.06	in this hole and is interpreted through-
				100	44.25	98.25	7609.8	4497.0	640.65	out the deeply weathered sections.
				111.4	44.25	98.25	7609.9	4505.2	632.7	
Note:	No survey pick up of hole collar.									

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DIAMOND DRILL LOG

Hole N° QR72D Page N° 1.

Feature : Bedding, Foliation, Fragment - size & shape □%; Shearing, Fault F, Vein c carbonate q quartz

Mineralization : Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

456076

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		No core.							
	2.03								
1.9		DP Pale green-brown carbonated and chloritised lava-breccia. Deeply weathered and partly kaolinised. Lithic fragments are angular to sub-rounded from 0.1 to 6 cm, numerous rounded cavities suggest the fragments are vesicular. Black manganese staining is common on fractures. The rock is interpreted as andesitic lava breccia.							
2.1	5								
2.15	8.2	Red-brown in colour (iron oxides?) deeply weathered and kaolinised as above. Deep weathering clearly outlines fragments. Rounded quartz grains to 3 mm are common and are considered to be siliceous vesicle filling.							
	10								
1.75									
2.3	15	5 cm							
3.0	17.5	17.5 - 18.4 m and 19.4 - 19.95 m; Pale grey-green in colour, representing a fresh kernel in a mass of weathered rock. White carbonate filling vesicles and cavities is common. Dark green sericite aggregates to 2 mm also appears to fill vesicles.						17.5	Rare Sph, Gn and Py as isolated disseminations generally < 1 mm.
	18.4							18.4	
	19.4							19.4	Rare disseminated sulphides as above.
	19.95	Fresh rock as above.						19.95	
2.0	20	Pale yellow-green aggregates to 5 mm appears to be epidote, occasional euhedral aggregates may represent altered pyroxene. Below 19.95 m deeply weathered, kaolinised, light brown to fawn in colour.							Rare disseminated Sph, > Gn has been noted in most of the unweathered rock intersected in this hole and is interpreted throughout the deeply weathered sections.
0.7									
0.75	25	No Core recovery.							

076

COMINCO

DIAMOND DRILL LOG

Hole N° QR72D Page N° 2.

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : 456077

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		No core recovery.							
	28.0								
1.3	30	DP Light brown to fawn, deeply weathered and partly kaolinised lava-breccia as above. The rock is soft and friable, easily broken by hand. Manganese staining is common.							
1.25		5 cm							
1.5	35								
1.25									
1.65	40								
1.4									
1.1									
1.2	45								
0.3									
0.85									
0.4									
0.5									
	50								

077

Commico

DIAMOND DRILL LOG

Hole N° QR72D Page N° 3.

Feature : Bedding, Foliation, Fragment - size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : 456078 — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
0.9									
0.25	52.4	Dark green to brown, partly weathered kernel as above. Vesicular fragments							
1.9	53.6	to 2 cm are common, vesicules are often filled with black sericite-chlorite?							
	55								
2.4									
0.5									
2.1	60								
0.55		5 cm							
	64.0								
	65	No core recovery.							
	67.0								
1.75		Clay and kaolin, red-brown in colour very deeply weathered. Shear zone?							
	68.8	Brown, deeply weathered and kaolinised as above 64.0 m.							
	70								
1.0									
1.3		71.6 - 77.3 m Brown deeply weathered as above, this interval exhibits white aggregates of kaolin? to 3 mm, occasionally euhedral in outline, representing altered feldspar? Sub-rounded occasionally green coloured quartz grains to 2 mm have been noted and may represent siliceous vesicle filling.							
1.15									
1.5	75								

078

Dominco

DIAMOND DRILL LOG

Hole N° QR72D Page N° 4.

Feature : Bedding, Foliation, Fragment - size & shape (%), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : 456079 — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
		Brown weathered DP as above.			
2.6					
	79.8				
2.6	80	Weathered, frawn-brown in colour, relatively competent rock, adequate core recovery. 80.8 - 81.1 m Fault breccia.			
1.4					
1.0	85				
1.8					
0.5	87.8				
2.0		Light green to dark green carbonated and chloritised lava breccia. (Partly weathered Andesitic lava breccia.)			
	90				
1.0					
1.75				92.5	Trace pyrite associated with irregular secondary carbonate veins. Rare Cpy (a small speck <1 mm has been noted).
1.0				93.8	
1.1		5 cm			
	95				
1.2					
0.6					
	97.0			97	Rare disseminated Sph, Gn has been noted.
0.9		Green carbonated and chloritised lava-breccia, fresh rock. Fragments are often sub-rounded and are commonly up to 6 cm and vesicular. The groundmass is fine grained and chloritic.			
1.9					
	100				

079

Commonwealth

DIAMOND DRILL LOG

Hole N° QR72D Page N° 5.

Feature : Bedding, Foliation, Fragment - size & shape (0%), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization : 456080 — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
1.75		Carbonate fills most vesicles and fractures.							
0.6		Joints at 25°, 50° to C.A. are stained with iron oxide and occasionally manganese.							
0.6									
3.0	105								
3.0									
2.4	110								
	110.8								
	111.4	Brown and weathered as described above 90 m.							
		Hole abandoned at 111.4 m. Unable to free jammed drill string.							
		5 cm							
	115								

E.L.2/70
E.L.15/73

8500N 8000N 7500N 7000N 6500N

4500E 4000E 3500E 3000E

straight gully along fracture at 120°M

Off-white - orange carb ?Alfd por or xt 94534

No o/c

Tea tree

BUTTON GRASS SLOPE

BUTTON GRASS FOREST

Swamp, mucs, water flows 0.5m under surface

coarsely vesc A(B?)a + A/Bt q-c veins 94546,47,48,49,50

massive o/c vesc A(B?)a, q veins low comp'n grub A-(B.)

A?a

94551 ,bsh breccia

spirsely vesc A B with b sh xmas

sh 60 35 bsh

94535 ?R or ?Dt bleached carb sric

LOGGED

sheared ox fd por ? or xt

sh, bleached - vesc lava, & ? 94536 bleached, oft much fallen dead timber

b/sh

b/sh

b/sh

swamp creek 0.5m below surface

40 volc /sh slump(?) breccia

b/sh

BUTTON GRASS

R-Retext 99400

Retext 94532

Boulders A/Dd(fdpor)

H.E.C. POWER LINE ? Possible course ?

A/Dt rubble

massive A/Dt

94545 vesc A/Dt

ox ?A/Dt

87510

weath ? Alt ?

sub o/c A/Dd(fe por frags)

?A/Dtdes carb sric Tr py

A/Dmassive ; carb sric

LOGGING RAMP (mud)

weath A/Dtpor (xt ?) in pl

?Altext

weath coarse A/D lt

?A/D fd por (xt ?) no o/c

v weath red ?A/D

A/Dtc

weath A/Dt

sheared A/Dd

LOGGED

A/Dt

vesc ? weath ?Ad (fd por)

creek 10m wide

q quartzite rubble

94544 carb A q 85

A/Dt-to

weath A ?

?Alt fi lava-b carb sric, Rg? 93419

LOGGED

A/Dd some oft white frags

LOGGED

lam weath ? A/D

vesc A/D lava ?

q fract

vesc lava (p) 94543

?Alt fd por (or xt) 94541

weath ? A/Dd

(Alp?) coarse Aalfd por 94540

94539 carb ser ? bleached

sharp ridge no o/c

rare rubble v weath weakly vesc ? volc

v weath volc ?

b/sh

bsh green brown weath vesc A-B lava (Alp)

bsh

Highway

Murchison

bsh

80

?Retext

Alt or lava-b

sub o/c A lava b

POWER LINE SURVEY

Afdpor lava

MISCLOSE

Alt or lava b (thin to 1cm s&c matrix)

rdxt

weath Ad or lava b

MISCLOSE

Rubble Afdpor

A lava

massive vesc A lava vesicles up to 0.5cm, quartz filled

fdxt 155142

boulders massive vesc A lava

logging track

massive tors A lava

vesc Ac or lava b

vesc A lava 183155

3700E

strongly alt Afdpx(?) por 183154

ox A rubble

ch, py 99401, 99402 99401

brecciated volc 155141

fdxt sric chlor

Afdtext

coarse Afdtext (fd por frags)

Alt 99386

ser schist ox Afdxt (? lava ?) 99388

ser coarse Afdxt

sil 99495 Bfd por lava

B/Afd por or xt

sh

sh/ volc sump breccia

weath vesc D? 148943

bsh

No o/c

183153 cream alt R(?) fdpor

massive A lava (?)

sparsely vesc lava

183154 green brown coarsely vesc A lava

183155 grey vesc A D lava vesicles to 1cm, quartz filled

rare bsh rubble

boulders A lava sub o/c

155140 por trigg A fr Sph, Cly, Py

alt A lava ?

vesic lavas A 155139

bsh rubble dd por weath A

blue grey fol'd, wcm cpy, vesc A-D to equiv 183970

rares volc vesc D lava 183969

rubble vesc A, alt sheared in 183968 creek rubble Alt pyrite, ?, tm Alt c, with py 183988 vesc A-D?

bsh rubble

bsh

62

bsh

?pit

pit

45

kaolinite tuff 183989

bsh

bsh

b/sh

148947 bsh

vesc to

much coarse to fine vesc A 99390

alt c py 183967

ser lito

coarse vesc A Alt

fine f, py

183967 (Py Pl) blue grey pyritic a

vesic clasty volc

R/D or s/c A

148944

sh/ volc sump breccia

Geological Legend see Plate QR 84

Index to sheets

G	F	E	K
H	A	D	L
J	B	C	M

8 cm

COMINCO EXPLORATION PTY. LTD.

Drawn by E.H.S. Traced by R.J.E.

Checked by

REVISED BY	DATE
E.H.S. R.J.E.	5/9/76
E.H.S. R.J.E.	8/9/76
E.H.S. R.J.E.	15/9/76

76-168 · NORTH WEST TASMANIA 001

Vol 2B

MACKINTOSH & HATFIELD AREA

QUE RIVER PROSPECT

SURFACE OUTCROP GEOLOGY

Location code K55/6/44 Scale 1 2500 Date June, 1975 Plate QR 81 (b)

456081

6500N
6000N
5500N
5000N
4500N
4500E
4000E
3700E
3500E
3000E
RIDGE TOP
CREST
Ridge
Gully
Flat
Myrtle
No o/c
Rt or lava ?
rubble white - cream coarser ? ox py ?
55
I66588
massive knobbly R lava ? flow banded, patchily silic. some q veins 1cm horizontal disposition
rubble ?
I56081 ox py ? inter carb. ? Rit
RIDGE TOP
cream sheared ? Rit
massive Rfd por. I56073 bleached (ser ?)
80
barite in sit 99 I56082
massive barite rubble on cliff
I55299 py rich coarse D ? lt (Py,P)
I56074 lt Tr gn, py, barite (Py,P)
RIDGE TOP
TR1 with ox py
PIT
MC 1 SITE
I56587 py in massive Rdfd por.
weath Ao ?
MC 2 SITE
sheared Rit
rubble
sheared ? Rit - lt
sheared Q Rit
barite
ser ? Rt
bleached ser. ? Rt, ox py ?
white Ry ? lt q vein rubble
white - cream weath silic sheared lt ?
swamp
massive sheared Ab
pink D(?) fdpor. I56596
weath. A Ab, or lava-b
weath. A
Afdpor
Ao rubble weath. carb. silic
weath. A rubble
A-Ba weath
A-Ba or lava-b
bsh and A-Ba rubble
bsh rubble swamp
grey clay or b/sh ?
Di rubble bsh
Di rubble
Di rubble (Red brown soils)
Di rubble I55296
much Di rubble on sub o/c
Di o/c massive boulders
I55295
silic Di (massive)
grey clays (or bsh)
sh breccia
grey soils
bsh
55
bsh I55297
silic carb A-B lava-b
much rubble A-B lava b
A-Ba or lava-b rubble
alt A-B fdpor lt
I55298 A-Ba (DP) silic carb Tr gn, Sph, cpy, py
85
46
bsh
Rfd por
Rft or lava ?
No o/c
Ridge
Myrtle
Forrest
Bracken
BRACKEN HILL
Myrtle Forest
Bracken and Dead Timber
Margin of Bracken Forest
LOW RIDGE
MAIN CREEK
MURCHISON HIGHWAY
POWER LINE SURVEY
MISCLOSE
BL 4200
99587
B1(fdpor) lto
massive lg/l A-B fdpor lava, lava-b Tr. Py
A-B fd por.
Afd por vr- lava lava-b
A-Bo weath
A/Dfdxlt
coarse A/Dfdxt (fd por frags.)
Alt or lava b (chips to 1cm silic matrix)
weath. Ao or lava b
A lava
massive vesic A lava vesicles up to 0.5cm quartz filled
boulders massive vesic A lava
fdxt I55142
ser. coarse Afdxt
Rfd por lava
R/Afd por or xt
A-B fd por.
A rubble
A rubble some sheared
ox A rubble
ch. py 9941, 9942 9954
brecciated volc I55141
fdxt silic chlor.
massive A lava (?)
boulder A lava sub. o/c
much coarse fine vesic A 99390
alt A lava ?
bsh rubble Afdpor
weath A
blue grey fdxt, with py, vesic Ao to east I83970
rotten volc vesic D lava I83969
bsh rubble
rubble vesic A, alt, sheared lt I83968 creek rubble Alt, pyrite, lt, precipitate
alt Alt, p, with cpy I83988
vesic A-Do
thinly tuffaceous I83989
alt o py I83987
coarse vesic A-Dlt I83967 (PyPr)
blue grey pyritic a
ser. lito
fine t. py
vesic A ? sheared
R/D or silic A
sh/volc slump breccia
I48944
I48947 bsh.
vesic to
deformed brec. bsh
blue grey A, D vesic lt a
? ox py iron rich lt
weath. vesic D ?
I48943
grey clay
b/sh
bsh
No o/c
Afdpor
Afdxt
Afdpor, a choleodary veinlets
I66585 A-Bfdhbpor to q veins with fine tr cpy
fine to coarse fdx tr cpy
I66583 rubble Ao, Afdxt R-Dfd por. alt with py ?
silic, carb (pink) Ao or lava-b
Myrtle Forrest
purple R Afdpor I66584
silic, A-Bfdxpor a tr py
A-Bfdhb por a
weath A-B
rubble q vein A-Bwr lava-b
Ao
A ? a carb. silic
Afdpor, Afdxt purple green alt
Ao
Afdpor lt
some A rubble
bsh rubble
bsh debris
rubble A-Bxr, q-c veined 99405
rubble A (fdpor.) a/to or lava B
cemented river gravels
grey clays
swampy
alt volc ? carb. silic
Di rubble
bsh I56079
50
99404
80
Tag 1000m from Hwy
weath A-B
ox Ao
ox Ao
alt A-D ? fdpor
Ao, with occasional bedded Afdxt frags alt carb. silic I66582
alt carb ? Ao
rubble Ao with bedded Afdpx xtfrags I66580
seperate rot lava b
massive, bedded (?) Afdpor to, frags discrete
Ao, Ab (fdpor, fdxt)
fine Ab, or lt ? slump breccia
silic bsh rubble Tr Py
bsh rubble in tree roots Ao on surface (scree)
bsh I66581
55
bsh
bsh precipitated
bsh
No o/c
LOW RIDGE
Do rubble
alt ? Do
Do rubble
rubble Rq por or qxt ?
vesic A lava
vesic Ao
vesic A-B + A-Bft weath.
weath. vesic A
nicely vesic ox A lava
rubble pink, white, green grey alt ? (DTL?) I83952 also D fdpor (or alt?)
A rubble
weath. orange lt (ser?)
mineral lineation pitches south
white sheared R volc
sheared Alt I83953 % 0 vol. biotite QFI see report in port 1 2 5% ox
mineral and fragment lineation
sheared Alt I83954
Afdpor
Afdpor.
Afdpor.
Afdpor.
sandy ck Rpor. rubble
rubble on o/c ? white R ?
Rfdpor. silic kinematic
sparse rubble carb. silic Ao ?
silic. carb Afd por.
A-Bo weath
A/Dfdxlt
Alt rubble
A lava
Alt
99386
ser schist ox Afdxt (? lava ?)
99388
Rfd por lava
R/Afd por or xt
part weath A or D ?
A-B fd por.
ch. py
ox A a
ox A a
A-B lava-b
Forrest
weath A
Afdpor
Afdpor, a choleodary veinlets
rubble Ao with bedded Afdpx xtfrags I66580
BRACKEN HILL
Bracken
Myrtle
fine Ab, or lt ? slump breccia
silic bsh rubble Tr Py
bsh rubble in tree roots Ao on surface (scree)
Afdxt
Afdpor
I66585 A-Bfdhbpor to q veins with fine tr cpy
fine to coarse fdx tr cpy
I66583 rubble Ao, Afdxt R-Dfd por. alt with py ?
silic, carb (pink) Ao or lava-b
Myrtle Forrest
purple R Afdpor I66584
alt carb ? Ao
alt A-D ? fdpor
silic, A-Bfdxpor a tr py
A-Bfdhb por a
Ao, with occasional bedded Afdxt frags alt carb. silic I66582
Ao
Afdpor lt
Ao, Ab (fdpor, fdxt)
Brocken and Dead Timber
Afdpor lt
some A rubble
bsh rubble
bsh I66581
55
bsh precipitated
bsh debris
Margin of Bracken Forest
grey soils
bsh
No o/c
LOW RIDGE
MAIN CREEK
MURCHISON HIGHWAY
20
40
bsh
p ?
rubble Rq por or qxt ?
No o/c
Do rubble
alt ? Do
Do rubble
No o/c
rubble q vein A-Bwr lava-b
Ao
A ? a carb. silic
Do
Do
Do
Do
Do
Do
bsh coarse py in bands (2")
swamp
Di rubble
Di rubble
Di rubble

6500N 6000N 5500N 5000N 4500N

6000E

5500E

5000E

4500E

M.L. 4m/75

Afdpor P
155292
Afd por
massive bedding
Afdpor ins
A-B fd por
sparse rubble A-B weath
A-Bfdpor lava b
main gully
ox rubble A-B fd px (?) por
coarse vesic (glassy) A-Bfd por lava
coarse vesic silic A-B fdpor lava b
vesic A-Bfd por lava b
weath A-Bfdpor ins
ox rubble A-B?
ox A-Bit
weath A-Bfdpor lt
ox A? ins
vesic fd por lava
vesic A-B fd por v lava
blue grey sheared rubble A? fd por + vesic lava
155291
weath A-Bit
carb silic sheared rock
155290
Rt, silic ser and green clay
155293
massive boulders vesic A-B lava b
white leached fine lt
RIDGE TOP
A Bfdpor lava b
also vesic A-B rubble
vesic Bfd por lava b
94506 g. in vesic
white/orange ser clay
cliff o/c A-Bfdpor lava b
coarse A-Bfd por
95415
many fd phenos
14894.42
ox Afd por ?
vesic Bfdpor lava
A-Bfdpor coarse phenos
B? ifdxt
99387
Bltfdpor ins
RIDGE TOP
massive A-B fdpor lava, lava-b fr fly
95406
A-B fd por
Afd por vf lava lava-b
A/Dfdxlt

ox A-B?
A-Bfd por q
silic vesic A-B fd por lava b
A? fd por lava b
large boulders vesic A-B lava b or a
ox A-B vf lava
major gully
99409
vesic A-Bvfdpor lava b
ox A-B fdpor
leached A., pale brown lemonine patches
ox A-Bit
rubble ox fine A-B or A-Bit
major gully
Afdpor
Afdpor rubble
Afdpor some
cliff o/c 155294
Afdpor lava
Afdpor lava
fine A/B?
to
Alt vesic A (sheared) vesicles 1cm
Afd por, Aa,
main gully
A-Bfdpor
coarse A-Bfd por
99408
113995
vesic A
Afdpor a, weath and fresh, also Afdxlt
Afdpor a or lava-b
coarse Afdpor or xt Alt
Afdpor
fresh Afdpor a lava-b
Afdpor
Aa
Afdpor
A-Bfdpor lava b
A-Bo., also fine t or lava (weath)
STEEP SLOPES (20° - 40°)
fdpor lava b
RIDGE TOP
carb silic A-B lava b
99407
A-B fd por
Afdpor
Afdpor
sparse rubble carb silic Aa?
rubble ??
156082
Alt - lava
boulders massive A-Bpxfdpor lava b
A-Bit and fine lava?
Flat
No o/c
Myrtle
RIDGE
CREST
No o/c
No o/c
rubble of Afd por
5 cm

Index to sheets

G	F	E	K
H	A		L
J	B	C	M

rubble, white-cream carb ser ? ox py ?

7500E 5000N 3000E

4560S3

COMINCO EXPLORATION PTY. LTD.

Drawn by E.H.S	Traced by R.J.E	YL-11-68	NORTH WEST TASMANIA 003
Checked by		Vol 2/3	MACKINTOSH & HATFIELD AREA
REVISED BY DATE			QUE RIVER PROSPECT
E.H.S R.J.E 30/6/76			SURFACE OUTCROP GEOLOGY
E.H.S R.J.E 15/8/76			
Location code K55/6/44		Scale 1:2500	Date Oct 1975 Plate QR 61 (d)

4500 N
4000 N
3500 N
3000 N
2500 N
6000E
5500E
5000E
4500E
7500E
3000E

E.L. 2/70
E.L. 15/73

granite boulders 183986
cuesta boulders (eastern cong ?)
rounded boulders mica ss (sheared)
Dfd por 183982
rubble in gully west A. Afdpor
RDefdpor 183981
massive Afdpx (?)por lava - b
Afdpor xt
massive A-Bfdpor vitreous pink green 183980
alt Afdpor a
sheared Afdpor or fdxt
rubble Afdxt pink, altered
RIDGE
45 / 85 S
A-Dlava 183979
massive alt A-D lava 183978
RIDGE TOP
No o/c
D lava or tr py 183980
rubble 183981
py in Afdpor tr
massive weath D lava
bleached fd por (Ph)
simil to Mt Charter Rfdpor
purple brown Dfd por lava 183982
29 sheared Alt
A lava, tr py
Alt or lava b
Afdpor lava / tr 183983
alt Alt
alt Alt rubble
sparse alt Alt rubble
Afdpor (boulders?) 183985
mica shs/ss 183982
15 / 80
No o/c
mica ss (sparse rubble)
Alt A lava b
rubble A lava b
156087 MnO2 in alt A-B lava b
fine grain (mica ss?) 183973
mica ss
mineral lineation
colour banding (= bedding?)
183971 dark grey brown mica ss shs
mica ss dyke
qv ?
coarse mica ss
massive mica ss 183972
F ?
NB Similar to RDV type?
APV Pyb
Alt A lava b (Pyb)
156086
RIDGE TOP
massive low cliffy
red grey coarse
183975 mica ss
183976 mica ss, massive, weakly foliated
rubble mica ss
RIDGE
weathered bleached A-Bfd
silic A-B lava - b
rubble Rfd por
massive Rfd por 156073 bleached (ser ?)
148936
5 cm

Index to sheets

G	F	E	K
H	A	D	M
J	B	C	

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 004

MACKINTOSH & HATFIELD AREA
QUE RIVER PROSPECT
SURFACE OUTCROP GEOLOGY

Drawn by E.H.S | Traced by R.J.E.
Checked by
REVISED BY | DATE
E.H.S R.J.E 1/4/76
E.H.S R.J.E 26/4/76

Location code K55/6/44
Scale 1 2500
Date January, 1976
Plate QR 81 (L)

456084
76-1168

4500E
4000E
3500E
3000E
4500N
4000N
3500N
3000N
2500N

No o/c
rubble Rhy por
massive Rhy por 156073 bleached (ser ?)
barite in py R 156072
80
Cutting
massive barite rubble on diff
155299 py rich coarse D? lt (Py P)
Trench ½ RIDGE TOP
156074 lt Tr gn, qy, barite (py P)
Trench
No o/c
barite
No o/c
sil A-B rdpor lt
A-Bir or lava b
155298 A-Bir (DP) sil/c carb Tr gn,bh, cdy, py
DP
Trench
swamp
85
46
bsh
bsh rubble swamp
bsh and A-Bir rubble
bsh
bsh
grey clays (or bsh)
bsh
sh breccia
grey soils
bsh
55
bsh 155297
Dr rubble
Dr rubble (Red brown soils ?)
Dr rubble 155296
Dr o/c massive boulders
Tubble Do
? weath Do ?
4500N
4000N
3500N
3000N
weathered bleached A-Bir
sil/c A-B lava b
156069 A-B rdpor lt
rubble sil/c carb A-B lava b
Track position approx only
sil/c carb A-B lava b
No o/c
156085
A-B lava b qtz, bh
sil/c q veined
A-B vesc lava b
much rubble A-B lava b
A-B lava b rubble
A lava b traces qtz
B lava rubble trace Py
B lava b
swamp
NB Similar to RDV type ?
Alt A lava b (Py P)
RIDGE TOP
Creek
A lava b
rubble A lava trace cpy, qtz
A lava b rubble
micaceous lithic quartz ss
166568
mica ss 166567
bh & veins
? grey clay on bsh ?
sandy creek
swampy
vesc R dr/door 166566P RD qtz vesc R/Db rubble (RDV ?)
(RDV ?) 156096 pink/green fdsh
Myrtle forest
85
156095 pink lit dike & rubble R lava, Rdpor
Tea tree
sparse rubble ? Dfdx pt albit - silic
light scrub, tea tree, grass etc
156090 coarse albi - silic ? Dfdpt (RDV)
sparse float D(?) fdxt albit - chlor (RDV group)
gum, tee tree button grass
No o/c
No o/c
RIDGE TOP
fl397l dark grey brown mica ss 85
mica ss 166564
mica ss
coarse mica ss
massive mca ss fl83972
mica ss fl83976
RIDGE

Index to sheets

G	F	E	K
H	A	D	L
J	B	C	M

5 cm

156055
76-11-68.

COMINCO EXPLORATION PTY. LTD.

Drawn by E H S | Traced by R J E
Checked by
REVISED BY | DATE
ERS RJE | 1/4/76

NORTH WEST TASMANIA 005
MACKINTOSH & HATFIELD AREA
QUE RIVER PROSPECT
SURFACE OUTCROP GEOLOGY

Location code K55/6/44 | Scale 1 2500 | Date January, 1976 | Plate QR 81 (M)

4500 N
4000 N
3500 N
3000 N
2500 N
3000 E
2500 E
2000 E
1500 E
rubble Do
? weam Do?
MT CHARTER RECONNAISSANCE LINE (AZIMUTH 440 Deg.)
bsh
No o/c
No o/c
No o/c
gum, tea tree button grass
gum, tea tree scrub button grass
MURCHISON HIGHWAY
pink grey fd por dike ? strongly alt locally silic 183175 (microgranite ?) layering or flowbanding alt fds rl horiz
fdpor dike
mixed zone of silic brecciated sits and sandy hiffs
feldspathic mco ss, 183176
sub horiz joints patchy q v
mix stained sh
zone of mixed sh and fdpor lavas or dikes (sills ?)
A-B fdpor lava or fdpr 183176
alt rotten fdpor dike ? q veining throughout
massive pink - green fd por lava ?
fine fit, fdpor or felst, probably some feldspathic ss
rubbly o/c grey - green sts
blocky sts, sh
grey bsh dominant
feldspathic mco ss (massive) 183177
alt fdpor lt 183178
coarse fdpor lt
fine gy (feldspathic) 183179
brecciated grey bsh
cherty sh and ch (blue grey)
rubble sts/gy
brecciated gy sts/gy
gy/ sts
rubble grey RORdxt
ss, ch sts, sh fdpr
1560889 Rivty Rlava
1560888 Rvfd dxt
overgrown track
yellow weath fd por
alt grey Dol (?) dike
massive mco ss 183172 note bands of sh 1-5 cm thick within ss units
mco ss
bsh
q veins
q vns in sts, sh
bsh in gutter
bleached sts, sh
fault
fault dips 70°NW slickensides plunge 15° NE
alt Dol ? dike
2 cm alternating bands bsh, sts, mass ss 183173
1560869
bsh, py
bsh
fdpr dike ?
q veining throughout
fdpr
fdpr
sh
45
60
20
25
38
50
55
60
75
45
ss, ch sts, sh fdpr
5 cm
456086
76-1168
INDEX TO SHEETS
G F E K
H A D L
J B C M
R Q P N
COMINCO EXPLORATION PTY. LTD.
Drawn by E H S
Traced by R J E
Checked by
REVISED BY DATE
E.H.S R.J.E 13/5/76
NORTH WEST TASMANIA 006
MACKINTOSH & HATFIELD AREA
QUE RIVER PROSPECT
SURFACE OUTCROP GEOLOGY
Location code K55/6/44
Scale 1 2500
Date April, 1976
Plate QR 81 N

3000E

2500E

2000E

1500E

6500N

6000N

5500N

5000N

4500N

MURCHISON HIGHWAY

MAIN CREEK

MT CHAPTER RECONNAISSANCE LINE (ABOVE MASON)

Rifdst 101469

rwf 101467

rwf, lt

Button grass

No o/c

rubble Do

rubble Rg por or dst ?

? weath Do ?

Do, Dr rubble 99405

A Dike (alt weath) 99402

fdstr

bsh

sh / volc slump breccia 188946

weath vesc D ? 188945

vesc A Do

shaley tuff 183989

alt Alt, g, with py 183981

? (a?) 1

mod zone of brecciated sch and sandy tufts

feldspathic mica ss 183176

massive mica ss 183172 rare bands of sh (c lam) within ss units

qveins in sts

qvs in sts, sh

bleached sts sh

alt grey Dol (?) dike

alt Dol^n dike

Fault dips 70°NW slickensides plunge 15° NE

2cm alternating bands bsh, sts, mica ss 183173

136969

bsh, py

qveins

in gutter

5 cm

456087

76-1168 1/3

INDEX TO SHEETS

G	F	E	K
H	A	D	L
J	B	C	M
R	Q	P	N

7500E

6000E

4500E

3000E

1500E

7500N

6500N

5500N

5000N

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 007

MACKINTOSH & HATFIELD AREA

QUE RIVER PROSPECT

SURFACE OUTCROP GEOLOGY

Drawn by E H S	Traced by R J E		
Checked by			
REVISED BY DATE			
E H S R J E 28/6/76			
Location code K55/6/44	Scale 1 2500	Date April 1976	Plate QR 81 P

E.L.15/73

E.L. 2/70

E.L. 5/74

Mt Charter

Bobadee River

Murchison Highway

POWER LINE CUT ENDS

MT. CHARTER LINE

OVERTHRUST LINE

FOLD AXIS

GOLD HILL

Owen cong

Granite boulder

Terruginous Tft

Main road
Secondary road
Track
Railway
Abandoned railway
Power trasmission line
Fence
Mine

Quarry or pit
Trig. station
River, creek
Survey line
Tenure boundary

Bedding
Cleavage
Joints
Faults

NOTE: For details of Geological Legend Refer Drwg No QR84

5 cm

STATE GN 13° 24' 26" — MN 8° 41' 00" — COMINCO MN

Magnetic north correct 1975 - annual change easterly by 0.4°

	Sheet B	Sheet F
	Sheet A	Sheet J
	Sheet D	

Index to adjoining sheets

456088

Mapping by: E.H Skey, D.L Ewington, I.B Freytag, C.H Young

Geological Legend see Plate QR84

76-1168

COMINCO EXPLORATION PTY. LTD.

Drawn by E H S	Traced by R J E	NORTH WEST TASMANIA	008
Checked by		MACKINTOSH & HATFIELD AREA	
REVISED BY / DATE: E H S R J E 10/9/75; E H S R J E 9/11/76; E H S R J E 29/4/76; E H S R J E 14/5/76; E H S R J E 11/6/76		SURFACE OUTCROP GEOLOGY	
		SHEET "A"	
Location code K55/6/44		Scale 1:10000	Date July, 1975	Plate DT61a

E.L. 15/73

E.L. 2/70

Murchison Highway

Q.R. RECCE LINE (POSITION APPROX.)

H.E.M. TRAVERSES 1973/74

PROPOSED POWER LINE

A.E.M. ANOMALY 4

ANOMALY 1
1973/4 RECCE LINES

No o/c

Tb

black sh

black sh 183140

black sh 183139

horizontal bedding

micaceous feldspathic 183141

183134 black shale quartz feldspar breccia

black shale rhyolite breccia 183137

siliceous feldspathic tuff 183135

Rqpor 183138

Rfdxlt

Rfdxlpt

Rfdxlt to Rt with b/sh xenos

Rfdxlpt to Rt with b/sh xenos

Rfdxlt 155048

155046 coarse Rqfdxlt

155047 Rfdqxlt

b/sts with py

sh with py

155052 vesic B carb silic with py

155053 carb A

155054

155056

155057

155058

155059 b/sh with py

155060 f vesic Rh or por

155061 vesic A/D

155062

155066

155067

155068 Rpor coarse ? sh with py

155069 b/sh with py

155070 (sheared) Mn stains

155072

155073 silic vesic Ab

155075

155076 ch with py

155077

155078

166572 blue grey qfdxt

166573 xenos bsh

166574 black ch with py

166575 mass fdqxt, coarse

166576

166577 sts, ch, qfdxt, q alt ? (Tyk)

166578

166579

166580

166581

166582

166583

166584

166585

166586

166587 sts ? or qfdxt-micaceous Dfdpor lava ?

166588 sts

166589

166590 coarse qfdxt

166591

166592

166593

166594

166595

166596

178985 bedded

178986 coarse qfdxt

178987 sts, sh

178988 bsh, polymict gnt

178989 graded polymict grit

178990 bedded sh sts, q por with tr sph py

178991 fl por bedded

178992 sts, sh

178993 fl por bedded

178994 sh polymict grit

178995 lens of qfdxt in bsh

178996 bsh xenos

178997 at fine qfdpor

178998 bsh

178999 bsh

179000 bsh

179001 bsh

179002 bsh

179003 bsh

179004 bsh

179005 bsh

179006 bsh

179007 bsh

179008 bsh

179009 bsh

179010 bsh

179011 bsh

179012 bsh

179013 bsh

179014 bsh

179015 bsh

179016 bsh

179017 bsh

E.L. 15/73

E.L. 2/70

E.L. 5/74

141582 Rpt Rpvt

To Bulgobac 141081

141170 Rwt Ro

141168 Rlt

7Rvt 141171 (+141585)

fRfdxt 141583

Rlvt 141584

141585 Rvt

Rvt

coarse ss 183972

183973 mica ss

183974 mica ss

183975 mica ss

No o/c

A lava b rubble

No o/c

5400N 5300E

D lava 183180

Alt 183181

Dfdpor lava?

massive D weath

bleached f.d por (Rf?)

A lava tr py

Alt or lava b (fd por) 183133

Dfdpor lava?

Alt or lava b rubble

Alt rubble

No o/c

Afd por 183185

mica ss/sts 183192

mica ss

ss/gy 183191

183190 mica gy, feldspathic ss

183189 A-D lava

A-D lavas

Afdpor 183186

183187 Bhbdpor lava

183188 o/c Di. dike

Sheared Dfdpor (?) 183182

Massive Dfdpor 183181

Massive Afdpor 183185

Afdpor ss/sts 183192

Afdpor f. mica ss 183193

Afdpor ss/sts 183194

Afdpor mica ss 183195

Afdpor mica ss/sts 183196

Afdpor mica ss 183197

Afdpor mica ss/sts 183198

Afdpor mica ss 183199

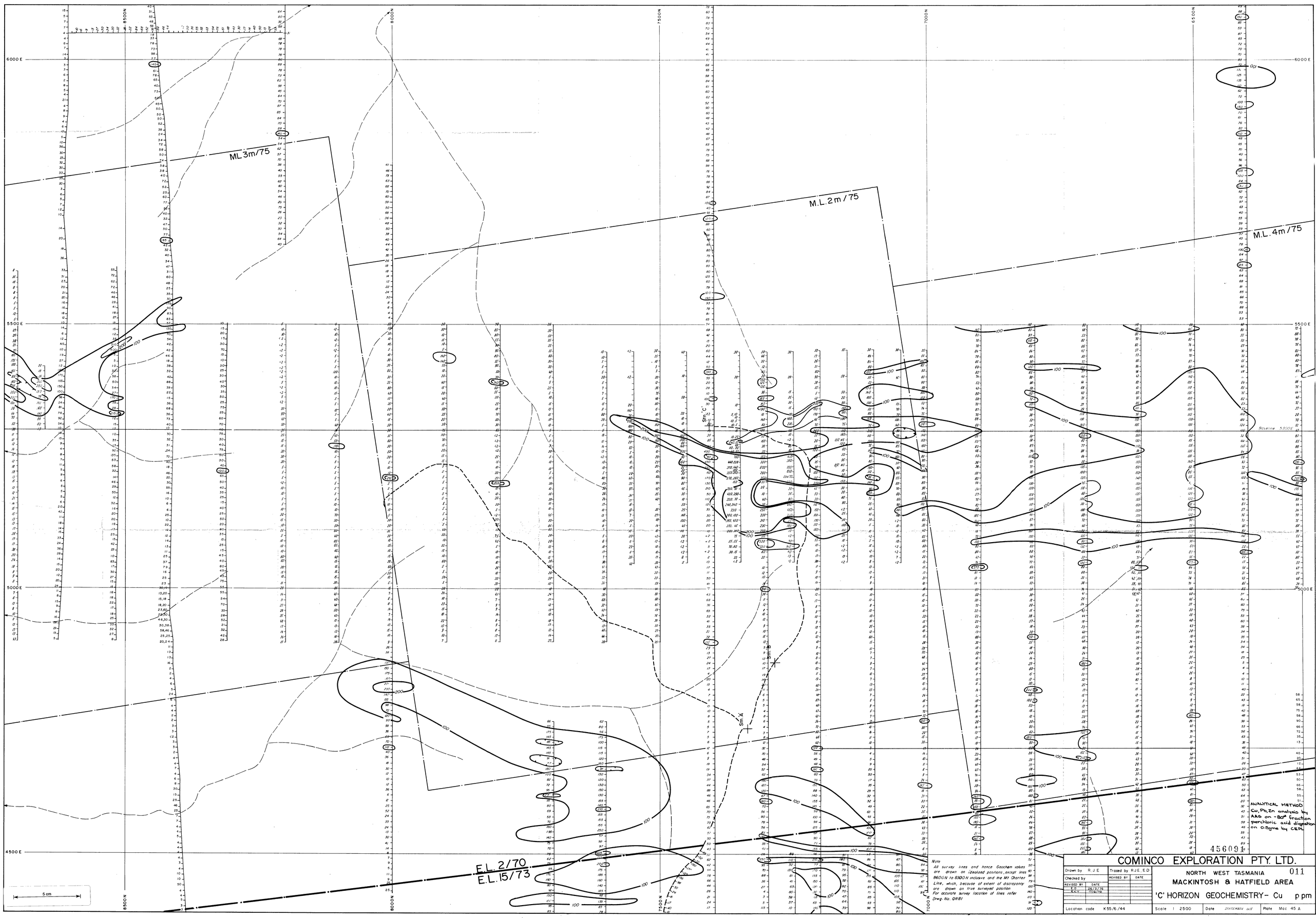
Afdpor mica ss/sts 183200

Afdpor mica ss 183201

Afdpor mica ss/sts 183202

Afdpor mica ss 183203

Afdpor mica ss/sts



Note
All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Dwg. No. QR81

ANALYTICAL METHOD
Cu, Pb, Zn analysed by AAS on -80# fraction perchloric acid digestion on 0.5gms by CEPL

456091

COMINCO EXPLORATION PTY. LTD.			
Drawn by R.J.E.	Traced by R.J.E., E.D.	NORTH WEST TASMANIA	011
Checked by	REVISED BY DATE	MACKINTOSH & HATFIELD AREA	
REVISED BY DATE		'C' HORIZON GEOCHEMISTRY- Cu ppm	
E.D. 26/3/76			
R.J.E. 17/8/76			
Location code K55/6/44	Scale 1 2500	Date SEPTEMBER 1975	Plate Mac 45 A

76-1168

E.L. 2/70
E.L. 15/73

8500 N
8000 N
7500 N
7000 N
6500 N

4500E
4000E
3500E
3000 E

Murchison Highway

5 cm

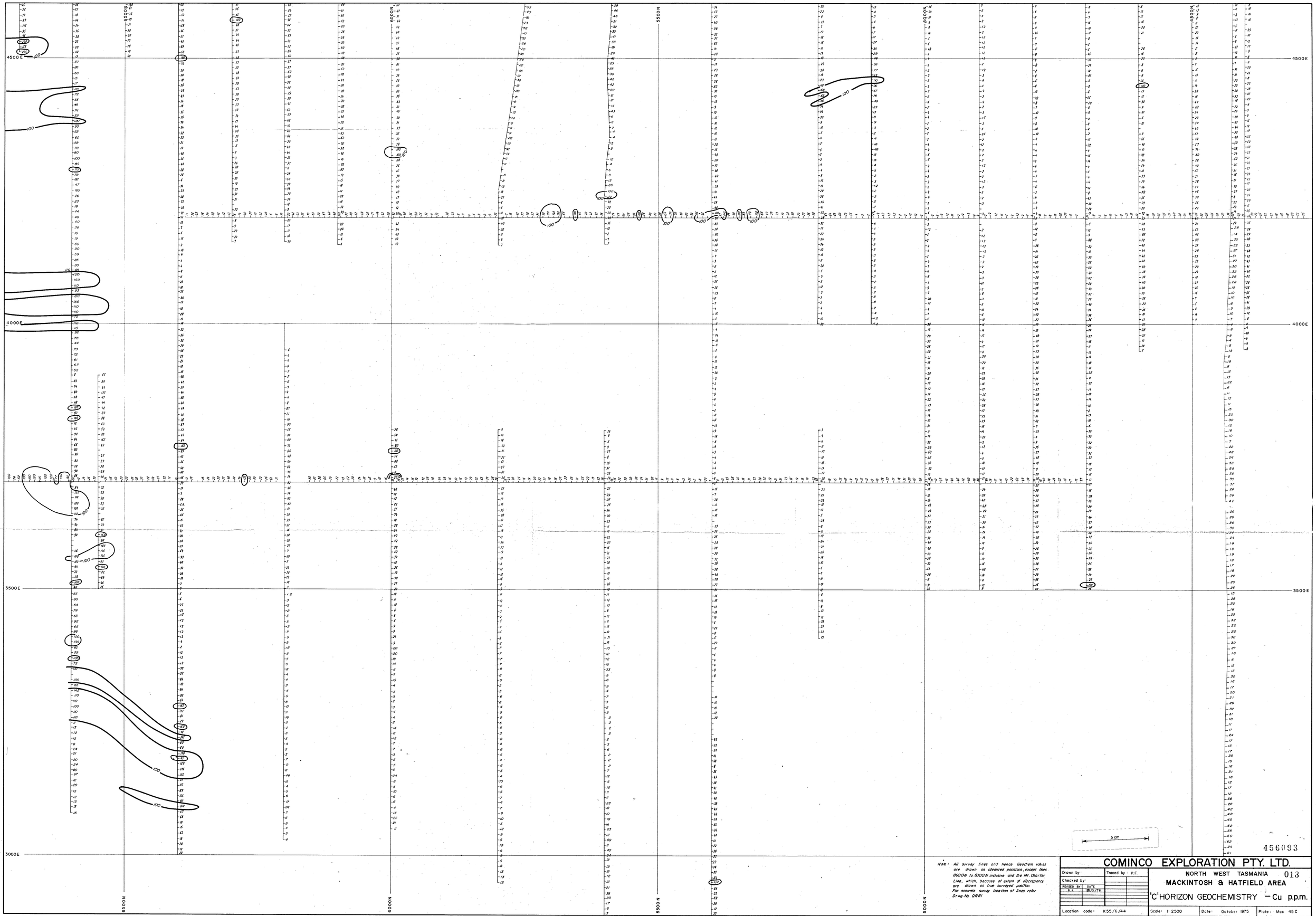
Note - All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Drwg. No QR81

42092

COMINCO EXPLORATION PTY. LTD.

Drawn by R.J.E	Traced by R.J.E	NORTH WEST TASMANIA	012
Checked by	REVISED BY DATE	MACKINTOSH & HATFIELD AREA	
REVISED BY DATE		'C' HORIZON GEOCHEMISTRY – Cu p.p.m.	
R.J.E 28/3/76			
Location code K55/6/44		Scale 1:2500 Date June, 1975	Plate Mac 45B

76-1168



Note: All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt. Chester Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Dwg No. DRB1

456093

COMINCO EXPLORATION PTY. LTD.			
Drawn by:	Traced by: P.F.	NORTH WEST TASMANIA 013	
Checked by:		MACKINTOSH & HATFIELD AREA	
REVISED BY: P.F. DATE: 28/3/76		'C' HORIZON GEOCHEMISTRY – Cu p.p.m.	
Location code: K55/6./44		Scale: 1:2500	Date: October 1975 Plate: Mac 45 C

76-1168

4500 N

4000N

3500N

3000N

2500 N

6000 E

5500 E

5000E

4500 E

E.L. 2/70
E.L. 15/73

Note All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Drwg No QR81

5 cm

456103

76-1165

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 023

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY- Pb p.p.m.

Drawn by	Traced by R.J.E.		
Checked by			
Location code K55/6/44	Scale 1:2500	Date March, 1976	Plate Mac 46 L

6500N

6000N

5500N

5000N

4500N

6000E

5500E

5000E

4500E

M.L. 4m/75

E.L. 2/70
E.L. 15/73

100

Note
All survey lines and hence Geochem values are drawn on idealized positions, except lines 6600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position
For accurate survey location of lines refer Drwg. No QR81

5 cm

456094

COMINCO EXPLORATION PTY. LTD.

Drawn by	Traced by P.F.	NORTH WEST TASMANIA	014
Checked by P.F. 26/3/76		MACKINTOSH & HATFIELD AREA	
		'C' HORIZON GEOCHEMISTRY — Cu ppm.	
Location code K55/6/44		Scale 1:2500	Date SEPTEMBER 1976 Plate Mac 45 D

76-1168

4500N

4500W

4000N

3500N

3000N

2500N

6000E

5500E

5000E

4500E

E.L. 2/70
E.L. 15/73

5 cm

Note: All survey lines and hence Geochem. values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt. Charter Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Dwg. No. QA81

COMINCO EXPLORATION PTY. LTD.			
Drawn by	Traced by R.J.E., E.D.	NORTH WEST TASMANIA 015	
Checked by		MACKINTOSH & HATFIELD AREA	
		C'HORIZON GEOCHEMISTRY- Cu p.p.m.	
Location code K55/6/44		Scale 1 2500	Date March, 1976	Plate Mac. 45 L

76-1168

4500 E

4000 E

3500 E

3000 E

4500 N

4000 N

3500 N

3000 N

2500 N

5 cm

456886

Note: All survey lines and hence Geochem. values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position
For accurate survey location of lines refer Dwg No QR81

COMINCO EXPLORATION PTY. LTD.			
Drawn by	Traced by R.J.E.	NORTH WEST TASMANIA	016
Checked by		MACKINTOSH & HATFIELD AREA	
		'C' HORIZON GEOCHEMISTRY- Cu p.p.m.	
Location code K55/6/44	Scale 1:2500	Date March, 1976	Plate Mac. 45 M

76-1168

4500 N
4000 N
3500 N
3000 N
2500 N

3000 E
2500 E
2000 E
1500 E

Note All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position.
For accurate survey location of lines refer Drwg No GP81

5 cm

456097

COMINCO EXPLORATION PTY. LTD.			
Drawn by	Traced by R.J.E	NORTH WEST TASMANIA	017
Checked by		MACKINTOSH & HATFIELD AREA	
		'C' HORIZON GEOCHEMISTRY- Cu p.p.m.	
Location code K55/6/44		Scale 1:2500	Date March, 1976	Plate No. 45N

76-1188

6500 N
6000 N
5500 N
5000 N
4500 N
3000 E
2500 E
2000 E
1500 E

Note All survey lines and hence Geochem values are drawn on idealised positions, except lines 8600 N to 8300 N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Dwg. No QR81

5 cm

456098

76-1168

COMINCO EXPLORATION PTY. LTD.			
Drawn by	Traced by R.J.E.	NORTH WEST TASMANIA 018	
Checked by		MACKINTOSH & HATFIELD AREA	
		'C' HORIZON GEOCHEMISTRY- Cu p.p.m.	
Location code: K55/6/44		Scale 1:2500	Date March, 1976	Plate Map 45 P

8500N 8000N 7500N 7000N 6500N

6000E 5500E 5000E 4500E

ML 3m/75

ML 2m/75

ML 4m/75

Sm A

Sm B

E.L. 2/70

E.L. 15/73

Baseline 5300S

5 cm

Note:
All survey lines and hence Geochem values are drawn on idealised positions, except lines 8600N to 8300N inclusive and the Mt. Charter Line, which, because of extent of discrepancy are drawn on true surveyed position.
For accurate survey location of lines refer Dwg. No. GR81

456689

COMINCO EXPLORATION PTY. LTD.

Drawn by R.J.E.		Traced by R.J.E.	
Checked by		REVISED BY	DATE
REVISED BY	DATE		
R.J.E.	28/3/76		
Location code	K55/6/44		

NORTH WEST TASMANIA 019

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY - Pb p.p.m.

Scale 1:2500 | Date June, 1975 | Plate Mac 46 A

76-1188

E.L. 2/70
E.L. 15/73

8500 N
8000 N
7500 N
7000 N
6500 N

4500 E
4000 E
3500 E
3000 E

Murchison Highway

456100

5 cm

Note: All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Drwg No QR81

COMINCO EXPLORATION PTY. LTD.

Drawn by R J E		Traced by R J E	
Checked by		REVISED BY	DATE
REVISED BY	DATE		
R J E	26/3/76		
Location code	K55/6/44		

NORTH WEST TASMANIA 020

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY– Pb p.p.m.

Scale 1 2500 | Date June 1975 | Plate Mac 46 B

76-1165

6500N

6000N

5500N

5000N

4500E

4000E

3500E

3000E

Note All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position For accurate survey location of lines refer Drwg No QR81

5 cm

76-1168

41C101

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 021

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY – Pb p.p.m.

Drawn by		Traced by P F	
Checked by P F 26/3/76			
Location code K55/6/44	Scale 1 2500	Date October 1975	Plate Mac 46 C

6500 N

6000 N

5500 N

5000 N

4500 N

6000 E

5500 E

5000 E

4500 E

ML 4m/75

E.L.2/70
E.L.15/73

250

500

1000

5 cm

Note:
All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position
For accurate survey location of lines refer Drwg. No. 0A91

456102

COMINCO EXPLORATION PTY. LTD.

Drawn by	Traced by P.F.	NORTH WEST TASMANIA 022
Checked by P.F. 26/3/76		MACKINTOSH & HATFIELD AREA
		'C' HORIZON GEOCHEMISTRY - Pb ppm.
Location code K55/6/44	Scale 1:2500	Date September 1975 Plate Mac 46 D

76-1168

4500E

4000E

3500E

3000E

4500N

4000N

3500N

3000N

2500N

5 cm

456104

76-1168

Note: All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Drwg. No. OR 81

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 024

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY- Pb p.p.m.

Drawn by	Traced by R.J.E., E.D.	Location code	K55/6/44	Scale 1 2500	Date March, 1976	Plate Mac. 46 M
Checked by					

4500 N

4000 N

3500 N

3000 N

2500 N

3000 E

2500 E

2000 E

1500 E

90 95 140 105 120 80 85 140 100 <20 21 185 270 25 120 45 <20 270 55 40 100 75 80 30 130 <20 <20 40 85 110 20 85 85 110 160 60 35 55 30 60 45 25 50 25 <20 20 200 85

<20 <20 <20

6500N
6000 N
5500 N
5000 N
4500 N
3000 E
2500 E
2000 E
1500 E

Note All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter Line, which, because of extent of discrepancy are drawn on true surveyed position
For accurate survey location of lines refer Drwg No 0781

5 cm

456106

76-1168

COMINCO EXPLORATION PTY. LTD.			
Drawn by	Traced by E.D.	NORTH WEST TASMANIA	
Checked by		MACKINTOSH & HATFIELD AREA 026	
		'C' HORIZON GEOCHEMISTRY- Pb p.p.m.	
Location code K55/6/44	Scale 1:2500	Date March, 1976	Plate Mac 46 P

8500N

8000N

7500N

7000N

6500N

6000E

5500E

5000E

4500E

ML 3m/75

ML 2m/75

ML 4m/75

Shr A

Shr B

E.L. 2/70
E.L. 15/73

5 cm

Baseline 53000E

NOTE -
All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter line, which because of extent of discrepancy are drawn on true surveyed position.
For accurate survey location of lines refer Drwg No QR81

456197

COMINCO EXPLORATION PTY. LTD.					
Drawn by R.J.E.	Traced by R.J.E.			NORTH WEST TASMANIA	027
Checked by	REVISED BY	DATE		MACKINTOSH & HATFIELD AREA	
REVISED BY DATE				'C' HORIZON GEOCHEMISTRY - Zn p.p.m.	
R.J.E. 26/3/76					
Location code K55/6/44	Scale 1 2500	Date June, 1975	Plate Mac 47A		

76-1168

E.L. 2/70
E.L. 15/73

8500N 8000N 7500N 7000N 6500N

4500E 4000E 3500E 3000E

Murchison Highway

5 cm

Note: All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Chapter line, which because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Dwg. No. GR 81

COMINCO EXPLORATION PTY. LTD.			
Drawn by R.J.E.	Traced by R.J.E.	76-1168	NORTH WEST TASMANIA 023
Checked by	REVISED BY DATE		MACKINTOSH & HATFIELD AREA
REVISED BY DATE R.J.E. 26/3/76			'C' HORIZON GEOCHEMISTRY- Zn p.p.m.
Location code K55/6/44	Scale 1:2500	Date June, 1975	Plate Mac 47 B

456108

76-1168

6500N

6000N

5500N

5000N

4500N

4500 E

4000E

3500E

3000E

200

600

200

200

200

6500N 6000N 5500N 5000N 4500N

6000E 5500E 5000E

ML 4 m /75

E.L.2/70
E.L.15/73

200 400 600

5 cm

Note:
All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 6300N inclusive and the Mt Charter line, which because of extent of discrepancy are drawn on true surveyed position
For accurate survey location of lines refer Drwg No. QR 81

Note: All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 6300N inclusive and the Mt Charter line, which because of extent of discrepancy are drawn on true surveyed position
For accurate survey location of lines refer Drwg No QR 81

456110

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 030

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY - Zn p.p.m.

Drawn by	Traced by P.F.		
Checked by			
REVISED BY	DATE		
R.F.S.	16/5/76		
Location code	K55/6/44	Scale 1:2500	Date September 1975
		Plate Mac 47 D	

76-1168

4500 N

4000 N

3500 N

3000 N

2500 N

6000 E

5500 E

5000 E

4500 E

E.L. 2/70
E.L. 15/73

5 cm

456111

Note All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive, and the Mt Charter line, which because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Drwg No. OR 81

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 031

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY- Zn p.p.m.

Drawn by	Traced by P.F.		
Checked by			
Location code K55/6/44	Scale 1 2500	Date March 1976	Plate Mac 47 L

76 - 1168

4500 E

4000 E

3500 E

3000 E

4500 N

4000 N

3500 N

3000 N

2500 N

200

400

200

200

200

Note: All survey lines and hence Geotem values are drawn on idealized positions, except lines 8600 N to 8300 N inclusive and the Mt Charter line, which because of extent of discrepancy are drawn on true surveyed position
For accurate survey location of lines refer Drwg. No. QR 81

5 cm

456112

COMINCO EXPLORATION PTY. LTD.

Drawn by

Traced by R J E.

Checked by

Location code K55/6/44

NORTH WEST TASMANIA 032

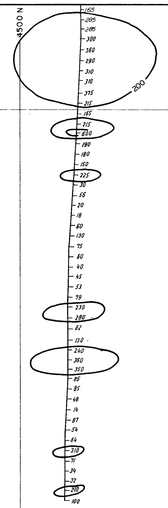
MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY- Zn p.p.m.

Scale 1 2500 | Date March 1976 | Plate Mac 47-M

76-1168

4500 N
4000 N
3500 N
3000 N
2500 N
3000 E
2500E
2000E
1500 E
2000 E
2500 E
3000 E
4500 N
4000 N
3500 N
3000 N



5 cm

456113

76-1168

Note: All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter line, which because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Drwg No QR 81

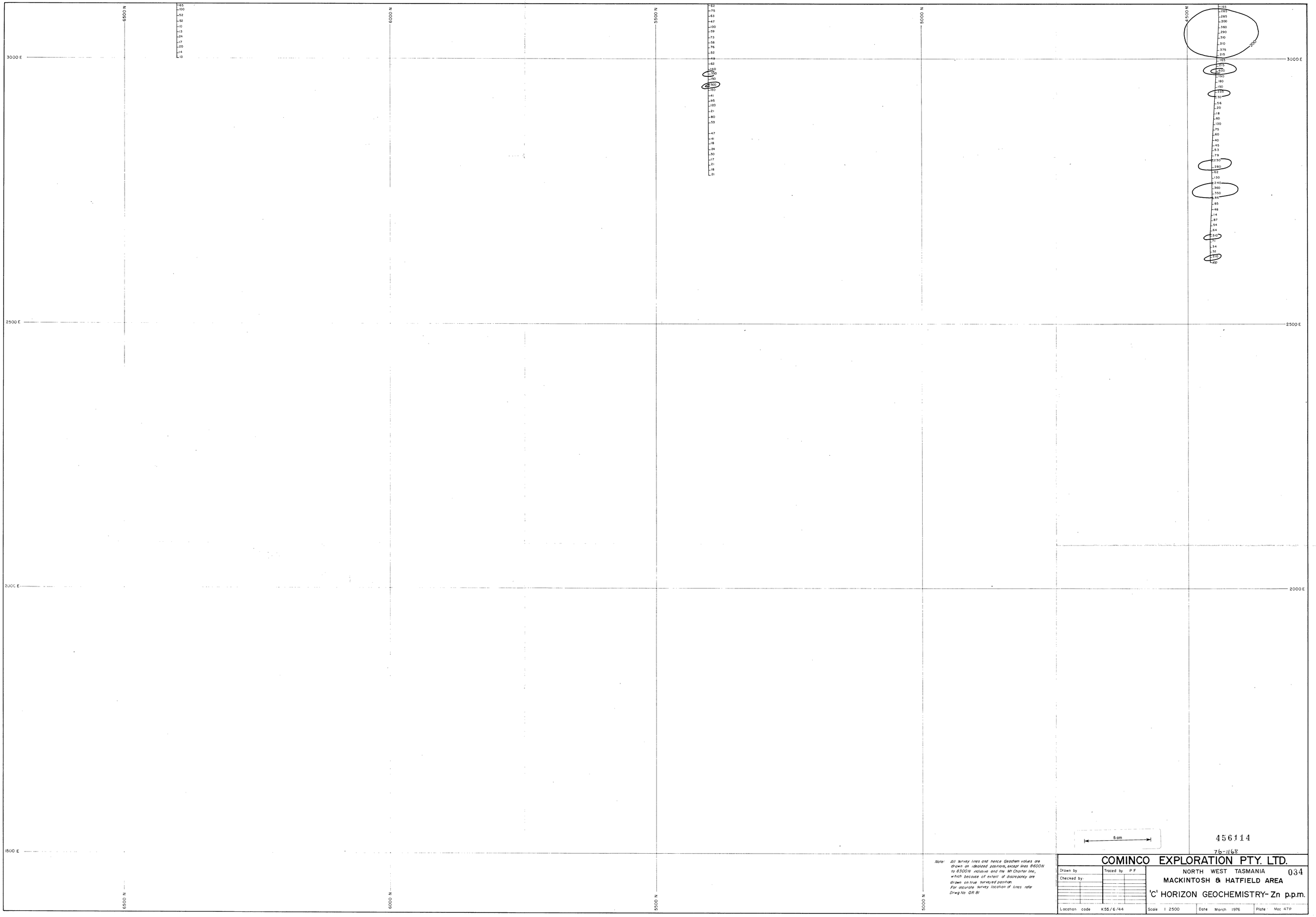
COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 033

MACKINTOSH & HATFIELD AREA

'C' HORIZON GEOCHEMISTRY- Zn p.p.m

Drawn by	Traced by E D.	Location code K55/6/44	Scale 1:2500
Checked by			Date March 1976
			Plate Mac 47 N



Note: All survey lines and hence Geochem values are drawn on idealized positions, except lines 8600N to 8300N inclusive and the Mt Charter line, which because of extent of discrepancy are drawn on true surveyed position. For accurate survey location of lines refer Drwg No QR 81

456114

76-1168

COMINCO EXPLORATION PTY. LTD.

Drawn by	Traced by P F	NORTH WEST TASMANIA 034	
Checked by		MACKINTOSH & HATFIELD AREA	
		'C' HORIZON GEOCHEMISTRY- Zn p.p.m.	
Location code K55/6/44	Scale 1 2500	Date March 1976	Plate Mac 47P

E.L 15/73

E.L 2/70

△ MT CHARTER

GOLD HILL Shaft

Blyth Boc River

Murchison Highway

swamp

Stream A

Stream B

Stream C

Stream X

9000N

8400N

7800N

7000N

6400N

6000N

5400N

Main road
Secondary road
Track
Railway
Abandoned railway
Power trasmission line
Fence
Mine
Quarry or pit
Trig. station
River, creek
Survey line
Tenure boundary

STATE G N | M N | COMINCO G N

13° 24' 26" — 8° 41' 00"

Magnetic north correct 1975 - annual change easterly by 04'

Sheet A

Index to adjoining sheets

5 cm

456115

76-1168

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA 035

HATFIELD E.L. 15/73 AND MACKINTOSH E.L 2/70

STREAM SEDIMENT GEOCHEMISTRY SAMPLE LOCATION AND NUMBERS

Drawn by G.R | Traced by E.D | Checked by

Location code K55/6/44 | Scale 1 10000 | Date JUNE 1975 | Plate DT 65/ A

387000 E
388000 E
389000 E
390000 E
391000 E
392000 E
393000 E
394000 E
395000 E

5400 000 N
9000 N
8000 N
7000 N
6000 N
5395000 N

E.L. 15/73

E.L. 2/70

Hutchison Highway

I83911

I83911 E

10 550 N

5 cm

456116

76-11/68

	Sheet C	
	Sheet B	
	Sheet A	

Index to adjoining sheets

COMINCO EXPLORATION PTY. LTD.

Drawn by G.R.	Traced by E.D.	NORTH WEST TASMANIA HATFIELD E.L. 15/73 C 036 STREAM SEDIMENT GEOCHEMISTRY SAMPLE LOCATION AND NUMBERS	
Checked by			
Location code K55/6/44		Scale 1:10,000	Date APRIL 1976 / Plate 07 85/8

387000 E
388000 E
389000 E
390000 E
391000 E
392000 E
393000 E
394000 E
395000 E

5390000N
9000 N
8000 N
7000 N
6000 N
5385000N

E.L. 15/73

E.L. 2/70

E.L. 5/74

156091
156092
156093
156094
THIS CREEK CROSSES LINE AT 5480 E

River
Mackintosh

5 cm

456117
76-1168

Index to adjoining sheets

	Sheet A	
	Sheet D	
	Sheet E	

COMINCO EXPLORATION PTY. LTD.

Drawn by SR | Traced by ED

Checked by

Location code

NORTH WEST TASMANIA 037

HATFIELD E L 15/73

STREAM SEDIMENT GEOCHEMISTRY
SAMPLE LOCATION AND NUMBERS

Scale 1 10,000 | Date APRIL 1976 | Plate ST 85/D

E.L. 15/73

E.L. 2/70

E.L. 5/74

Bluphoc River

Murchison Highway

GOLD HILL shaft

△ Mt. Charter

387000 E
388000 E
389000 E
390000 E
391000 E
392000 E
393000 E
394000 E
395000 E

5395000 N
4000 N
3000 N
2000 N
1000 N
5390000 N

9000N
8000N
6200N
9400N
7400N
7000N
6400N
8400N
5200N
7400N
6000N
5300 E
3700 E
4200E
4400 N
4200 N
3800 N
4000N
3400 N
7000 E
4800 N

5 cm

456118 76-1168

- Main road
- Secondary road
- Track
- Railway
- Abandoned railway
- Power trasmission line
- Fence
- Mine
- Quarry or pit
- Trig. station
- River, creek
- Survey line
- Tenure boundary
- Copper / Lead / Zinc

STATE G N | MN | COMINCO G N

15° 24' 26" | 8° 41' 00"

Magnetic north correct 1975 - annual change easterly by 04'

	Sheet B	Sheet F
	Sheet A	
	Sheet D	

Index to adjoining sheets

ANALYTICAL METHOD
Cu, Pb, Zn analysis by AAS on -40* fraction, perchloric acid digestion on 0.5gms. by CEPL.

COMINCO EXPLORATION PTY. LTD.

Drawn by	Traced by E D	NORTH WEST TASMANIA 03E	
Checked by		HATFIELD EL15/73 & MACKINTOSH E.L2/70	
		STREAM SEDIMENT GEOCHEMISTRY	
		Cu, Pb, Zn values in p.p.m	
Location code K55/6/44		Scale 1 10000	Date May 1976	Plate DT 60/A

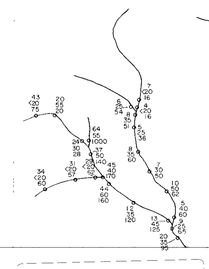
387000 E
388000 E
389000 E
390000 E
391000 E
392000 E
393000 E
394000 E
395000 E

5400 000 N
9000 N
8000 N
7000 N
6000 N
5395000 N

E.L. 15/73

E.L. 2/70

Mitchell Highway



5 cm

456119

76-1168

Index to adjoining sheets

	Sheet C	Sheet G
	Sheet B	Sheet F
	Sheet A	Sheet J

COMINCO EXPLORATION PTY. LTD.

Drawn by		Traced by P.F	
Checked by			
Location code	K55/6/44	Scale	1 10,000
Date	JUNE 1976	Plate	DT 60 - B

NORTH WEST TASMANIA 039

HATFIELD - MACKINTOSH AREA

Stream Sediment Geochemistry

Cu, Pb, Zn values in p.p.m.

E.L. 15/73

E.L. 2/70

E.L. 5/74

Mackintosh River

5390 000 N

9000 N

8000 N

7000 N

6000 N

5385 000 N

387 000 E

388 000 E

389 000 E

390 000 E

391 000 E

392 000 E

393 000 E

394 000 E

395 000 E

5 cm

456120

76-1168

	Sheet A	Sheet J
	Sheet D	
Sheet 379/380	Sheet E	

Index to adjoining sheets

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA

HATFIELD - MACKINTOSH AREA 040

Stream Sediment Geochemistry

Cu, Pb, Zn values in p.p.m.

Drawn by	Traced by P F		
Checked by			
Location code K 55/6/44	Scale 1 10,000	Date JUNE 1976	Plate DT 60-D

E.L. 15/73

E.L. 2/70

E.L. 5/74

Bilyenac River

Murchison Highway

GOLD HILL
shaft

△ Mt. Charter

5395000 N
4000 N
3000 N
2000 N
1000 N
5390000 N

387000 E
388000 E
389000 E
390000 E
391000 E
392000 E
393000 E
394000 E
395000 E

9000 N
8800 N
8600 N
8400 N
8200 N
8000 N
7800 N
7600 N
7400 N
7200 E
7000 N
6800 N
6600 N
6400 N
6200 N
6000 N
5800 N
5600 N
5400 N
5200 N
5100 E
5000 N
4800 N
4600 N
4400 N
4200 N
4000 N
3800 N
3600 N
3400 N
3100 E
3000 E

1000 E
100
100
3000

50
100
50
1000

10,000
1000
100
3000

50
100
50
2000

3000
300
2000
20

>10,000
1000
10
>10,000
500
10
5000
10

1000 E
100
100
6000

50
100
100
500

Main road
Secondary road
Track
Railway
Abandoned railway
Power trasmission line
Fence
Mine

Quarry or pit
Trig station
River, creek
Survey line
Tenure boundary

Ba
Y
Sr
Ti

STATE G.N. M.N. COMINCO G.N.
13° 24' 26" 8° 41' 00"
Magnetic north correct 1975 - annual change easterly by 04'

	Sheet B	Sheet F
	Sheet A	
	Sheet D	

Index to adjoining sheets

5 cm

ANALYTICAL METHOD.
Ba, Y, Sr, by Emission Spectrography A.C.S. Labs.

456121

76-1168

COMINCO EXPLORATION PTY. LTD.

Drawn by
Checked by
Traced by P F
Location code K55/6/44

NORTH WEST TASMANIA
HATFIELD - MACKINTOSH AREA 041
Stream Sediment Geochemistry
Ba, Y, Sr, Ti values in p.p.m.

Scale 1 10000 | Date JUNE 1976 | Plate DT 64

E.L. 15/73

E.L. 2/70

Mt. Charter

Mackintosh River

Main road
Secondary road
Track
Railway
Abandoned railway
Power transmission line
Fence
Mine
Quarry or pit
Trig. station
River, creek
Survey line
Tenure boundary

iron copper
manganese lead
zinc
all µg/g except iron (%)

Base sheet and contours enlarged from 1:31,680 Tasmanian Lands Dept. Topo.
Contour interval 50 feet.

STATE G.N. MN COMINCO G.N.
13° 24' 26" — 8° 41' 00"
Magnetic north correct 1975 - annual change easterly by 0.4°

Sheet B
Sheet A
Sheet D
Index to adjoining sheets

5 cm

456122

CHEMLABS REPORT: ANALYSIS OF HUMUS SAMPLES, SEPTEMBER 1975 76-1168

COMINCO EXPLORATION PTY. LTD.

Drawn by KERD
Checked by
Traced by

NORTH WEST TASMANIA 0 042
MACKINTOSH EL 2/70 - HATFIELD E.L. 15/73

STREAM HUMUS

Location code K55/6/44
Scale 1 10000
Date MAY 1976
Plate DT 66 A

E.L. 15/70

E.L. 2/70

Mathinna Highway

2200

2300

2100

1800

387000 E | 388000 E | 389000 E | 390000 E | 391000 E | 392000 E | 393000 E | 394000 E | 395000 E

5400 000 N

9000 N

8000 N

7000 N

6000 N

5395000 N

iron / manganese ○ copper / lead / zinc

all µg/g except iron (%)

Base sheet and contours enlarged from 1:31,680 Tasmanian Lands Dept. Topo. Contour interval 50 feet.

Index to adjoining sheets: Sheet C; Sheet B; Sheet A

5 cm

456123

CHEMLABS REPORT: ANALYSIS OF HUMUS SAMPLES, SEPTEMBER 1975 76-1168

COMINCO EXPLORATION PTY. LTD.

Drawn by KERD | Traced by

Checked by

NORTH WEST TASMANIA
DUNDAS TROUGH

043

STREAM HUMUS

Location code K55/6/44 | Scale 1 10,000 | Date MAY 1976 | Plate DT 66 B

E.L. 15/73

E.L. 2/70

E.L. 5/74

Mt. Charter

GOLD HILL

See Note re this Area

Ridgedoc River

ML 3m/75

ML 2m/75

ML 4m/75

5 cm

Main road
Secondary road
Track
Railway
Abandoned railway
Power trasmission line
Fence
Mine

Quarry or pit
Trig station
River, creek
Survey line
Tenure boundary
Dip and strike of bedding
Dip and strike of cleavage

Tb Tertiary Basalt

Jurassic (?) Dolerite – Diorite

Ordovician – Conglomerate, grit, sandstone

Cambrian – Dacite-Rhyolite lavas and pyroclastics with visible quartz (commonly) light grey-cream or orange colourations. Intrusions shown + overprint

Mica sandstones, grits Dark greenish brown when fresh, light grey in o/c

Sholes (black, grey)

Breccia (Sedimentary)

Cherts (blue-grey, white black)

Andesite – Basalt (lavas, lithic tuffs, agglomerates, lava breccias) Typically green / intrusions shown + overprint

Scoriaceous and coarsely vesicular (>3mm) andesite – basalt lavas

Cambrian – Intermediate to acid (dacite-rhyolite) lavas and pyroclastics within andesite sequence (includes DTL, MTL, GP mine groups) Typically pink light red brown to fawn coloration

Altered (sericite-carbonate-chlorite) and pyritic fragmentals and lavas (Hyb of mine sequence) Blue grey colour when fresh

—L— Photo lineament
—F— Interpreted Fault
—LG— Geophysical lineament
—LC— Geochemical lineament
(P) Pyrite and/or base metal occurence
(M) Magnetite occurence

STATE G.N. M.N. COMINCO G.N.
13° 24' 24" 8° 41'00"
Magnetic north correct 1975 - annual change easterly by 0.4°

Index to adjoining sheets

	Sheet B	Sheet F
	Sheet A	
	Sheet D	

Map compiled from fact geology, (1971-76 mapping) soil geochemistry and Induced Polarisation data

NB. For detailed Interpretation of Ore Bearing Zone between 7300N - 7900N, refer to Drwg No QR 83 at scale 1:2500

COMINCO EXPLORATION PTY. LTD.

Drawn by E H S	Traced by R J E	456124 NORTH WEST TASMANIA	76-1168
Checked by		DUNDAS TROUGH : 044	
		MACKINTOSH E.L 2/70 - HATFIELD E.L 15/73	
		Preliminary Interpretive Geology	
Location code K55/6/44		Scale 1 10000	Date June, 1976	Plate DT62A

387000 E | 388000 E | 389000 E | 390000 E | 391000 E | 392000 E | 393000 E | 394000 E | 395000 E

5400 000 N

9000 N

8000 N

7000 N

6000 N

5395000 N

Mackintosh Highway

E.L. 15/73

E.L. 2/70

Tb

F

5 cm

N.B. For details of Legend refer Drwg. No. DT62A

Index to adjoining sheets

Sheet C | Sheet B | Sheet A

COMINCO EXPLORATION PTY. LTD.

76-1168

Drawn by E.H.S. | Traced by R.J.E.

Checked by

456125 NORTH WEST TASMANIA
DUNDAS TROUGH 045
MACKINTOSH E.L.2/70 - HATFIELD E.L. 15/73

Preliminary Interpretive Geology

Location code K55/6/44 | Scale 1:10,000 | Date June, 1976 | Plate DT62B

387000 E | 388000 E | 389000 E | 390000 E | 391000 E | 392000 E | 393000 E | 394000 E | 395000 E

5390000 N

9000 N

8000 N

7000 N

6000 N

5385000 N

E.L. 15/73

E.L. 2/70

E.L. 5/74

Mackintosh River

PEARCE'S COPPER REWARD

5 cm

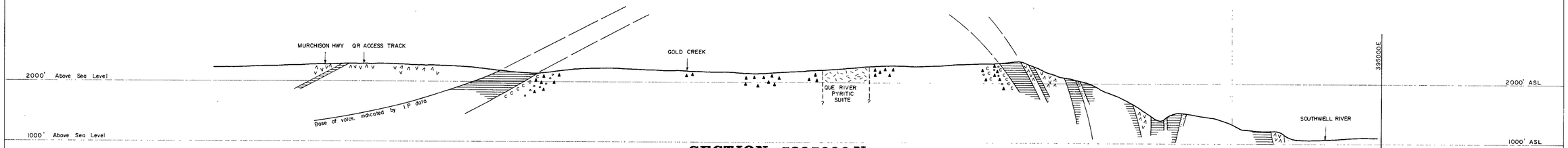
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NB For details of Legend refer Drwg No DT62A

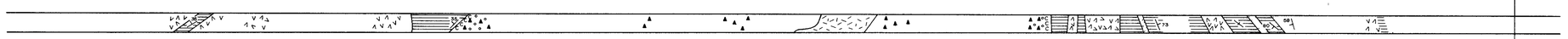
Index to adjoining sheets

Sheet A | Sheet D | Sheet E

COMINCO EXPLORATION PTY. LTD.		
Drawn by E.H.S	Traced by R.J.E	NORTH WEST TASMANIA 76-1468. 046
Checked by		DUNDAS TROUGH
		MACKINTOSH E.L 2/70 - HATFIELD E.L 15/73
		Preliminary Interpretive Geology
Location code K55/6/44	Scale 1 10,000	Date June, 1976	Plate DT62D



SECTION 5395000 N



PLAN

— LEGEND —

- Rhyolitic volcanics (quartz, feldspar porphyries, crystal tuffs, lithic tuffs, agglomerates
- Carbonaceous, locally graphitic, pyritic shales, siltstones also in Southwell catchment
- Mica sandstones, grit
- Andesitic (basaltic) volcanics (lava-breccia agglomerates)
- Vesicular to scoriaceous andesites (dacites?)
- Cherts (pyritic locally)
- Pyritic Pyroclastic suite of Que River zone

5 cm

456127

Cominco Exploration Pty Ltd

Drawn by EHS	Traced by RJE	NORTH WEST TASMANIA 76-1168.
Checked by		MACKINTOSH & HATFIELD AREA 047
		Interpretive Cross Section through 5395000 N
Location code K55/6/44		Scale Vert & Horiz 1:10,000 | Date June, 1976 | Plate DT63

8500 N

8000 N

7500 N

7000 N

6500 N

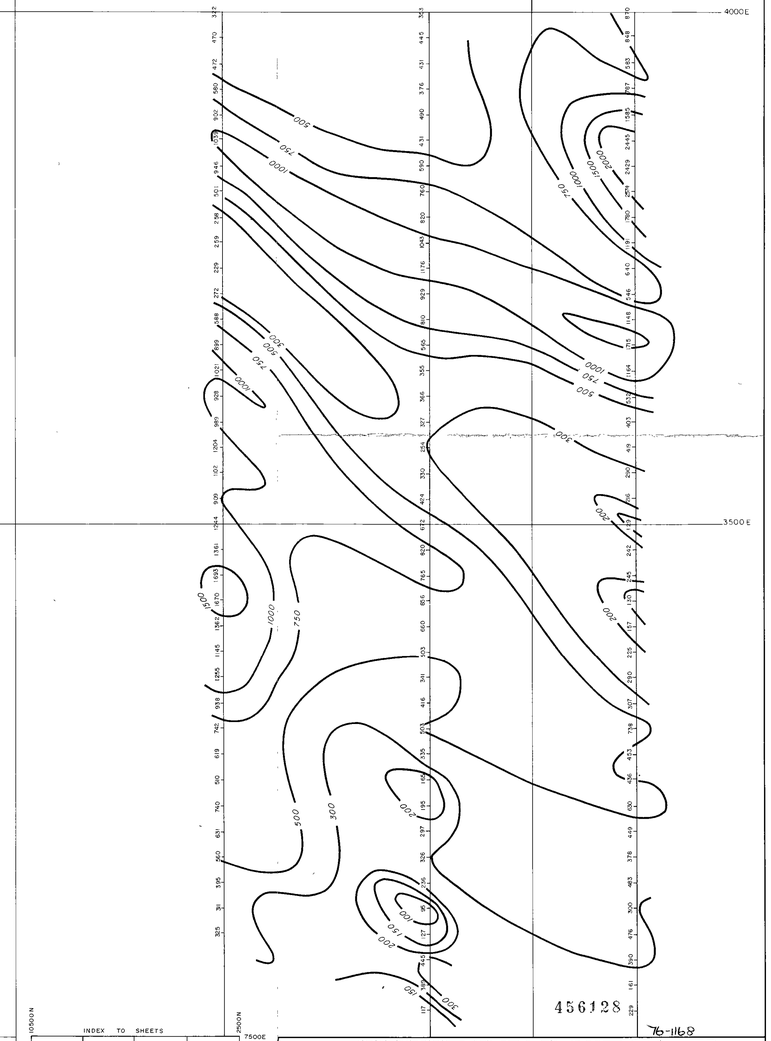
4500 E

4000 E

3500 E

3000 E

E.L. 2/70
E.L. 15/73



456128

76-1169

5 cm

INDEX TO SHEETS

G	F	E	K
H	A	D	L
J	B	C	M
R	Q	P	N

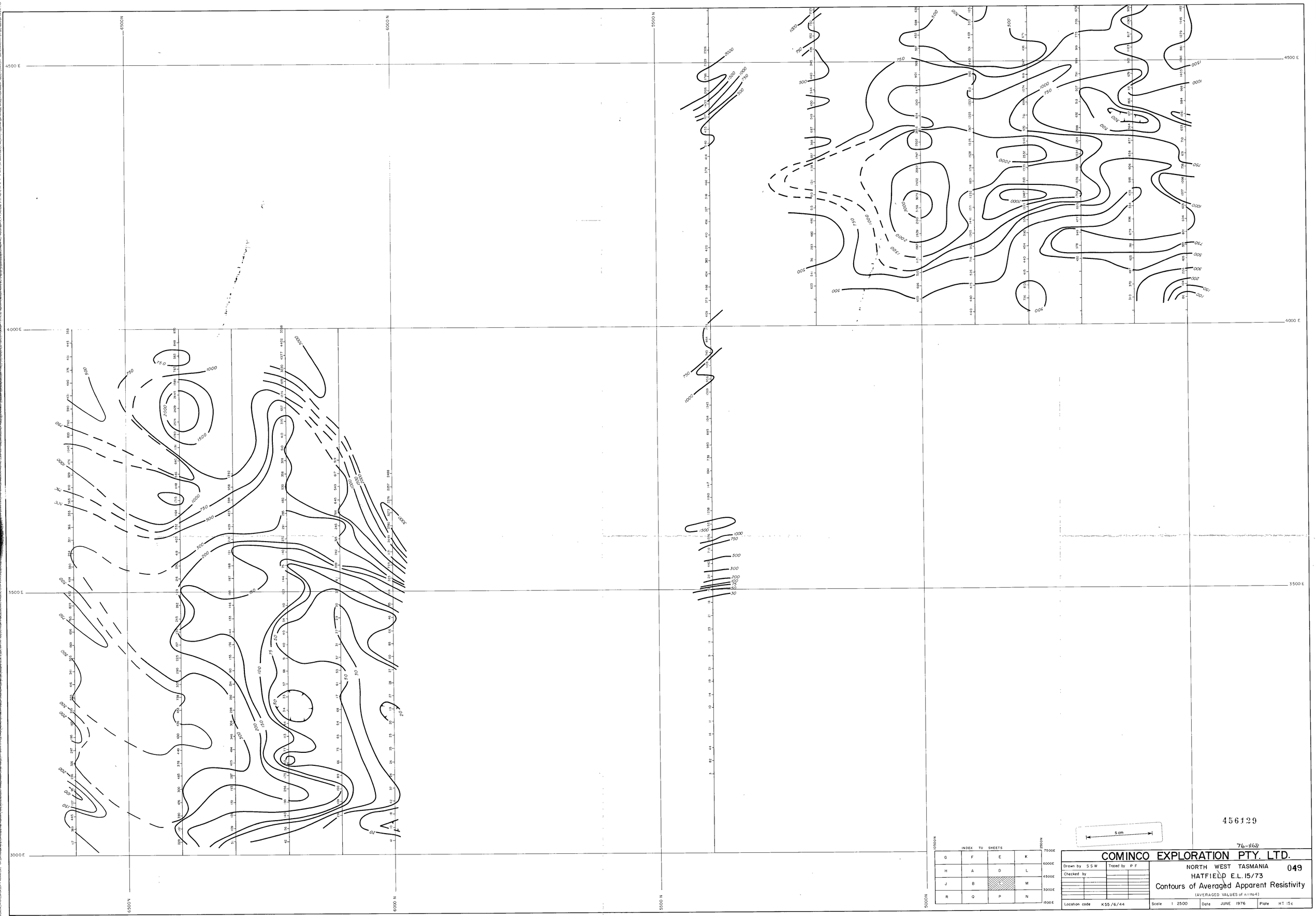
10500 N — 7500E
6000E
4500E
3000E
1500E — 7000 N

COMINCO EXPLORATION PTY. LTD.

Drawn by S S W | Traced by P F
Checked by

NORTH WEST TASMANIA 048
HATFIELD E.L. 15/73
Contours of Averaged Apparent Resistivity
(AVERAGED VALUES of n = 1 to 4)

Location code K55/6/44 | Scale 1 : 2500 | Date JUNE 1976 | Plate HT 15b



456129

76-1168

COMINCO EXPLORATION PTY. LTD.

Drawn by S S W | Traced by P F

Checked by

NORTH WEST TASMANIA 049

HATFIELD E.L. 15/73

Contours of Averaged Apparent Resistivity

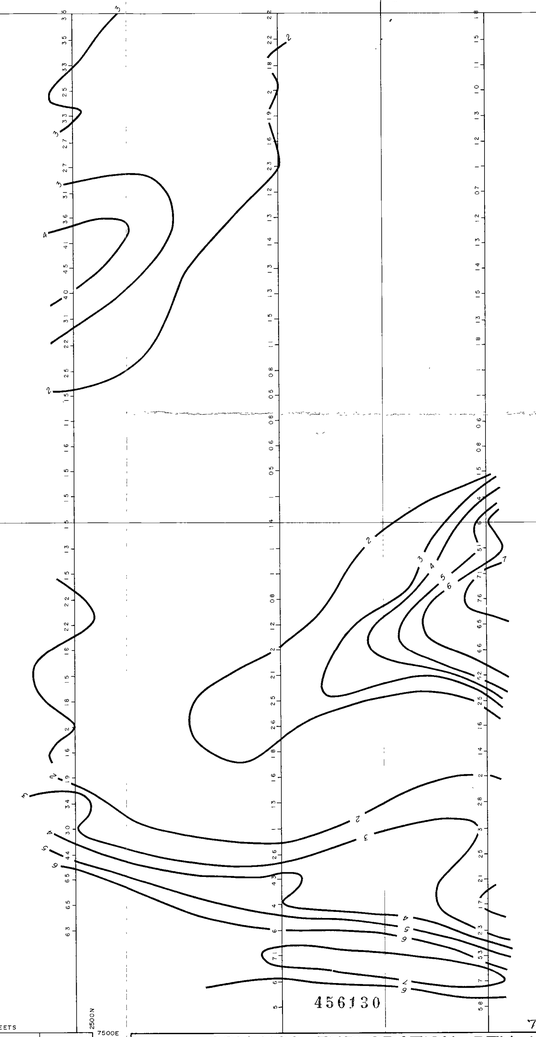
(AVERAGED VALUES of n=1to4)

Location code K55/6/44 | Scale 1 2500 | Date JUNE 1976 | Plate HT 15c

E.L.2/70
E.L.15/73

9500 N
8500 N
6000 N
8000 N
7500 N
7000 N
6500 N

4500 E
4000 E
3500 E
3000 E



5 cm

INDEX TO SHEETS

G	F	E	K
H	A	D	L
J	B	C	M
R	Q	P	N

10500 N
7000 N
7500 E
6000 E
4500 E
3000 E
1500 E

456130

76-1165

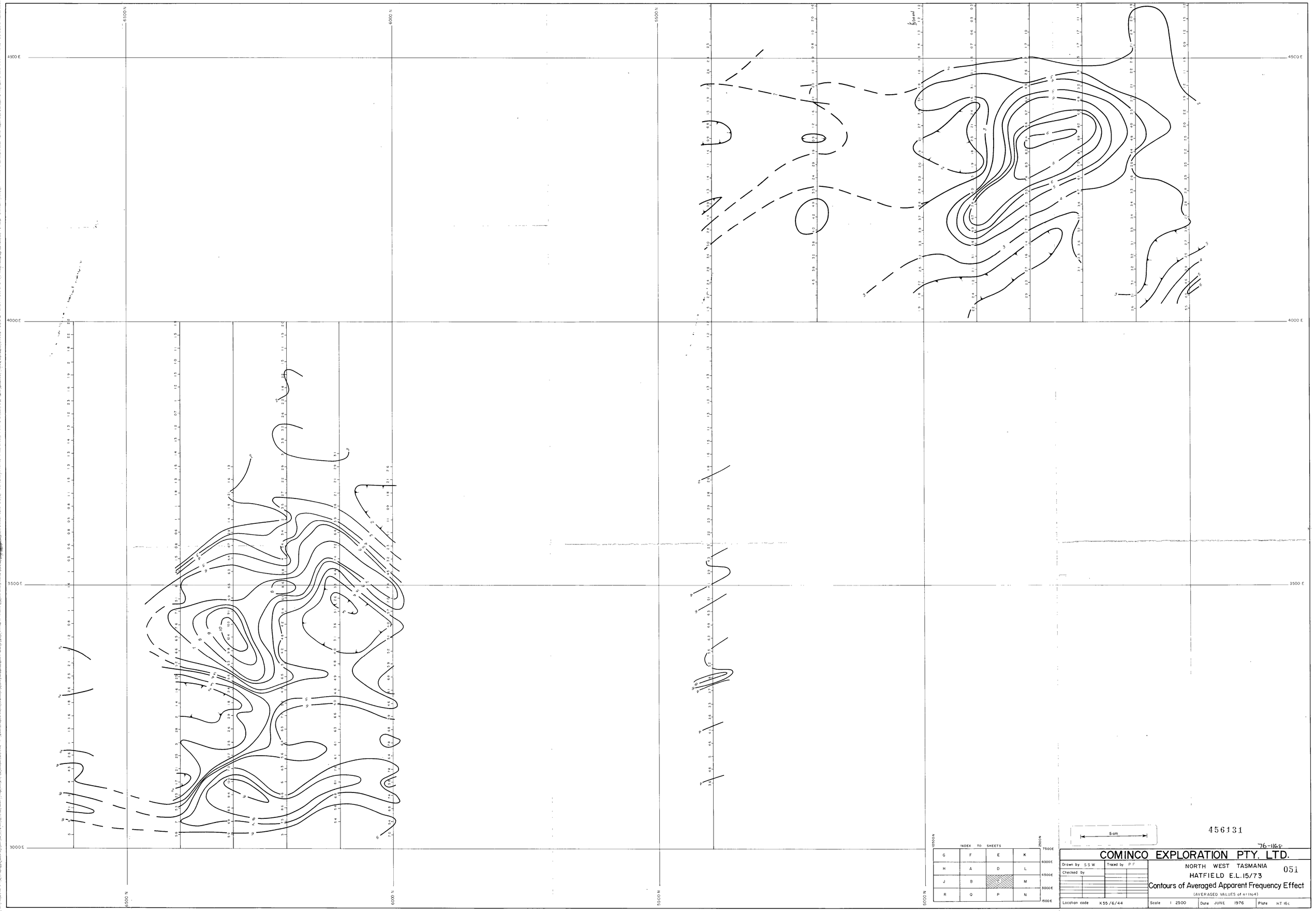
COMINCO EXPLORATION PTY. LTD.

Drawn by S.S.W. | Traced by P.F.
Checked by

NORTH WEST TASMANIA
HATFIELD E.L.15/73
Contours of Averaged Apparent Frequency Effect
(AVERAGED VALUES of n = 1 to 4)

050

Location code K55/6/44 | Scale 1:2500 | Date JUNE 1976 | Plate HT 16b



INDEX TO SHEETS

G	F	E	K
H	A	D	L
J	B	C	M
R	Q	P	N

10500N 2500N
7500E 6000E 4500E 3000E 1500E

5 cm

456131

76-1165

COMINCO EXPLORATION PTY. LTD.

Drawn by S.S.W. | Traced by P.F.
Checked by

NORTH WEST TASMANIA 051
HATFIELD E.L.15/73
Contours of Averaged Apparent Frequency Effect
(AVERAGED VALUES of n=1to4)

Location code K55/6/44 | Scale 1 2500 | Date JUNE 1976 | Plate HT 16c

4200 E | 4300 E | 4400 E | 4500 E | 4600 E

00 RL

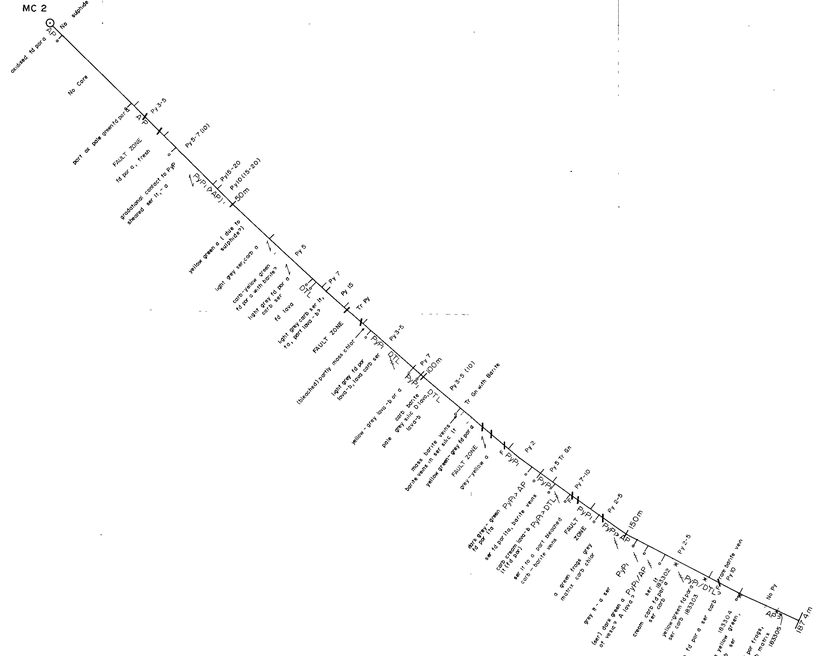
-100 RL

-200 RL

-300 RL

4260

MC 2


Py5-7.(01)
Py5-20
Py5(15-20)
Py 5
Py 7
Py 5
Py 7
Py 5
Py 7

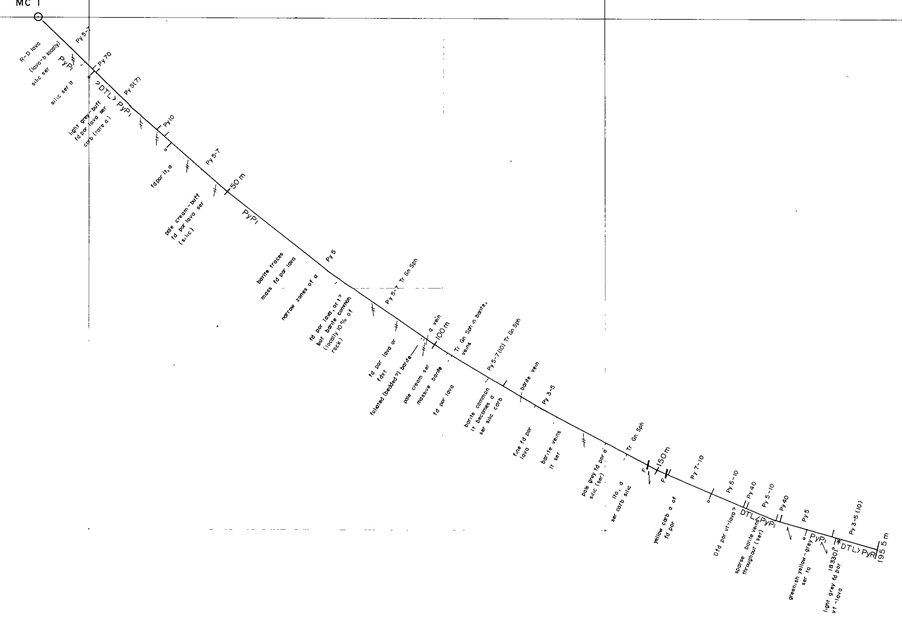
4200 E | 4300 E | 4400 E | 4500 E | 4600 E

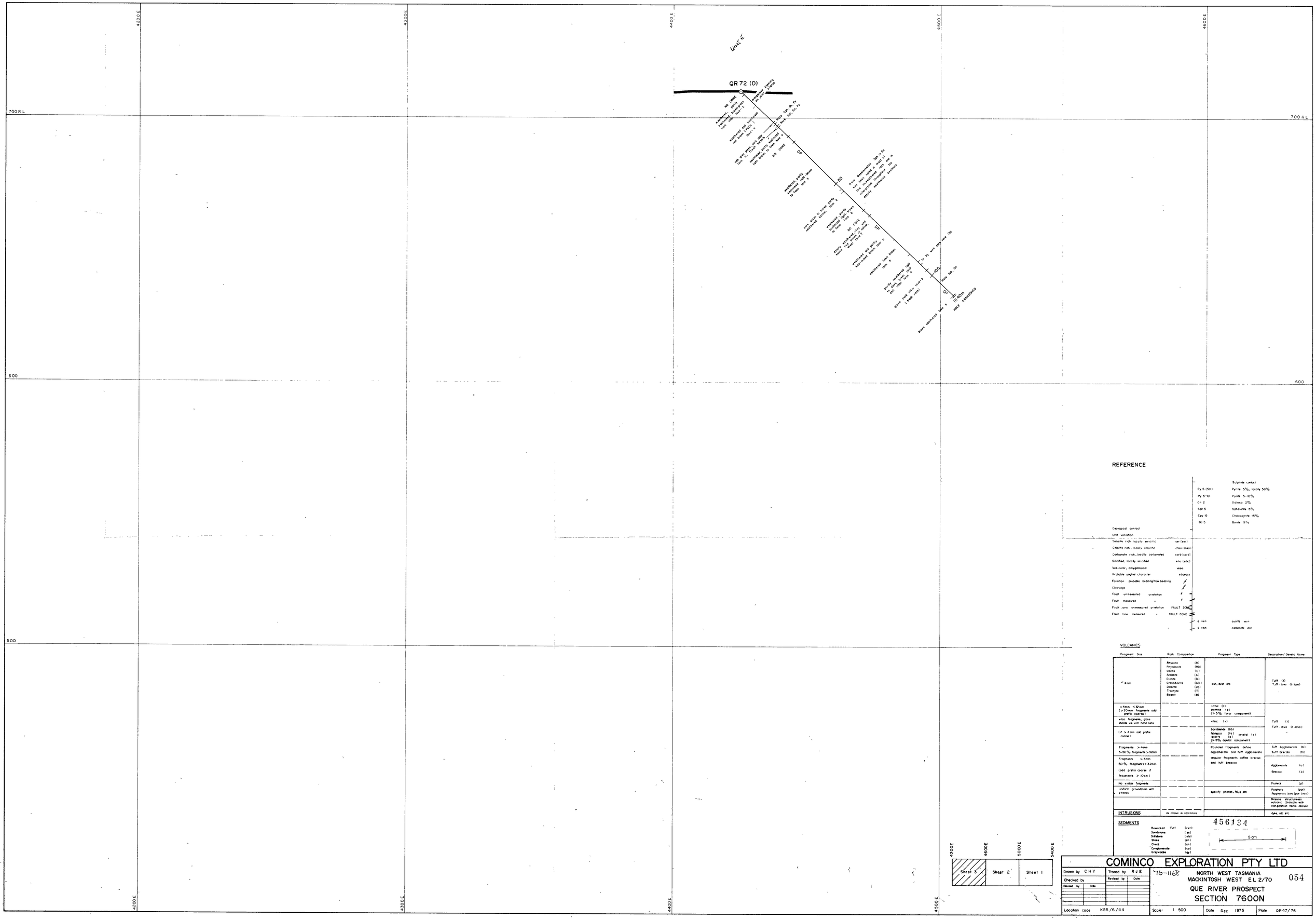
00 RL

-100 RL

-200 RL

-300 RL





REFERENCE

	Sulphide content
Py 5 (50)	Pyrite 5%, locally 50%
Py 5-10	Pyrite 5-10%
Gn 2	Galena 2%
Sph 5	Sphalerite 5%
Cpy 15	Chalcopyrite 15%
Bo 5	Bornite 5%
Geological contact	
Unit variation	
Sericite rich, locally sericitic	ser (ser)
Chlorite rich, locally chloritic	chlor (chlor)
Carbonate rich, locally carbonated	carb (carb)
Silicified, locally silicified	silic (silic)
Vesicular, amygdaloidal	vesic
Probable original character	siliceous
Foliation probable bedding/flow bedding	
Cleavage	
Fault unmeasured orientation	F
Fault measured "	F
Fault zone unmeasured orientation	FAULT ZONE
Fault zone measured "	FAULT ZONE
q vein	quartz vein
c vein	carbonate vein

VOLCANICS

Fragment Size	Rock Composition	Fragment Type	Descriptive / Generic Name
< 4 mm	Rhyolite (R) Rhyodacite (RD) Dacite (D) Andesite (A) Diorite (Di) Granodiorite (GDi) Dolerite (Do) Trachyte (T) Basalt (B)	ash, dust etc	Tuff (t) Tuff - lava (t-lava)
> 4 mm < 32 mm (> 20 mm fragments add prefix coarse)		lithic (l) pumice (p) (> 5% for p component)	Tuff (t) Tuff - lava (t-lava)
vitric fragments, glass shards ve with hand lens		vitric (v)	
(if > 4 mm add prefix coarse)		hornblende (hbl) feldspar (fs) crystal (x) quartz (q) (> 5% crystal component)	
Fragments > 4 mm 5-50% fragments > 32mm		Rounded fragments define agglomerate and tuff agglomerate	Tuff Agglomerate (ta) Tuff Breccia (tb)
Fragments > 4 mm 50 % fragments > 32mm (add prefix coarse if fragments > 10 cm)		angular fragments define breccia and tuff breccia	Agglomerate (a) Breccia (b)
No visible fragments			Pumice (p)
Uniform groundmass with phenos		specify phenos, ft, q, etc	Porphyry (por) Porphyritic lava (por lava)
			Massive structureless volcanic (indicate with composition name above)
INTRUSIONS	as above ex volcanics		dyke, sill, etc

SEDIMENTS

Reworked Tuff	(rwt)
Sandstone	(ss)
Siltstone	(sts)
Shale	(sh)
Chert	(ch)
Conglomerate	(cg)
Greywacke	(gy)

456134

5 cm

COMINCO EXPLORATION PTY LTD

Drawn by C H Y	Traced by R J E	76-1168	NORTH WEST TASMANIA MACKINTOSH WEST EL 2/70 054 QUE RIVER PROSPECT SECTION 7600N
Checked by	Revised by Date		
Revised by Date			
Location code K55/6/44	Scale 1 500	Date Dec 1975	Plate QR47/76

E.L. 15/73

E.L. 2/70

E.L. 5/74

Bulgobac River

Murchison Highway

GOLD HILL
(South)

△ Mt. Charter

387000 E
388000 E
389000 E
390000 E
391000 E
392000 E
393000 E
394000 E
395000 E

5395000 N
4000 N
3000 N
2000 N
1000 N
5390000 N

9000N
9400N
8000N
8200N
8400N
7000N
7400N
6000N
6400N
5200N
5400N
4800N
4200N
3800N
4000N
3400N

3700 E
4300 E
5300 E
7000 E

Main road
Secondary road
Track
Railway
Abandoned railway
Power trasmission line
Fence
Mine

Quarry or pit
Trig. station
River, creek
Survey line
Tenure boundary

I.P. COVERAGE

a = 100m
a = 50m
a = 25m
Grid
a = 200m

STATE GN
M.N
COMINCO GN
13° 24' 26"
8° 41' 00"

Magnetic north correct 1975
- annual change easterly by 0.4°

	Sheet B	Sheet F
	Sheet A	
	Sheet D	

Index to adjoining sheets

5 cm

·456135

76-1168

COMINCO EXPLORATION PTY. LTD.

Drawn by RMSW | Traced by RKY

Checked by

NORTH WEST TASMANIA
DUNDAS TROUGH
055

Que River Prospect
Summary Map of I.P. Coverage

Location code K55/6/44 | Scale 1:10000 | Date July 1976 | Plate QR 88 A

387000 E | 388000 E | 389000 E | 390000 E | 391000 E | 392000 E | 393000 E | 394000 E | 395000 E

5400 000N

9000 N

8000 N

7000 N

6000 N

5395000 N

Murchison Highway

E.L. 15/73

E.L. 2/70

9300 E

10,000N

9400 N

7300 E

5 cm

456136

I.P. COVERAGE

- a = 100m
- a = 50m
- a = 25m
- Grid
- a = 200m

Index to adjoining sheets

Sheet C
Sheet B
Sheet A

COMINCO EXPLORATION PTY. LTD.

Drawn by RMSW	Traced by RKY	76-1168
Checked by		
Location code K55/6/44		

NORTH WEST TASMANIA
DUNDAS TROUGH
Que River Prospect
Summary Map of I.P. Coverage

058

Scale 1 10,000 | Date July 1976 | Plate QR88 b

GEOLOGICAL LEGEND & COLOUR CODE

DERWENT SERIES

Nº	CODE	NAME	ROCK COLOUR	ALTERATION	INTERPRETED COMPOSITION	TEXTURE	SULPHIDES
48	AP	ANDESITIC PYROCLASTICS	Green	Chlorite (carbonate)	Andesite - Basalt	lfdpxhbxt/lta, lfdhbxt, lta, vesic lava - b	Pyrite ≤ 1% rare traces base metals
59	DTL	DACITIC TUFF-LAVA	Buff-pink, partly green also light grey	Weak sericite, rich carbonate	Dacite - (rhyolite?)	fdxt - lava, lava-b, some vesic	Pyrite generally < 2% locally 10%
64	MTL	MAGNETITE BEARING TUFF-LAVA	Mid - dark brown	Carbonate	Dacite (?)	fine t-lava, fdxt - lava	Pyrite < 1%
46	GP	GREEN PYROCLASTICS	Off white to blue grey, characteristic brilliant green spotting	Sericite, carbonate, green illite - hydromuscovite	Dacite	lta, vesic fragments	Pyrite < 3%
6	PyP_1	PYRITIC-PYROCLASTICS (grouped - PyP - on summary plans)	Blue grey	Sericite, carbonate silica, chlorite	Probably dacite	lt, ta, fdxt	Py 5%, also stringer Sph, Gn, Cpy
27	PyP_2		Grey off white to orange	Sericite, carbonate silica, chlorite	Probably dacite	lfdxt, ta, a	Py 5% rare stringer mineralization
11	PyP_3		Green, yellow-green often mottled	Sericite, carbonate silica chlorite	Probably dacite	l, lt, ta, often vitric, some vesic	Py 3-5%, including stringer mineralization

SULPHIDES

12	Greater than 5% combined base metals (Cu, Pb, Zn)
29	Massive Pyrite >60%
32	Pyrite 25% - 60%
33	Pyrite 10% - 25%

NOTE

1) Since a number of the groups defined above represent alteration it will be apparent that intermediate types occur.

2) Within PyP_1 some units contain a large number of typical DTL fragments.

3) PyP_2 is pyritised, bleached, sericitised and carbonated. Texturally similar to some AP types with shredded carbonate rich lithic fragments containing orange brown phenocrysts.

AP — Limit of ANDESITIC PYROCLASTICS, plotted on Drill Hole

DRILL HOLE TRACE

	Sulphide contact
Py 5 (50)	Pyrite 5% locally 50%
Py 5-10	Pyrite 5-10%
Gn 2	Galena 2%
Sph 5	Sphalerite 5%
Cpy 15	Chalcopyrite 15%
Ba 5	Barite 5%

Geological contact		
Unit variation		
Sericite rich, locally sericitic	ser (ser)	
Chlorite rich, locally chloritic	chlor (chlor)	
Carbonate rich, locally carbonated	carb (carb)	
Silicified, locally silicifield	silic (silic)	
Vesicular, amygdaloidal	vesic	
Probable original character - eg -	siliceous	
Foliation probable bedding / flow bedding		
Cleavage		
Fault unmeasured orientation	F	
Fault measured orientation	F	
Fault zone unmeasured orientation	FAULT ZONE	
Fault zone measured orientation	FAULT ZONE	
q vein		quartz vein
c vein		carbonate vein

VOLCANICS CLASSIFICATION

FRAGMENT SIZE	ROCK COMPOSITION	FRAGMENT TYPE	DESCRIPTIVE / GENETIC NAME
< 4 mm	Rhyolite (R), Rhyodacite (RD), Dacite (D), Andesite (A), Diorite (Di), Granodiorite (GDi), Dolerite (Do), Trachyte (T), Basalt (B)	ash, dust, etc.	Tuff (t), Tuff-lava (t-lava)
> 4 mm < 32 mm (> 20 mm fragments add prefix coarse)		lithic (l), pumice (p), (> 5% l or p component)	
vitric fragments, glass shards visible with hand lens		vitric (v)	Tuff (t), Tuff-lava (t-lava)
(if > 4 mm add prefix coarse)		pyroxene (px), hornblende (hb), feldspar (fd) crystal (x), quartz (q), (> 5% crystal component)	
Fragments > 4 mm, 5-50% fragments > 32 mm		Rounded fragments define agglomerate and tuff agglomerate	Tuff Agglomerate (ta), Tuff Breccia (tb)
Fragments > 4 mm, 50% fragments > 32 mm (add prefix coarse if fragments > 10 cm)		angular fragments define breccia and tuff breccia	Agglomerate (a), Breccia (b), Lava Breccia (lava-b)
No visible fragments			Pumice (p)
Uniform groundmass with phenos		specify phenos, fd, q, etc.	Porphyry (por), Porphyritic lava (por lava)
			Massive structureless volcanic (indicate with composition name above)
INTRUSIONS	as above in volcanics		dyke, sill, etc.
SEDIMENTS			
Reworked Tuff (rwt), Sandstone (ss), Siltstone (sts), Shale (sh), Chert (ch), Conglomerate (co), Greywacke (gy)			

5 cm

COMINCO EXPLORATION PTY. LTD.

NORTH WEST TASMANIA

QUE RIVER PROSPECT

GEOLOGICAL LEGEND

	DRAWN	CHECKED	REVISED	DATE
	J I H		D M R	25-1-76
			E H S	25-1-76
			C H Y	25-1-76

Location Code

Scale

Date

Plate QR 84

057

456137

76-1168