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Report No. TAS/9

DECEMBER, 1977

PREUSSAG

Preussag Australia Proprietary Limited

PREUSSAG AUSTRALIA PROPRIETARY LIMITED

COMSTAFF JOINT VENTURE

TASMANIA - AUSTRALIA

PROGRESS REPORT ON THE PINNACLES AREA

VOLUME I - TEXT

GERHARD KRUMMEI

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PROGRESS REPORT ON THE

PINNACLES AREA

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TASMANIA, AUSTRALIA

PROGRESS REPORT ON THE

PINNACLES AREA

VOLUME III - ILLUSTRATIONS

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ILLUSTRATIONS

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SUMMARY.

A programme of exploration comprising mapping, costeaning, trial PEM and limited diamond drilling was undertaken at the Pinnacles.

Lithological varieties, structural complexities and base metal distribution are typical to many other volcanogenic environments. Soft sediment deformation is common. The Zn-Pb-Cu mineralization can be categorized into:

i) Net vein fracture-type : epigenetic or syngenetic remobilized

ii) Associated with chert and silicification : sub-volcanic or bedded

iii) Massive, banded : bedded syngenetic and synvolcanic guides to ore include lithology, stratigraphy, alteration as well as geochemical and possibly I. P. and S. P. responses.

The Pinnacles and Thomas's Lode Systems are the main lenses of interest but their aggregate tonnage and grades are uneconomic at present, but further avenues for exploration exist.

The setting of the cherty, bouldery, slumped sulphide-bearing lodes can be interpreted as part of an exhalative field on the flanks and close to a zone of extrusive vents adjacent to an open basin. Mechanical transport by slumping and rafting of accumulated base metal sulphides triggered by seismic activity associated with explosive volcanism and aided by gravity sliding may account for many of the features observed in the lode horizons exposed.

A possible intravolcanic basin is interpreted to lie N.E. of the Pinnacles, which may offer suitable loci for the deposition of a Rosebery-type deposit.

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1. INTRODUCTION.

1.1. This report relates to geological investigations and data compilation within the area of The Pinnacles Metric Grid (PMG) between grid lines 10S/10W-20W and 28S/10W-20W. Aspects of geology peripheral to the grid were also examined to assist with the solution of specific structural, lithological or correlation problems in order to facilitate eventual tie-in of the prospect geology with that of the nearby Chester East and Chester Grids.

The bulk of the field work on this project was undertaken between December 1976 and end-February 1977, with subsequent minor and limited field checks of core and geology so as to narrow down interpretive freedom.

Office compilation and interpretation of assembled data, accompanied by intermittent literature search, was in progress between May and December, 1977. The latter was supplemented by discussions relating to palaeogeographic settings of volcanic breccia ores in an attempt to obtain indications of the possible genetic origin, source and continuation of the flow-pyroclastic-associated base metal mineralization at Pinnacles, and the relationship of such mineralization to bedded ores of the Rosebery-type.

1.2. Objectives.

The overall objective of the programme was:

i) the interpretation of the geology of the Pinnacles Prospect;

ii) to achieve an understanding of the palaeogeographic setting of the Pinnacles Prospect;

iii) an interpretation of the prospect's relationship to the nearby Chester and Chester-East areas and the Zn-Pb deposits of the Rosebery district.

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The terms of reference towards this aim consisted of:

a) emphasis on structure;

b) check on the lithologies of the prospect;

c) detailed mapping of recent costeans;

d) detailed mapping of some old workings;

e) investigation of the relationship of base metal mineralization to geology;

f) interpretation of the palaeo-environment of the prospect.

Subsidiary to this were:-

a) confirmation of the suitability of drilling three (3) shallow holes into the Pinnacles Lode in the Main South Trench area;

b) proposal of other drill sites and/or other work.

Available previous geological, geochemical and geophysical information on the prospect was reviewed. The latter two often provided data which successfully guided geological interpolation and extrapolation over short distances.

The following were completed in addition to the main programme, so as to achieve better two- and three-dimensional geological correlation:

a) Brown's, McGuiness's and several other small excavations were located, cleared and, in most cases, mapped and sampled;

b) costeans were excavated on 16S/10.2W - 11.8W
17S/14.8W - 17.2W
19S/15.6W - 18. W

These were mapped and sampled;

c) costeans 12.8W/22S as well as part of the access track from costean 20S/11W to 18S/11W was rehabilitated to obtain better exposure of bedrock;

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d) most access tracks throughout the prospect were mapped;

e) check mapping was undertaken along all grid lines and tie lines;

f) drill core from holes CP1, 2, 2A, 7, 8, 9, 10, 12, 13 and 14 was examined primarily for facing data and type of mineralization, main lithologies and alteration.

1.3. Sources of Information.

Apart from references cited, the following provided additional useful information:

a) mapping by R. Smith of Comstaff;

b) discussions with Comstaff personnel;

c) petrological descriptions by Central Mineralogical Services;

d) Comstaff drill logs for Pinnacles series of CP drill holes;

e) EZ drill logs for the PP series of drill holes at Pinnacles by the EZ Company.

Base maps and topographic sections provided at 1:2000 by Comstaff were computer corrected plots of tape-and-compass plan and elevation surveys of the PMG grid formerly undertaken by field hands. Survey precision limits were relatively poor ($\pm 5^{o}$). As a result of this crude data input, mathematical corrections of survey data seem inadequate. This results in a number of cases where differences exist in horizontal distances between plan and ground truth, giving distortion of real angular and spatial relationships on the computer-prepared plans and sections. As the precision implicit in computer output may not apply, caution is required in the use of these maps, particularly for detailed geological work and drill hole planning. This problem is further compounded by the occasional incorrect station flagging on the ground.

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1.4. Location, Physiography and Climate.

The prospect is located in N. W. Tasmania in rugged but relatively open terrain. It lies 8 Km west of the Murchison Highway, approximately 75 Km south of the port of Burnie and about 10 Km north of the mining town of Rosebery. The recently discovered Que River polymetallic synvolcanic base metal deposit is located approximately 18 Km to the North East.

The eastern part of the grid covers the steep eastern flanks of Burns Peak (approximately 661m a.m.s.l.), the highest and northernmost of the Pinnacles line of peaks. Most of the base metal sulphide mineralization known to-date lies near the base of the western flank of this hill where it passes into a glacial swamp on the north and west.

The southern and western flanks are steeply dissected by small tributaries to the south-flowing Marionoak River located just beyond the present western boundary of the PMG grid.

Residual and mixed residual/colluvial soils occur on the eastern flanks of Burns Peak within the PMG grid. Most of the western flanks of the prospect area covered by strongly leached and bleached talus debris and colluvium often overlain by a humic layer up to 40 cm thick. Morainic, fluvio-glacial and possibly glacial lacustrine sediments in places at least 3m thick blanket most of the north-west and central-west of the grid (ca. 30% of the gridded prospect area). Mixed residual soils and cappings of remnant glacial material are found in the south-west.

Open button-grass or low scrub with occasional clumps of relic eucalypt forest are characteristics of the central part of the area. This is fringed to the north, west and south-west by rain forest with patchy horizontal scrub and thick re-growth.

The area is exposed to the prevailing south-westerly winds, but rainfall, estimated at about 2,000 mm p.a., appears slightly lower than that for the surrounding district.

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1.5. Access and Infrastructure.

Year-round access to the prospect by 4-wheel drive vehicle is via a bulldozed track westward from the sealed Murchison Highway (8 Km) or northward via the bulldozed Chester track (by 4-wheel drive only) from the newly constructed Hydro-Electric Commission (H.E.C.) gravel road south of Chester (5 Km). (Fig. 1).

Nearest population centres are:

Tullah	(population ca. 1,200)	9 Km SE
Rosebery	(" ca. 5,000)	10 Km S
Waratah	(" ca. 400)	25 Km N

Rosebery offers the normal range of basic infrastructure facilities.

A number of operating mines have been established in this district:

Mt. Farrell Mine (Tullah)	- care and maintenance.
Rosebery Zn-Pb-Cu	- 10 Km S.
Renison Sn	- 15 Km SW.
Cleveland (Luina) Sn, Cu	- 25 Km NW.
Que River Zn-Pb-Cu	- 18 Km NE.: developing

The nearest deep-water port is Burnie (75 Km NNE) on the north coast of Tasmania.

Construction of the Pieman River Power Development Scheme around and west of Tullah (nearest point 6 Km South of prospect) is well advanced. When completed, the scheme will offer cheap electric power to the district for industrial consumption. Three (3) hydro-electric power stations are proposed for completion by 1985:

Station	Start-up Date	Est. Av. Annual Output ($kWhr10^6$)	Distance from Pinnacles
Mackintosh	1981	326	10 Km ESE
Bastyan	1983	370	6 Km S
Lower Pieman	1985	1,074	33 Km W

In addition, the H.E.C. power line for Abminco's Que River Mining Project passes approximately 6 Km E of the prospect.

The private Emu Bay Railway line (owned by E.Z. Co. and servicing the Rosebery Mine) passes 5 Km East of the prospect and links the area with the north coast of Tasmania and Burnie.

The nearest regular commercial airport facilities are at Wynyard (76 Km N).

A small, fair-weather airstrip suitable for single engine planes is situated at Waratah and Zeehan (each approximately 1 hour from the prospect by road).

The prospect area can be reached from Melbourne in three hours by air-road-track.

TENEMENTS.

The prospect lies within E.L. 5/63, part 4, held by Comstaff Pty. Ltd. (Fig. 2). It is subject to renewal at calendar six-monthly periods.

STATISTICAL.

1977 Exploration.

1. Mapping:

grid lines	:	23,000 m
costeans	:	3,478 m
trenches, shafts, drives	:	534 m
tracks	:	7,100 m
		34,112 m

...... /8.

3.2. Costeaning:

costeans cut	:	600 m
costeans restored	:	380 m
access: new and restored	:	400 m
		1,380 m

.3. Geochemistry:

Number of samples:	costean and track	:	115
	old workings	:	34
	drill core	:	447
			596

Analyses for Cu, Pb, Zn, Ag, Ba; ± Au.

Geophysical:

Number of P.E.M. traverses	:	4
P.E.M. distance traversed	:	2,740 m

Diamond Drilling:

Number of holes	:	2
Total length drilled	:	409 m

HISTORY OF EXPLORATION AND MINING.

The early history of development and production in the Pinnacles area is given by McIntosh Reid(1):

1891 : Silver Falls Prospect discovered by J. Lynch et al. (Pb, -Zn, ±Cu).

1896 : Discovery of alluvial gold by Tom Strong (Strong's Alluvial Workings).

1896 : Discovery of Pinnacles Lodes by McGuinness Bros. (Zn, Pb, Cu, Ba).

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1899 : R. T. Brown drives tunnel (Brown's Working) on behalf of Tasmanian Pinnacles Proprietary Ltd; also Excavation of Thomas's Tunnel.

1911 : Granville Mining and Prospecting Association, a syndicate, examined the Silver Falls Prospect; Pb-Zn-Cu in dolomite; discouraging; little development.

1918 : Lynch Creek Prospect discovered by McIntosh Reid. (Siliceous gossan (?after pyrite) with barite and slabs of galena, pyrite).

1947 : Electrolytic Zinc Company creates vehicle access track through the Pinnacles to Silver Falls (30).

1948 -
1949 : E. Z. drilling (13 DDH - small bore) and topo-surveying; E. Z. erects survey beacon on Burns Peak.

1962 : Comstaff acquires exploration tenement over the region which includes the Pinnacles Prospect.

1968 -
1972 : Initial phase of gridding, geochemical sampling, geophysics, mapping, diamond drilling (3 DDH) by Comstaff.

1973 -
1976 : Second phase of detailed exploration including diamond drilling (8 DDH).

late
1976 : Preussag enters Comstaff Joint Venture; further detailed definitive work; 2 drill holes.

NOTE: (1) - numbers in brackets relate to references.

Estimated total early production (to 1918) at the Pinnacles (source: McIntosh Reid).

Area:	Long Tonnes Ore:	Metal Type:
Brown's Working Surface	96	Zn, Pb, Cu, Ag, Au
Brown's Tunnel	193	Zn, Pb, Cu, Ag, Au
Thomas' Tunnel	52	Zn, Pb, Cu, Ag, Au
McGuinness' Workings	5	An, trace,",Ag, Au
Pinnacles lode (S.trench)	55	An, trace,",Ag, Au
Approximate Total :	401	

...... /10.

5. GEOLOGY.

5.1. Regional - N. W. Tasmania.

The regional geology of Western Tasmania is described by Williams, Solomon & Green (2), and up-dated by Solomon, Green & Reid (3).

The major elements of the region are the Pre-Cambrian metamorphosed Tyennan and unmetamorphosed Rocky Cape massifs separated by the broad, arcuate north-trending Dundas Trough which is flanked to the east by the Mt. Read Volcanic Arc. The latter have a complex sedimentary, volcanic and tectonic history which ranges from possible upper Pre-Cambrian times to the Tertiary.

The detailed stratigraphy of the Eo-Cambrian sequences of N. W. Tasmania is still unresolved and under discussion (30, 31, 32, 33, 34, 35, 36, 37, 38).

As understanding of the Lower Palaeozoic Geology of the region grew, the Dundas Trough was variously described as a geosyncline (4), a series of rift valleys (5, 6), a back-arc basin with a west-dipping subduction zone and as a collision site between the two Pre-Cambrian regions following closure of an oceanic basin by subduction down an east-dipping Benioff Zone (7).

The re-interpreted areal extent of the volcanics (150 Km wide belt), the dominance of acidic over intermediate/basic rocks (10:1 approximately) and their chemical composition (especially trace elements Zn, Y and Ti, Co, Ni & Cr) led to the suggestion (7) that the tectonic framework of Mt. Read Volcanics may be of the Andean rather than Island Arc type.

The main Phanerozoic orogenic and deformational event in the region is the Lower Devonian Tabberabberan Orogeny which folded the sediments of the Dundas Trough into an arcuate system of anticlinoria and synclinor trending approximately north-south to NNE over most of Western Tasmania.

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The main metallogenic epochs in the region are:-

i) ?late Proterozoic to early Late Cambrian: massive sulphides associated with volcanic rocks:

- . pyrite-sphalerite-galena-chalcopyrite deposits of Rosebery, Hercules, Que River;
- . pyrite-chalcopyrite-bornite deposits of Mt. Lyell;
- . magnetite-pyrite deposits of Savage River;
- . osmiridium in ultramafic masses:- Heazlewood;

ii) late Devonian - early Carboniferous: associated with granitoids:

- . pyrrhotite - cassiterite - stannite replacement deposits; e.g., Cleveland, Renison, Mt. Bischoff;
- . scheelite in granitoid and aureoles: e.g. King Island;
- . disseminated cassiterite in altered granitic rocks, e.g. Heemskirk;
- . quartz-cassiterite-wolframite veins;
- . silver-lead-zinc fissure veins; Zeehan, Mt. Magnet.

E.L. 5/63 part 4, which contains the Pinnacles Prospect, embraces a prospective segment of the western flank of the Mt. Read Volcanic Arc and adjacent Cambrian sediments.

Regional - Pinnacles Prospect.

The geology of the district is dominated in the East by dacitic and andesitic lavas, tuffs and ignimbrites of the 2200 m thick Mt. Black member of the 4000 m thick Mt. Read Volcanic Group. The lowermost 800 m of the sequence are identified in the Chester Grid where it dips and faces east (8). Occurrences of base metal mineralization (mainly fracture fill or fault controlled) are known (1). A pyritic agglomerate with minor chalcopyrite and underlain by pyritic chert was recently exposed over 100 m in a synclinal structure

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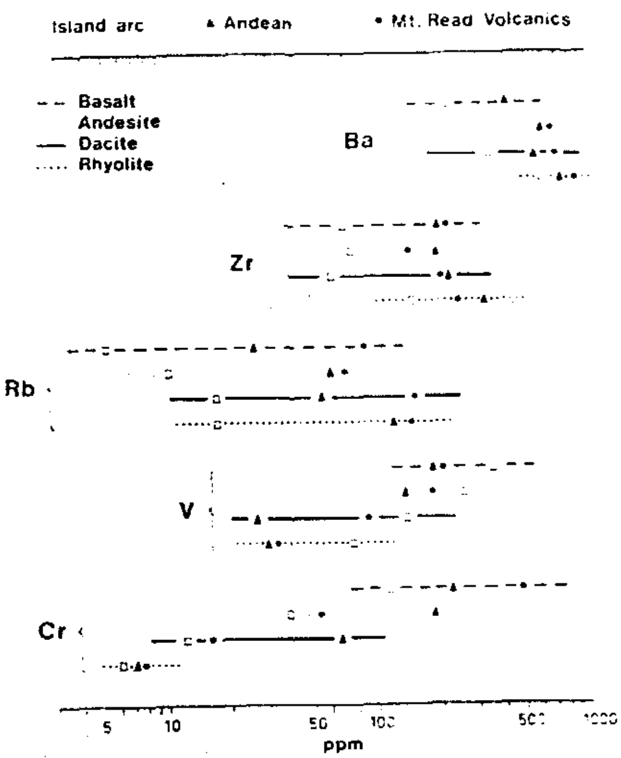

Fig. 6. Average values for Ba, V, Rb, Cr and Zr in island-arc and Andean volcanics and the Mt. Read Volcanics (data from Tables 1 & 2)

in a cutting on the new Hydro-Electric Commission road approximately 5 Km from the Murchison Highway turnoff.

The Upper Pre-Cambrian to Middle Cambrian Primrose Pyroclastics underlie the Mt. Black Volcanics (9, 10). The sequence is folded with generally steep dips.

Younging directions are variable and often inconclusive.
In plan, the exposed thickness of this folded sequence ranges from less than 1 Km up to about 3 Km. Lithologies are highly variable, mainly felsic and range from coarse pyroclastics and agglomerates through vitric lapilli tuffs, crystal tuffs, re-worked tuffs, ashfall tuffs and minor lavas to lenses of fine clastic sediments (shales, siltstones). Shock-induced slumping and pyroclastics flows appear relatively common in some areas. A characteristic feature of the sequence is the frequency of a high degree of widespread sericitic alteration. This sequence contains the Hercules and Rosebery group of massive base metal sulphide deposits (10,11), the Chester pyrite deposit (1), the Pinnacles Prospect and a number of other sulphide occurrences discovered by Comstaff in E. L. 5/63 part 4, whose significance still requires evaluation.

North and north-west of the Pinnacles, the Primrose Pyroclastics pass into and interfinger with more distal, finer grained deeper water sediments consisting mainly of grey shales, black shales, argillites, siltstones, various acid tuffs, re-worked tuffs and air-fall ash beds in a former sedimentary basin. This is now preserved as the Que Syncline which plunges at shallow angles towards the NNE. Graded bedding and slumping are much less evident though they still attest to occasional episodes of seismic instability in the region during deposition.

The Primrose Pyroclastics lie on the western flank of a major north plunging synclinorium suggested by Hall, Cottle et al. (12).

Tightly folded sediments and minor volcanics of the Rosebery Group lie to the west of the Primrose Pyroclastics and time-equivalent sediments. The Group consists of a sequence of banded argillites, shales, quartzite, dolomitic and pyritic shales, thin pebble-conglomerates (green chrome-rich mica), and minor acid volcanic units (2, 8). It is host to minor stratabound base metal mineralization which may be stratiform (e.g. Salmon's) stratiform, remobilized into fissures (New Find (N.F.).

This sequence, which ranges in thickness from 1 - +2000 m in plan, extends at least as far north as the Pinnacles Prospect and possibly beyond. It is correlated with the Middle to Upper Cambrian Dundas Group (2). Lithologically, the Group shows broad local resemblance to some of the volcano-sedimentary units of the Primrose Pyroclastics and the more distal sediments of the Que Syncline. This similarity led Rosebery Geologists (e.g. 9) to postulate an interfingering relationship with the Primrose Pyroclastics.

Recent exposures in H.E.C. cuttings on the Pieman River as well as drill intersections in CP2, CP13, CP15 and costean exposures at Pinnacles clearly indicate that the contact between the Primrose Pyroclastics and the Rosebery Group is a fault (?zone) - the Owen Shear. This fault dips at 35 - 40° to the east at least in the Pieman - Pinnacles sector.

Evidence for direction of movement along the Owen Shear is scanty, ambiguous and inconclusive. At the Pieman H.E.C. cutting, folding immediately below the fault-plane could represent drag and downward movement to the east. However, regional chrono-stratigraphic relationships suggest over-thrusting to the west. A maximum throw of some 1400 m has been suggested (5).

The Crimson Creek Argillites, comprising about 2500 m of folded, fine-grained mudstone coloured deep red or green, with thin bands of pyroclastics or lithic-wacke, minor basaltic pillowed flows and tuffs, dolomitic sandstone and tectonically emplaced ultramafic bodies are thought to stratigraphically underlie the Rosebery Group. The precise relationship of the Crimson Creek Argillites to the Mt. Read Volcanics is not known.

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5.3. Detailed Geology - Pinnacles Prospect.

5.3.1. Lithology.

The major lithological units at the prospect are relatively well known but their relationships are often complex and their identity in outcrop and drill core may often be obscured by intense alteration, weathering, leaching or secondary silicification. (Figs. 3 - 24).

The sedimentary sequences comprise units of black, grey or grey-green interbanded shales, mudstones, argillites, siltstones and occasional chert, with minor sandstones, greywackes and occasional thin pebble conglomerates. Contorted bedding, pull-apart structures and possible sedimentary flow breccias are suggestive of slumping and gravity sliding. Graded bedding, flame structures and current bedding are relatively infrequent and difficult to identify in outcrop; ripple-marks were not observed.

The rocks appear unfossiliferous.

The sedimentary sequences are interbedded and may interdigitate with units of felsic and mafic volcanic rocks. In this case, the shaley or muddy pelitic sediments have a distinctive black colour which often gives way to grey or grey-green tints with distance from the volcanic pile. The suite of felsic rocks includes a high proportion of coarse, poorly sorted flow pyroclastics in a matrix of black mudstone or tuff, lapilli tuffs, crystal and vitric tuff, sericitic schists, re-worked tuffs and ash. Rhyolitic and dacitic lavas have been identified petrologically, in drill core and in outcrop. Quartz porphyries and quartz-felspar porphyries are distinctive units in this volcanic pile, and may show both concordant and discordant relationships to the enclosing rocks.

Rocks of the mafic, green or dark green volcanic suite have been identified as andesitic lavas, aquagene tuffs lapilli tuffs and agglomerate of dacitic to intermediate composition. Pinkish felspars are occasionally present.

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Broadly, the felsic rocks lie in a major NNE trending zone approximately 500 m wide (in plan) in the south and 350 m in the north. A lesser zone 200 m wide occurs in the SE of the PMG grid. (Fig. 4).

A 250 m wide zone of mafic rocks lies in the SE and a further zone of dacitic - andesitic rocks, mainly crystal lapilli tuffs, occupies the trough of a synclinal structure west of Thomas's Tunnel. (Fig. 4).

Grey, grey-green or black shales and argillites with a minor volcanic content (acid to intermediate) are dominant west of the Owen Shear in the S.W. of the grid. Similar lithologies also interdigitate with volcanic derivatives in the west and north-west of the prospect.

Structure: (Fig. 25, 26)

The Owen Shear has been identified as the major fault structure within the PMG grid (Fig. 4). It is clearly exposed in the H.E.C. access track at the new Pieman rail crossing south of Chester. The characteristic, thin pug zone was encountered in drill holes CP2, and CP 13 and further close correlation can be achieved through exposures in costeans 28S, 26S, 24S and 20S. In several of the costeans, the fault is defined by a narrow zone of fault slivers rather than by a single plane of movement.

The average strike of the structure is 340° mag.with average dips of 35 - 40° east and possibly steeper segments. Throw and direction of movement are uncertain. Its presence explains the apparent lack of lithological correlation between surface exposure and drill hole geology in CP13 and CP15. It also highlights the fact that the sediments associated with the Pinnacles and Thomas's lode occur at a different stratigraphic level from those in the SW of the prospect.

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The Owen Shear could be an important control on the extent of mineralization at the prospect. The possible limiting effect of the Shear on the down-dip extent of the Pinnacles Lode between CP10 and CP13 is illustrated in Figs. 15, 17, 19, 27 and 28).

West of the Thomas's Lode system it imposes limits to the lateral and down plunge extent of the stratigraphy prospective for Rosebery-type mineralization.

A number of deformational fold styles can be recognised at the prospect:

i)	normal deformation	(e.g. Main South Trench)
ii)	wet (soft) sediment deformation	(e.g. 18S/15.8W)
iii)	polyclinal or kink-style folding	(e.g. 20S/18.2W costean)
iv)	chevron-style folding	(e.g. costean 26S, 28S)

Interpretation of other detailed structures at the prospect is hampered by lack of continuous marker beds and interference of slump folds though some gross structural relationships may be inferred.

A number of minor folds defined in the Rosebery Group Sediments (line 20 - 26S) in the south west of the grid do not correlate well from line to line. However, the vergence sense of drag-fold patterns suggest a major synclinal axis to the east.

Examination of drill core for facing data to use as a guide to structure met with limited success only.

An anticline is clearly defined in Rosebery Group sediments below the Owen Shear in CP15. Continuity of the adjacent synclinal structure to the east is corroborated by downward facing data in PIN 2.

Structural data was initially summarized on a Wulff Net. Scatter of data points was somewhat greater than anticipated and this necessitated replotting of most of the data on a Schmidt Net for contouring.

A plot of poles to bedding (Fig. 25) clearly shows a 30° difference in the direction of folding on either side of the Owen Shear. West of the Owen Shear, the

.... /18.

statistical fold axis trends N345° mag. and plunges approximately 15 - 20° NNW
(A) as defined by B_1 and B_2. (Fig. 25)

Poles to bedding show a weak tendency to spread along possible great circles G_1, G_2 and G_3, suggestive of concentric folding.
The wide spread of points may reflect interference by slump structures and asymmetry caused by deformation of wet sediments in a rotating stress field. Poles π_1 + π_2 to the former two great circles fall within or close to a major field of fold axial plunges.

There is acceptable correspondence between the field embracing theoretical plunges A, π_1 and π_2 and measured plunges of minor fold axes. π_3 coincides well with a measured minor field of southerly plunges.

East of the Owen Shear statistical axial trends are approximately N15° magnetic. The statistical plunge of the major fold axis as defined by the intersection of B' and B" and also the great circle of poles to bedding show a tendency to cluster around area (B) (25 - 30° to N15° mag.) (Fig. 25). This area partially overlaps an elogate field of measured fold axes plunge. The relatively poor fit of theoretical area measured data may in part be due to the small number of actual measurements available.

Measurements of foliation/cleavage are summarized in Fig. 26. Cleavage is steep and most prominently developed in the altered volcano-sedimentary sequence east of the Owen Shear. The statistical pattern is similar to that of bedding (Cf. Fig. 25 and 26) from the same section of the prospect.

A similar relationship is reported from the Rosebery mine (9, 10).

The 30° swing in structural trends across the Owen Shear may be due to:

i) fault rotation of the two main structural blocks about the Owen Shear;

ii) possible differences in the directions of the original sedimentary basins hosting rocks of the two groups, which may have pre-determined later regional tectonic grain.

...3. Stratigraphy.

The gross stratigraphy of the prospect can be divided into several major groups. The Middle-Upper Cambrian Rosebery Group lies to the west of the Owen Shear on the western and south-western fringes of the prospect. The Upper Proterozoic - Lower Cambrian Primrose Pyroclastics and equivalents underlie the remainder of the grid to the east of the Owen Shear. The north-western 30% of the area is covered by Quaternary (Pleistocene) glacial and periglacial deposits.

The detailed stratigraphy of the prospect still remains somewhat sketchy and tentative.

Construction of a satisfactory detailed stratigraphic column for the prospect is hampered by:

1) lack of distinctive marker horizon apart from the mineralized horizon itself;

2) rapid lateral lithological variation and facies changes;

3) lack of good outcrop in critical areas between known sections;

4) obliterating or masking effects of the strong alteration;

5) incomplete understanding of the structure of the area.

In conformity with the prospect's position on the eastern flank and nose of the north-plunging Que Syncline the oldest members of the Primrose Pyroclastics in the area would lie in the south. Progressively younger members would lie in a northerly direction. (Fig. 4).

On this basis, construction of a tentative stratigraphic column can be attempted (Table 1) which will necessarily be subject to revision and modification as the understanding of the structure and geological environment of the prospect improves.

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TABLE 1.

	Main Units		Approx. Thickness in Plan	Main lithologies
	Black shales	:	+?30m	laminated grey & black argillites
	Mafic tuffs	:	±?70m	crystal, lapilli and vitric tuff; minor pyroclastics, shales, argillites
	Sandstone	:	?+?30m	light grey sandstone, minor tuff, shale
ᴗosebery Group	Acid Volcanics	:	±?80m	vitric tuffs and pyroclastics
	Banded Argillites	:	+100m	grey or grey-green or black argillites, minor tuff, greywackes; tight chevron folding
	————		unknown section unknown thickness	———— separated by fault
Top	Mafic Volcanic Sequence	:	+150m	crystal, lithic and lapilli tuffs, ?pyroclastic flows with boulders of banded massive Zn-Pb-Ba mineralizatio towards base.
Primrose Pyroclastics	Laminated Argillite	:	90-170m	laminated and banded black and dark grey argillites, siltstones; minor cherts; various felsic tuffs, minor bedded sulphides; cherty lode (Thomas' System)

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TABLE 1.

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TABLE 1 (CONT'D)

	Main Units	Approx. Thickness in Plan	Main Lithologies
Primrose Pyroclastics Cont'd.	Massive Pyroclastics :	300-400m	coarse flow pyroclastics, vitric, crystal and lapilli tuffs; ignimbrites; rhyolitic - dacitic lavas; minor sericite schists; minor cherts, shales, sandstones and silt-stones; highly altered; quartz felspar porphyry; mineralized cherty lode (Pinnacles Lode).
	Banded Argillite :	25-50m	Interlaminated black and light grey argillites, siltstones, minor cherts, sedimentary flow breccias (? possibly equivalent to laminated argillite above); in parts altered
	Mafic Volcanics :	$\pm$250m	Dacitic - andesitic tuff, lapilli tuff, crystal tuff, agglomerate; lava;
	Felsic Unit :	$\pm$200m	?Vitric tuff, lapilli tuff; highly altered
	Mafic Volcanics :	?	dark green dacite/andesite tuff + lavas

....../22.

TABLE 1 - (cont'd).

5.... Mineralization.

Three distinct styles of base metal mineralization have been identified at the prospect from core and surface exposure:

i) Zn-Pb-Cu-Py as net vein fracture or fissure fill;

ii) Zn-Pb-Cu-Py mineralization, disseminated to sub massive associated with chert boulders;

iii) massive, fine-grained, finely banded Zn-Pb-Barite and Zn-Pb-Cu-Py mineralization.

Type i) net vein fracture fill sulphides are often zoned from yellow to dark-brown sphalerite centres through black sphalerite to chalcopyrite/pyrite rims set in quartz or carbonate. Examples occur in drill holes CP14 and CP15. Development of these veinlets is dependent upon hydraulic fracturing of water-laden sediments under conditions of shock-loading (13). Thus the finer grained argillic and tuffaceous units in the area are prospective for this type of mineralization.

Although fracturing may occur over considerable widths, fracture density is generally low and overall base metal sulphide grades are low (+1-3% combined Zn-Pb-Cu). On its own this type of mineralization does not represent an economic exploration target.

Type ii) mineralization is intimately associated with beds (or zones) up to 17m wide containing loosely to closely-packed boulders of chert or silicified shale/mudstone in a matrix of tuff or fine-grained clastic sediment. The Pinnacles and Thomas's lode systems are of this type. Where exposed, these lodes invariably have a sharp (?faulted) footwall and a diffuse, gradational hanging wall contact.

The Zn-Pb-Cu-pyrite mineralization is often interstitial to the cherty boulders but it may also occur within them as blebs, fracture-fill, in vugs or thin, discontinuous bands. The sulphides are generally best developed towards the footwall and peter out into the hanging wall in a manner suggestive of density grading. Furthermore, a crude or vertical zoning is often apparent in assay results with higher copper values at the base passing through lead zinc into a more barite enriched zone at the top (e.g. PIN 1). A similar lateral zoning outward from copper-enhanced centres is also evident in plan (Fig. 28). Minor gold and silver are present. Dark green, chloritic alteration is often present in close association with sulphides, and the lode is surrounded by a halo of low-grade sulphides and pyrite. X-ray diffractograms also suggest the possible presence of anhydrite (Appendix 4). The style of mineralization and associated silicic and chloritic alteration is strongly reminiscent of sulphides deposited close to exhalative vents at or just beneath the water-bedrock interface in partly compacted sediments (14,15).

Type iii) mineralization consists of fine-grained, massive high grade, finely banded sphalerite-galena-barite mineralization with pyrite and/or chalcopyrite. This mineralization closely resembles the banded stratiform volcanogenic mineralization at Rosebery and at the Que River deposit (39).

To-date, only in-situ, rounded boulders ranging in size up to 1m x 2m of this type of material have been found at Pinnacles west and south-west of Thomas's Tunnel (e.g. 16S/17.7W, 17S/16.7W, and float over 18S/16.5W approximately). These boulders lie embedded in a matrix of crystal tuff which is part of coarse to medium grained, poorly sorted, chloritic flow pyroclastics and are associated with boulders of chert and rafts and slumps of argillite. The source bed of this type of material and repetitions of similar, undisturbed mineralization represents the main exploration target at the Pinnacles Prospect.

. Alteration.

The main types of hydrothermal alteration affecting both the sediments and volcanic sequences at the prospect are:-

i) sericitization;
ii) chloritization;
iii) silicification;
iv) pyritization;
v) carbonatization;
vi) kaolinization.

Sericitization: This alteration is strong, widespread and a characteristic feature of the Pinnacles prospect. It was mapped over a NNE trending zone increasing from 3-400m in plan width in the north to +500m in the south. Both clastic sediments and rocks of volcanic origin appear to be affected resulting in features ranging from bleaching to the more characteristic yellow or yellowish-green coloration, waxy texture and development of a pseudoschistosity. In the most intensely altered areas the original rock is totally replaced by a mass of sericite, illite and fine-grained quartz. At the Pinnacles lode, it is developed above and below the lode horizon, but weakens and peters out westwards towards the Owen Shear (e.g. Pin 1 and 2).

Chloritization: Strong chloritization is closely associated with sulphide mineralization both at the Pinnacles lode and Thomas's lode system. Patchy aggregates of dark chlorite with sulphide cores are relatively common in the more silicic areas in the alteration halo around the lode.

This type of alteration appears to be more widespread in the rocks of more intermediate composition west and north-west of Thomas's Tunnel where it may be either pervasive or associated with net vein fracturing in areas bleached by sericitization. The green or dark green colour imparted by chloritization makes recognition of intermediate to basic rocks more difficult.

Silicification: This type of alteration is present as pervasive, fine-grained, cherty silica and chert intimately associated with base metal sulphide or pyrite mineralization in both the Pinnacles and Thomas's lode systems.

Secondary, diagenetic silicification often seen in outcrop should not be confused with the primary form of this alteration.

Pyritization: This can be recognized both in the footwall and hanging wall of the main lode systems at Pinnacles as bedded aggregates and fracture coatings. Pyrite frequently occurs as disseminated fine euhedral grains, clusters or aggregates and may exceed an estimated 10% of the rock near the lode horizon. Re-crystallized,

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euhedral grains of pyrite are also occasional disseminated constituents of some of the shaly horizons at the prospect but seldom reach significant concentrations. The origin of the latter may be different from the bedded stratiform, slumped and contorted pyritic bands of probable syngenetic origin as seen in CP12 and 13.

Carbonatization: Recent petrological work on the core of Pin 1 (Appendix 4) suggests that carbonate alteration (dolomite, siderite) may be more widespread in the rock matrix than previously suspected.

Siderite-calcite-quartz are particularly common minor fissure and fracture-fill components associated with base metal sulphides in net vein fractures.

Kaolinization: Minor, accessory amounts of kaolin have been reported (Appendix 4) from DDH Pin 1.

Significant kaolinization occurs in Thomas's Tunnel close to the footwall of the lode as well as along joints, fissures and minor faults north and west of Thomas's Tunnel.

Strong kaolinization of a lapilli tuff was also noted in costean 22S/10.6W and along joints in andesitic tuffs along strike from this locality in costean 18S/9.6W.

Such areas may represent areas of intense alteration within fumarole channels and vents.

GEOCHEMISTRY - SOIL.

The A^{o} soil horizon at the Pinnacles Metric Grid was sampled during 1974/75 and results were subject to prior comment (16,17). These earlier results were re-contoured with a geological bias (Figs. 29, 30, 31, 32) guided by an improved understanding of the bedrock geology. A composite summary is shown in Fig. 41. Sectional graphic plots of the geochemical results are also shown in relation to known geology and I. P. responses in Figs. 5 - 24.

...... /26.

Results were processed by the VSTAT computer programme to produce the usual geochemical statistics utilized for interpretive purposes. A statistical summary is given in Table 2.

The incidence matrix and correlation coefficients between Cu, Pb, Zn, Ba and Hg are shown in Table 3. The correlation is high between copper, lead, zinc and mercury but only fair to moderate between the base metals and barium. Examination of cross-sectional plots shows that barium is often depleted or suppressed over known sulphide occurrences, and forms peaks on the flanks of the base metal highs (e.g. Figs. 9, 14, 16, 17, 18).

Results can be broadly grouped into a northern or southern field separated by a relatively inert zone.

Lead, zinc and barium clearly indicate the presence of both the Pinnacles and Thomas's lode system for at least part of their strike lengths. Geological knowledge of the prospect now suggests that the spottiness of results may to some extent reflect patchiness of base metal concentrations in bedrock or lode. Copper shows a somewhat more complex dispersion pattern around the lodes. The copper highs just to the west of the Pinnacles Lode could reflect higher copper content in the footwall of the Pinnacles Lode - a zonal feature common to many volcano-sedimentary deposits.

...... /27.

TABLE 2.

COMSTAFF PTY. LTD. PINNACLES SOIL DATA GEOCHEMISTRY. 77/09/16 11.22.25.

STATISTICAL SUMMARY

NUMBER OF SAMPLES = 969

ELEMENT	NO. OF VALUES	RANGE LOW	RANGE HIGH	MEAN	STANDARD DEVIATION	VARIANCE	COEFF. OF VARIATION	3rd MOMENTS	4th MOMEMTS
Cu	952	0.00	6000.00	11.12	194.47	37818.51	17.50	30.73	943.78
Pb	952	4.00	9999.00	45.31	339.60	115330.03	7.50	26.93	776.53
Zn	952	2.00	9999.00	36.71	329.45	108536.17	8.97	29.14	877.24
Ba	948	0.00	3500.00	170.23	172.37	29712.72	1.01	9.39	154.79
Hg	951	0.00	9999.00	83.60	360.34	129847.07	4.31	24.04	627.14

COMSTAFF PTY. LTD. PINNACLES SOIL DATA GEOCHEMISTRY 77/09/16 11.22.25.

TABLE 3.

CORRELATION COEFFICIENTS

Cu	1.00				
Pb	.96	1.00			
Zn	.98	.95	1.00		
Ba	.63	.65	.62	1.00	
Hg	.90	.86	.88	.57	1.00
	Cu	Pb	Zn	Ba	Hg

INCIDENCE MATRIX

Cu	952				
Pb	952	952			
Zn	952	952	952		
Ba	946	946	946	948	
Hg	951	951	951	951	951
	Cu	Pb	Zn	Ba	Hg

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The contour maps also highlight an untested zone some 400m x 100m anomalous in Pb, Zn, and Cu within elevated values of barium extending from 14S/11.6W to 17S/12.6W.

A moderately anomalous base metal zone emanating from approximately 20S/10.6W shows broad correlation with fracturing and strong kaolinization and could be correlated with an exhalative zone within a sequence of andesitic rocks.

It should be noted that the intensity levels of geochemical response for Cu and Pb falls off considerably over glacials, though some values are still evident. In contrast, the contour plans show the glacials to be relatively unresponsive with respect to barium and zinc. The barium line anomaly west of 14S/16W is unexplained. It may represent contamination from Brown's Working along an old creek bank.

However, in section plots over glacials, barium shows a number of depressed peaks which in several cases correlate with low-order base metal responses (e.g. Figs 6 - 10). These geochemical features have not been investigated and are not understood.

Available soil geochemistry has proved to be a useful guide to detailed mapping at the prospect.

GEOPHYSICAL SURVEYS.

I. P. Surveys.

A gradient array I. P. survey was completed over the Pinnacles Metric Grid in 1974/75 along lines approximately 200m apart. There are no results for line 28S. Results are shown in stacked profile format in Figs. 33, 34, 35 and 36. On these plots, distances between grid points have not been computer-adjusted for topography.

There are no obvious strong resistivity or frequency anomalies with the exception of the western end of line 26S. However, above-background responses can

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be a useful aid to geological mapping. The effectiveness of the I. P. mapping method could be increased through laboratory measurements of conductivities to determine response characteristics of major rock types in the area.

Thus, the frequency effect and apparent resistivity highs along the western sectors of lines 24S and 26S could imply merely a difference in geophysical signature of the Rosebery Group rather than signify anomalous responses.

7.1.1. Percentage Frequency Effect & Apparent Resistivity.

A broad high on 26S/16.5 - 19W and also 24S/19 - 20W could represent a characteristic signature of the Rosebery Group at the contact with the Primrose Pyroclastics (cf. Sect. 7.1.2. below).

Only a narrow, minor response was obtained over the Pinnacles lode (est. 10 - 15% sulphide) on 22S which broadens into a zone in excess of 100m through 20S and 18S to 16S. Thereafter, correlation becomes tenuous. Elevated responses are recorded both over glacials and Primrose Pyroclastics (e.g. 12S/17.4W and 12S/13.4W).

The weak responses must be weighed against the known characteristic of the Cambrian pyrite in Western Tasmania to give suppressed responses well below proportion to its concentration (e.g. 5 - 10% disseminated, firm-grained pyrite in cherty rock - no significant bench test response: Trussell, pers.comm.) (Chester?)

7.1.2. A broad zone of low resistivity along the western edge of the Pinnacles Metric Grid north of 22S appears to reflect sediments east of the Owen Shear which are coeval with the Primrose Pyroclastics. This is in marked contrast to the high resistivities recorded over Rosebery Group sediments west of the Owen Shear from 22S - 24S.

The sharp trough at 18S/15.8W (no associated geochemical anomalies) may be a contact-effect between altered pyroclastics and sediments while sulphide-bearing black shales 100m to the west only register a minor low. This contact effect may again be recorded by a minor, sharp low at 16S/15W, but Thomas's lode approximately 50m further west gives a slight increase in resistivity caused perhaps by the presence of barite.

...... /31.

On 14S/16.6W a narrow trough over glacials is duplicated by a PEM-low for which there is no geological explanation at present.

Fluctuations in the profiles on lines 12S and 10S over glacials similarly cannot be fully explained though the troughs at 12S/13.6W lie along the northward strike projection of Brown's lode.

7.2. <u>Pulse EM Survey</u> : (Fig. 37, 38, 39, 40)

A trial pulse EM survey was run over suspected mineralization along portions of line 14S, 16S, 22S. Line 26S was apparently barren of sulphide mineralization and was selected as a control line. Transmitter-receiver spacing was 60m and coil diameter halved to 5m by doubling up the available 10m coil for ease and speed of handling.
Responses over known sulphide mineralization at the Pinnacles and Thomas's Lode were unimpressive, though a slight positive response was recorded over the Pinnacles Lode at 22S/16-17W on 7 of the 8 channels used. It is doubtful whether such a response would have been recognised during a normal regional survey as representing sulphide mineralization.

Significant lows were recorded on all channels (8 in all) at the traverse extremities on lines 14 and 16S. On line 16S this negative anomaly is coincident with a frequency effect and low resistivity response about a shale/pyroclastic contact below which minor sulphide mineralization occurs in a zone of net vein fractures (viz. CP14). The low at the western extremity of 14S is not fully understood. There is a minor coincident resistivity low but bedrock geology is obscured by thick glacials. The cause of the anomaly is mooted to be a zone of sediments.

The cause of the pronounced low on all channels on the eastern end of line 26S (13.2W) is unknown. It is flanked to the east by a resistivity low and frequency

...... /32.

effect high. This negative anomaly lies 400m along strike to the SW from a band of altered argillites and siltstones and may perhaps reflect the southward continuation of this zone of (?altered) sediments.

8. RESERVE POTENTIAL.

Correlation of mineralized horizons achieved with the use of surface outcrop, drill hole data, A^o geochemistry and I. P. responses defined the Pinnacles Lode over a strike length of some 500m and the Thomas's Lode system (including McGuinness's and Brown's sectors) over a similar strike length. The Pinnacles Lode has been tested by 12 drill holes over the past 30 years. (Figs. 27, 28). Included are PIN 1 and PIN 2, two of the three original proposed drill holes sunk in 1977. Of these, eight intersected target, two were aborted and two were poorly sited. Results are summarized in Table 4.

Past attempts to intersect the Thomas's Lode system were relatively unsuccessful because of poor knowledge of target and/or poor drilling technique. Of 9 holes, only two (PP 31 and PP 46) intersected the target zone at shallow depth (Fig. 27).
Results of this drilling are summarized in Table 5.
The main results of drilling other targets (5 holes) are given in Table 6.

Pinnacles Lode:

Assuming continuity of Cu, Zn, Pb sulphides laterally and in depth, downdip extent limited by Owen Shear and interpolating between drill holes CP 10 and CP 13:

strike length : 450m

average depth : downdip : 130m

average width of significant mineralization : 4.1m

average S.G. : 2.8

inferred tonneage : 670,000 approximately

at a weighted grade of : 0.40% Cu, 1.59% Pb, 4.65% Zn or weighted 6.88% combined metal at zinc equivalents.

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This includes a higher-grade triangular shoot containing approximately 162,000 tonnes at a weighted grade of 0.51% Cu, 2.09% Pb, 5.62% Zn, or weighted 8.52% combined metal at zinc equivalents (1).

N.B.:

1) Zinc equivalent is Zn : Pb : Cu = 1:1:2.

2) Gold and silver values are not considered in these calculations.

The lode is open to the north but appears limited in depth.

Thomas's Lode System:

This system is assumed to include McGuinness and Brown's Workings. Assuming continuity of lode and sulphide between McGuinness' and on Brown's Workings, accepting an arbitrary depth limit of 150m and interpolating between drill holes PP31 and PP51, then -

strike length : 500m

estimated average width of mineralization : 3.5m

estimated depth extent : 150m

estimated S.C. : 2.8

tonnage potential : 735,000 tonnes

There are insufficient samples to indicate grade averages. The lode system appears open to the north, south and in depth.

On the assumption that the weak mineralization associated with chert through 16S/13W and the geochemical anomaly at 17S/12.4 - 12.8W could represent lodes similar to those already known, it is possible to speculate that total tonnage potential of the prospect could be in the order of 2.5 - 3 million tonnes.

...... /34.

Drill Hole No.	From-To	Drilled Length	Est. True Width	ASSAYS % Cu	% Pb	% Zn	Ag gm/t	Au gm/t	METAL RATIOS Zn:Pb	Zn:Cu	Zn+Pb / Cu	Pb:Ag	Ag:Au	COMMENTS
	m	m	m											
CP 8	-	-	-	-	-	-	-	-	-	-	-	-	-	Aborted: no assa
CP 9	57-60	3	0.7	0.37	0.48	2.97	-	-	6.2	8.03	9.32	-	?	?drilled downloc cherty
CP 10	153-155	2	1.4	0.023	0.25	1.40	8	NA	5.6	60.87	71.74	312.5	-	Cherty lode
CP 13	49.45-55.35	5.9	5.1	0.02	0.12	2.85	6.3	NA	23.75	14.25	15.64	190.5	?	Cherty lode
PIN 1	99.5-101.3	1.8	1.4	0.07	0.09	2.0	7.5	Nil	22.22	28.57	29.86	120.0	-	Cherty lode
PIN 2	156.9-160.2	3.3	2.9	0.05	0.89	1.75	8.0	Nil	1.97	35.00	52.8	1112.5	-	Cherty lode
PP 34	95-104.5	9.5	8.23	0.67	2.9	6.9	15.6	Tr	2.38	10.30	14.63	1858.9	-	Cherty lode
PP 36	125.9-135.6	9.7	6.65	0.3	0.3	3.2	3.0	Tr	10.67	10.67	11.67	1000.0	-	Cherty lode
PP 39	7.3-9.1	1.8	1.7	0.2	Nil	2.4	18.4	4.4	-	12.0	12.0	0	4.18	?top of cherty l
PP 40	6.1-13.7	7.6	7.14	0.67	3.7	8.0	34.1	8.8	2.16	11.94	17.46	1085.0	3.88	Cherty lode
PP 41	34.2-38.9	4.7	3.02	0.31	1.2	3.6	18.7	Tr	3.0	11.61	15.48	641.7	2.46	Cherty lode
PP 42	-	-	-	-	-	-	-	-	-	-	-	-	-	Aborted before target

Pinnacles Lode.

TABLE 4.

NA - not assayed
Tr - traces

NOTE: i) PP series: Ax and XRT holes drilled by E.Z. 1948/49
ii) CP series: Bx-Ax size holes drilled by Comstaff 1974/75
iii) PIN series: Bx-Ax size holes drilled by Comstaff Joint Venture 1977

Drill Hole No.	From-To	Drilled Length	Est. True Width	% Cu	% Pb	% Zn	Ag gm/t	Au gm/t	Zn:Pb	Zn:Cu	Zn+Pb / Cu	Pb:Ag	Ag:Au	COMMENTS
					ASSAYS					METAL RATIOS				
	m	m	m											
CP 7	94-95	1.0	0.64	Tr	Tr	1.2	NA	NA	-	-	-	-	-	Cherty "breccia". Not main lode.
"	196-197	1.0	0.64	Tr	Tr	1.8	NA	NA	-	-	-	-	-	Fractures in shale. Main lode not reached
PP 31	128.4-128.9	0.5	0.32	0.04	Nil	4.5	Nil	Nil	-	-	-	-	-	Cherty lode.
"	162.5-167	4.50	3.45	0.09	Nil	3.3	6	Nil	-	36.7	36.7	Nil	Nil	Cherty lode-?main zone
PP 45	-	-	-	-	-	-	-	-	-	-	-	-	-	Aband'd bef. target
PP 46	16.9-22.8	5.9	-	0.74	1.9	7.1	30.6	0.3	3.7	9.6	12.2	62.1	102	Cherty lode
PP 48	-	-	-	-	-	-	-	-	-	-	-	-	-	Aband'd bef. target
PP 50	-	-	-	-	-	-	-	-	-	-	-	-	-	Stopped bef. main target
PP 51	?	?	?	-	-	Tr	-	-	-	-	-	-	-	Poor core recovery in zone of interest
PP 52	-	-	-	-	-	-	-	-	-	-	-	-	-	Lost bef. target
PP 59	-	-	-	-	-	-	-	-	-	-	-	-	-	No significant sulphides?hole stopped prem'urely?

NA - not assayed

NOTE: i) PP series : Ax and XRT holes drilled by E.Z. 1948/49

ii) CP series : Bx-Ax size holes drilled by Comstaff 1974/75

TABLE 5.

Thomas's Lode System.

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Drill Hole No.	From-To	Drilled Length	Est. True Width	ASSAYS					METAL RATIOS					COMMENTS
				% Cu	% Pb	% Zn	Ag gm/t	Au gm/t	Zn:Pb	Zn:Cu	Zn+Pb / Cu	Pb:Ag	Ag:Au	
	m	m	m											
CP 12	107.78-110.49	2.71	2.67	Tr	Tr	2.33	NA	NA	-	-	-	-	-	in fissures in shale
CP 12	120.29-128.43	8.14	8.02	Tr	Tr	1.99	NA	NA	-	-	-	-	-	" " " "
CP 14	128.21-132.21	4.0	3.94	0.01	0.03	1.41	NA	NA	47	141	144	-	-	" " " "
CP 14	136.21-147.21	1.0	-	0.01	0.22	1.27	NA	NA	5.8	127	149	-	-	" " " "
CP 15	39.9-44.7	4.8	3.39	0.01	1.18	2.16	9	NA	1.83	216	334	131	-	in fractures & veins in shale & tuff
CP 15	48.3-51.0	2.7	1.91	Tr	1.12	3.17	10	NA	2.83	-	-	112	-	in fractures & veins in shale & tuff
CP 1	-	-	-	-	-	-	-	-	-	-	-	-	-	insignificant base metal content
CP 2	-	-	-	-	-	-	-	-	-	-	-	-	-	insignificant base metal content

TABLE 6.

Other Drilling.

DISCUSSION.

Considerable interpretive effort was devoted to the definition of the palaeogeographic environment of the mineralization at the Pinnacles Prospect and the surrounding district. There is little doubt that the mineralization at the prospect is of the volcanogenic stratabound type. There is also evidence in the form of in situ large boulders of massive, banded Zn-Pb mineralization indicating that conditions were also favourable in the prospect area for the formation of stratiform volcanogenic mineralization of the Rosebery type in suitable sedimentary traps. Deposition of these two styles of mineralization may be contemporaneous/(14,15,18, 40, 41). Further regional geological and trace element analytical data is required in order to resolve conclusively whether the mineralization is related to island arc evolution according to the model of Mitchell & Bell (19) or related to acid volcanism of the Cordilleran type (7).

The origin and setting of the Pinnacles and Thomas's lodes can be explained in terms of a relatively simple genetic model with references to processes which appear relatively common in a volcanogenic environment. It appears that submarine exhalative activity was in progress on the flanks of a submerged rise of volcanic origin which possibly extended north-east from the south and from the east of the Pinnacles, as attested by the presence of acid and intermediate lavas and derivatives. The latter are volumetrically dominant in the south and south-east of the prospect, suggesting proximity to an extensive area of effusive vents (Fig. 43) which may extend well into the Chester grid. Criteria for the recognition of effusive vents are cited by several authors (40, 42, 43, 44).

During explosive submarine eruptions, pumiceous and pyroclastic debris of acid to intermediate composition would have been quenched, sorted and sloughed laterally (?east and north) into deeper water to become conformably interbedded with marine sediments (45).

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The erosive power of such flows could be expected to exert considerable destructive influence on any pre-existing, non- or poorly consolidated sulphide mineralization. During periods of quiescence, clastic material would have been supplied to the area by erosion of the volcanic rise. Re-worked tuffs and ash would constitute material derived from far-off volcanic activity.

Contemporaneous sulphide deposition is envisaged to have occurred by fumarolic activity during periods of quiescence as encrustations on vugs, fissures and cavities, as well as by partial replacement of the host rock in a paraconformable setting a slight distance below, but close to, the water - bedrock interface (14,15).

Strong concentrations of sulphides would build up over short distances around exhalative vents, but base metal sulphide values would fall off rapidly with distance from source (14). This model would give a field of pod-like mineralization distributed along the same stratigraphic horizon, separated by low grade or barren areas. Simultaneously, fumaroles charged with base metal ions would rise through the overlying body of water, and precipitate their load in response to falling temperature gradients and ocean currents (20, 46). In an open basin, the base metal ions would be dispersed over a wide area, giving low grade geochemical values. Their accumulation would be further diluted by mixing with the influx of clastic material. Under special conditions of basinal traps and low rates of influx of clastic material, massive, bedded and banded deposits of the Rosebery type could form.

Sedimentary traps and depressions close to exhalative centres and in enclosed basins would be more favourable sites for the accumulations of this type of deposit than basins distal to exhalative centres. That such conditions existed at several stratigraphic levels of the Pinnacles Prospect is shown by the presence of the boulders of massive sulphide 16S/17.6W and 17S/16.6W.

...... /39.

Under stable seismic, tectonic or erosive conditions, or in enclosed small basins, such deposits would be preserved undisturbed.

Areas close to eruptive centres would be subject to repeated seismic shocks originating from the explosive nature of acid volcanism. The latter could provide part of the shock-loading mechanism required to form net vein fracturing commonly seen in what are interpreted to have been water-laden sediments or tuffs. Such earthquake activity would also act as a trigger mechanism for gravity slides of partly or non-consolidated sediments basinward down the slope of a submerged volcanic site. Under extreme conditions, fluxiturbidite flows could form, resulting in the total break-up of the slumped horizon with abrasion and rounding of the constituent boulders. The size of the boulders would vary and a crude grading may become apparent. Any high-density, sulphide-rich liquids or boulders would gravitate interstitially towards the base of the slumped horizon and lag behind the main body of the flow.

Breccia and mechanically transported ores of this type in varying stages of disruption have been described from volcanic settings in Europe (21, 22), Canada (13, 23, 24), Turkey (25), Russia (26), Japan (27), Tasmania (28), New South Wales (Degeling; pers. comm.) and possibly Fiji (43). Possible trigger mechanisms are suggested by several investigators (25, 28, 29). The slumped area would then be covered by the products of nearby, rejuvenated volcanicity or by clastic sediments in the event of a pause between seismic activity and any related volcanicity.

Such a cycle of events could be repeated a number of times in the acid volcanic environment at Pinnacles. This repetition could account for the appearance of cherty boulders and beds of rounded flow pyroclastics at several stratigraphic horizons at the prospect. The Pinnacles and Thomas's Lodes may have formed during

...... /40.

periods of extended quiescence as indicated by the development of a relatively thick zone of sediments. Other narrower, cherty horizons exposed at the prospect may represent either short periods of quiescence, weak fumarolic activity or the edges of a stronger, more extensive exhalative field.

A possible sequence of sedimentary and tectonic events leading to the formation of lodes at Pinnacles is depicted in Fig. 42.

The question arises whether Zn-Pb-Cu deposits formed under conditions proposed in the above model can give rise to economically viable ore bodies. At Buchan's, Newfoundland, several mines are operative in this geological environment. Ores have been found to maintain economic grade for distances in excess of 2 Km from their source (23). Other examples can be cited from the Noranda mining field in Canada (48, 49, 50, 51).

Flow breccia ore is also mined at the Shakanai Mine, Japan (27), and recent interpretations of the origin of the Rosebery Deposits suggests that it is a slump structure whose advance has been arrested before total break-up.

The regional implications of the above model indicate a prospective contact zone between the Primrose Pyroclastics and the sediments of the Que Syncline northward from the Pinnacles. It is interesting to note that this contact strikes into an area of stream sediment zinc-lead and minor copper anomalism as well as Input response (CAH) in the Bulgobac area in E5/63, pt. 2. Unfortunately, a large portion of this prospective belt was relinquished several years ago and is no longer available to Comstaff for exploration.

The area immediately N.E. of Pinnacles and N. of EL5/63 pt.2 Chester East in E.L. 5/63 pt. 2 is to a large extent covered by glacial material and sample density is low. First pass exploration is therefore considered to have been inadequate. Additional careful sampling is thought

...... /41.

warranted, particularly in the light of a few zinc anomalies in heavy mineral concentrates derived from this area.

10. CONCLUSIONS.

10.1. The current phase of mapping at the prospect has clarified the gross stratigraphy in the area and provided a crude guide to the detailed prospect stratigraphy.

10.2. Construction of a detailed structural picture is still incomplete because of complications introduced by minor folding and slumping and uncertainties due to poor outcrop in critical areas, distinctive marker horizons and possible impersistent lensoid lithologies.

The Owen Shear is recognised as a major fault structure separating stratigraphic groups of different ages and possibly limiting the downdip extent of the Pinnacles Lode.

10.3. Significant mineralization investigated to-date is of the volcanogenic stratabound type. It consists of Zn-Pb-Cu sulphides and pyrite within a lode consisting of poorly sorted, rounded boulders of chert or silicified fine-grained clastic sediments and volcanic material resting in a matrix of tuff or mudstone.

The original mineralized sedimentary horizon is considered to be mechanically transported or broken up by seismically triggered slump movements down the slope of a volcanic pile situated on the edge of an open marine basin.

10.4. In this environment, significant base metal distribution at the prospect may be patchy and generally concentrated around areas immediately surrounding former exhalative vents.

10.5. Tonneages indicated for the Pinnacles and Thomas's Lodes to-date are non-commercial and grades are subeconomic.

...... /42.

Available information suggests that the overall tonneage at the prospect would be limited to the order of 3 million tonnes at this stage. This appears insufficient for commercial exploitation.

10.6. Evidence of boulders of massive, banded sulphide mineralization points to the north-west and north of the area as a reasonable exploration target for Rosebery-type mineralization.

10.7. The suggested intravolcanic basin N.E. of Pinnacles appears to lie in a palaeogeographic position favourable for Rosebery-type mineralization.

10.8. Review and reassess Input, aeromagnetic and stream sediment responses over the prospective contacts and areas north of Pinnacles through the CAH and Bulgobac.

11. RECOMMENDATIONS.

11.1. Prospect exploration.

i) Any further detailed geological work at the prospect should be founded on an accurate base map prepared by stadia survey.

ii) Further exploration at the Pinnacles should be concentrated on the area north of line 20S with the objective of locating the source bed of the boulders of banded, massive Rosebery-type sulphides exposed at 16S/17.65W and 175.

First priority should be given to the triangular sector contained between the Owen Shear in the west and a line extending north north-east from 20S/16W. The area within the PMG grid to the east of this line has lower priority.

iii) Define the top contact and strike extent of the chloritic mafic volcaniclastic unit west of Thomas's and Brown's Workings.

...... /43.

iv) Concentrate exploration effort within and to about 100m on either side beyond the top and bottom contact of this unit along strike to the N.W. and N.E. by gridding, soil sampling, gradient I. P. @ 100m line spacing to about 1 Km north of line 10S.

v) Clear out, map and sample the underground and remaining surface excavations in the Brown's Workings area.

vi) Sample Thomas's Trench at, say, 2m intervals.

vii) Attempt mise-à-la-masse to test continuity of sulphide along the established strike length of the Pinnacles Lode and Thomas's Lode System.

viii) Surface equipotential surveys should be undertaken to test for the possible extension of the Pinnacles and Thomas's Lode (Brown's and McGuinness sectors) beneath glacial cover to the N.E. and S.W. and to determine whether or not these lodes join up.

ix) To assist in the interpretation of the I. P. data, undertake a programme of conductivity measurements of a range of samples of lode material and major types of country rock.

x) Assay drill hole CP8.

xi) Re-examine the core generated by former E.Z. drilling for lithology, styles of mineralization and facing data.

xii) Although Thomas's Lode does not represent a prime exploration target, any mineralization here could represent additional ore reserves.

As such, the depth extent of the lode should be tested by drilling in due course.

xiii) High density stream sediment sampling of minor and major creeks over glacials in the N.W. of the PMG grid.

...... /44.

xiv) Determine the bedrock beneath the Cu-Pb-Zn geochemical anomaly at 17S/12.3 - 13W by costeaning.

xv) Fill in gradient I. P. PMG lines 11S, 13S, 15S, 17S and 19S as a guide to geological mapping and location of sulphides.

xvi) Continue with studies of volcanogenic breccia ores to obtain a more accurate fix on the source of the boulders of massive Zn-Pb-Cu mineralization at Pinnacles.

xvii) Include manganese on the list for all routine geochemical analysis and assays.

xviii) Analyse all significant drilled mineralization for manganese and iron.

11.2. <u>Regional Exploration</u>.

i) Attempts to trace the prospective flank zone between sediments in the Que Syncline and the Primrose Pyroclastics to the north-east.

ii) Attempt to define more precisely the extent and dimensions of the suggested intravolcanic basin N.E. of Pinnacles and determine its prospectivity for Rosebery-type Zn-Pb-Cu mineralization by mapping, lithogeochemistry and stream sediment sampling.

iii) Define the contact between the Primrose Pyroclastics and the Mt. Black Volcanics.

iv) Attempt to re-sample the streams in the apparently low-sample density area north of Chester East with the objective of increasing sample density per square Km.

v) Continue regional studies of the palaeogeological environment to locate stable intravolcanic or "open" basins on flank sites which could serve as traps for brines or solutions enriched in base metals.

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Appendix 1

Drill Logs

DDH PIN 1 and PIN 2

058

AUSTRALIAN ANGLO AMERICAN LIMITED
DRILLHOLE LOG
Summary Sheet

Page
of

PROJECT	COMSTAFF PTY. LTD.	AREA	PINNACLES
CO-ORDS	21 S 16.2 W	DEC^{LN} -65°	AZIMUTH 270°m	RL

DRILLHOLE TYPE
DH No. PIN 1

DATE COMMENCED 18.2.77	DATE COMPLETED 27.2.77	DRILLED BY LONGYEAR	DRILL RIG LY 38
Non Coring to: 0 - 3m	HQ Core to: -	NQ Core to: 3m - 178m	BQ Core to: -
EOH 178m			

SURVEY DATA

Instrument: EASTMAN KODAK SINGLE SHOT

DEPTH	DECLINATION Uncorr	DECLINATION Corr	AZIMUTH	DEPTH	DECLINATION Uncorr	DECLINATION Corr	AZIMUTH
30	-	-64	269°M	145	-	-56.4	275°M
65	-	-63.75	273°M	175	-	-53.7	274°M
95	-	-61.1	273°M				
125	-	-58.75	274°M				

LOG SUMMARY

ROCK TYPE	MINERALIZATION Style	Grade	Intersection width (Corr)
3m H casing left in hole.			
Recovery: Core drilled : 178m			
Core recovered : 169.95m			
% recovery : 95.84%			
(0-6.8): Overburden and weathered tuff.			
(6.8-27.5): Vitric, lapilli tuff; strong pervasive sericitic alteration; pyrite 1 - 5%.			
(27.5-54.7): Mainly vitric and crystal vitric tuffs with some volcaniclastics; minor galena-sphalerite in fissures, joints and aggregates; pyrite 1 - 5%.			
(54.7-79.7): Intergrading lapilli, crystal and vitric tuffs; contacts indistinct strong sericitic alteration throughout; scattered ?fiammi and altered clasts; pyrite : minor + 1%; locally silicified.			
(79.7-88.5): Cherty, silicified rock : scattered sphalerite-galena; pyrite 10 - 15%.			
(88.5-93):Vitric, crystal and lapilli tuffs; strong sericitic alteration; chloritic; sphalerite galena aggregates more common; pyrite 5 - 10%.			
(93-101.2): Lode zone; (chalcopyrite) - sphalerite galena aggregates occasionally associated with banded pyrite; cherty clasts in matrix of sericitic vitric tuff; spotty chlorite alteration.; occasional slump features, pyrite locally 15 - 20%.			
(101.2-115): Silicified volcaniclastic; sparse, patchy sulphides; pyrite 5 - 8%.			
(115-132): Lithic crystal tuff; dacitic-andesitic; ?chloritised; trace pyrite only.			
(132-163.7): Predominantly volcaniclastics (?slump pyroclastics) with interbedded muddy shales and grey cherts; slumped; chloritic, sericitic alteration fading; pyrite 1 - 3%.			
(163.7-178): Black shales, lesser tuffaceous sandstone; slumped; facing downhole.			
End of hole 178m.			

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APPENDIX 1.

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 1 | TYPE Diamond | CO-ORDINATES PMG 21/00S/16.2W | INCLINATION -65° | DIRECTION 270° mag.

DATE START 18.2.77 | DATE FINISH 27.2.77 | LOGGED BY G. Krummei | DRILL Longyear 38 | FINAL DEPTH 178m

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.
0	6.50		1.15		
	9.50		2.35		
	12.50		3.00		
	15.45		2.95		
	18.55		3.10		
	21.01		2.45		
	21.50		0.50		
	24.50		2.10		
	27.50		2.90		
	30.50		2.70		
	33.50		3.00		
	36.50		3.00		
	37.72		1.20		
	39.00		1.20		
	42.60		2.80		
	45.60		2.95		
	48.50		2.90		
	51.50		3.00		
	54.50		3.00		
	57.50		3.00		
	60.50		2.80		
	63.30		2.80		
	65.90		2.60		
	69.00		3.10		
	72.00		2.45		
	75.50		3.05		
	78.50		3.00		
	81.50		3.00		
	84.50		3.00		
	87.50		3.00		
	90.50		3.00		
	93.50		2.87		
	96.50		2.70		
	99.50		3.00		

DESCRIPTION

(0-6.8m): Overburden and weathered, leached, white altered ?tuff; quartz fragments.

(6.8-21m): Vitric lapilli tuff: grey-green massive rocks with wisps, patches and blebs of dark green waxy ?sericite; patchily distributed white K-felspar crystals altered to kaolin; rare altered white and grey fragments and clasts; pyrite in matrix, often euhedral, fine-grained; also along joints and fissures (total : 1 - 5% pyrite), occasionally in larger aggregates (e.g. @10.5m). Trace galena in fractures; localized strong potassic alteration.
@ 16.45m foliation : 0 - 25° to core axis.

(21-27.50m): As above, but more yellowish green, possibly reflecting stronger sericitic alteration.
@ 21.01 : 0.5m strong sericitic alteration; scattered kaolinized felspar crystals; in parts more cherty traces disseminated small aggregates of galena-sphalerite.
Pyrite : disseminated, in small aggregates and in fractures and joints : 1 - 5%.

(27.50-36.50m): Massive pale-yellow-green to pinkish ?crystal vitric tuff with patches and slivers of green ?sericite-illite; fine-grained pyrite (1 - 5%) disseminated throughout; occasional aggregates of sphalerite-galena in ground mass and fractures @ 12.50 : ?fault with 7cm - wide breccia zone containing interstitial galena and sphalerite; rare joints with lining of dark chlorite, e.g. @ 30.50m, 34.2m, 35.5m.

ASSAY RESULTS

146060

AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 1 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
99.50	102.50		3.00			(31.70-36.3m): ?crystal tuff: med. gr. crystals of kaolinised felspar.	
	105.50		2.85			(35.2-36.5m):Diffuse cherty patches - ?silicification.	
	107.50		2.95			(36.2m): Foliation : 10°.	
	111.50		3.00				
	113.50		3.00			(36.6-36.9m): ?Vitric tuff: massive, pale yellow-green, altered, sericitic	
	117.50		3.00			sparse fine-grained disseminated pyrite; trace felspar crystals.	
	118.50		1.00				
	121.50		3.00			(36.9-47.30m): As above, but pinkish brown, with wisps and bands of green	
	124.50		2.35			or dark green, soapy sericite; scattered, altered faintly outlined	
	127.50		2.95			crystals of felspar;(ghost textures) after volcaniclasts, sparse,	
	130.50		2.93			diffuse; quartz-carbonate-filled fractures with occasional sparse	
	133.50		3.00			aggregates of galena-sphalerite; fine-grained disseminated pyrite	
	137.50		3.00			throughout; pyrite aggregates larger, more common : 5 - 8% pyrite.	
	140.50		3.00			@ 39.5 : foliation - 35°.	
	143.50		3.00				
	146.50		3.00			(47.3-54.7m) : ?Crystal tuff: As above, yellow green; patchy zones of	
	149.50		2.95			ragged, altered white felspar crystals at 48.9, 50.5 - 51.1, 52.7 -	
	152.50		3.00			53.9; 54.3 - 55.1.	
	155.50		3.00			Relic altered ?clasts @ 52m, 54.9m.	
	158.50		3.00			51.2 - 51.9 : somewhat more siliceous, fractured.	
	161.50		2.90				
	164.50		2.95			(54.7-59.9m): Lapilli tuff - volcaniclastic rock, brown, limonitic, highly	
	167.50		2.95			altered (sericitic), with buff clasts and green, soapy, fiami-like	
	170.50		3.00			structures; 57.2 : foliation 40°.	
	173.50		2.97			Pyrite : trace to 1%.	
	176.50		2.98				
	178.00		1.60				

14606

AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. FIN 1 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS

(59.9-63.6m): Tuff vitric-crystal; pale yellow-green; sheared with kaolinised, altered K-felspar crystals; ?ghost textures of remnant volcaniclasts. Pyrite : 1 - 2% approximately.
63.6m : basal contact 50°.

(63.6-69m): Tuff lithic vitric; ?volcaniclastic; sheared, pinkish brown; abundant white ?fragments and ragged crystals of altered felspar diminishing towards base of unit; sparse disseminated pyrite : 1% approx.
@ 65.5m : foliation 35°.

(69-75.2m): Vitric tuff and volcanoclastic, pale yellow green, altered, sericitic; narrow patchy dark chloritic alteration zones; fine hairline fractures throughout.
@ 69.2m : 30cm pale grey green, sericitic.
@ 69.7m : possible shear; 65°; also 60cm altered chloritic zone of net vein fracturing; sphalerite-galena aggregates in fractures at top of zone:
73.3m : 1.1m chloritic N.V.F. zone. (= net vein fractured)
74.8m : 40cm chert; silicification pinkish pyrite + 1% throughout.

(75.2-78.3m): ?Lapilli crystal tuff : dark grey green and buff mottled rock with diffuse clasts and ?altered felspar crystals; irregular hairline fracturing throughout. 78.3m: contact - ?shear : 70°.
Origin : ?possible chloritic volcaniclastic.

(78.3-78.6m): Yellow-green altered volcaniclastic with white-buff clasts.
Sericitic (potassic) alteration.
Lower contact 65° - ?possible shear.

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 1 TYPE CO-ORDINATES INCLINATION DIRECTION
DATE START DATE FINISH LOGGED BY DRILL FINAL DEPTH

DEPTH FROM	TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(78.6-79.1m): Dark green to black shaly volcaniclastic; sheared; black ?mudstone matrix.	
						(79.1-79.7m): ?Transition zone - ?shear zone. 25cm sheared coarse yellow-green volcaniclastic with rounded clasts. 79.2m : ?shear 50° 79.3m : ?shear 55°; 35cm green, vitric soapy sericite/illite.	
						(79.7-88.50m): Light grey, cherty, silicified rock with sparse carbonate-filled fractures; fine-grained, disseminated pyrite throughout : 10 - 15% pyrite. Sphalerite-galena in scattered small aggregates throughout the rock and as paint on fissure fill; sparse whispy green chlorite/sericite alteration; possible f.g. K-felspar crystals. 84.40 : foliation : 75°.	
						(88.50-89.60m): ?Crystal lapilli tuff - volcaniclastic; dark green, altered, with abundant diffuse felspar crystals; becoming more siliceous, pinkish towards base. Pyrite : 10 - 15% disseminated in matrix. Sparse disseminated sphalerite-galena.	
						(89.6-93.0m): Vitric-lithic-crystal tuff; highly altered sericitic; with wisps of sericite-chlorite. 92m : foliation : 60°. Pyrite : 5 - 10%. Aggregates of sphalerite-galena becoming more prevalent.	

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 1 TYPE CO-ORDINATES INCLINATION DIRECTION
DATE START DATE FINISH LOGGED BY DRILL FINAL DEPTH

DEPTH FROM	TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(93-101.2m): Lode zone; upper contact diffuse.	
						93.5-93.8m: sphalerite-galena in fractures.	
						94-96.2m: grey chert, occasionally banded.	
						@ 94.6m : banding : 45°.	
						chalcopyrite, galena, sphalerite mineralization occurs in narrow fractures and as aggregates associated with irregularly banded pyrite.	
						95.30m : chalcopyrite-sphalerite-galena aggregates.	
						95.8m : chalcopyrite-sphalerite-galena aggregates and in fractures and fissures; silicified clasts.	
						Estimated total sulphide : 15 - 20%.	
						96.2-96.7m: ?shear zone; strong sericitic alteration, with development of schistosity; passing into altered, sericitic vitric ?crystal tuff. Shear/foliation : 55°.	
						96.7-101.2m: Complex zone of grey cherts; silicification, green sericite-illite, chlorite alteration; net vein fractured shale with carbonate fracture fill; aggregates of pyrite with patchy aggregates and fracture fill of sphalerite, galena, and sparse chalcopyrite: Est. total sulphide : 20 - 25%.	
						Sharp lower contact.	
						100.1m : 55cm dark shale, net vein fractured, slumped; sparse pyrite, sphalerite galena in fractures.	
						(101.2-115m): Silicified volcaniclastic; pink to grey, altered, with dark green ?fiami-like structures of ragged, sheared aspect @ 102m; and altered ?ghost fragments of ?volcanic clasts.	
						105.9m : Broken core: 30cm; possible fault; lower contact 50° approx. disseminated pyrite throughout : 5 - 8%; sparse patches of chalcopyrite, sphalerite, galena (cpy, 107.3m). e.g. sphalerite-galena dissem.; over 10cm @ 102.9m.	

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 1 TYPE CO-ORDINATES INCLINATION DIRECTION

DATE START DATE FINISH LOGGED BY DRILL FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(115-132.0m): Lithic crystal tuff, altered; dacitic-andesitic; massive green, medium grained, chloritised; veinlets up to 1.5cm wide with quartz-carbonate fill.	
						123.1m : patchy zone of argillic alteration.	
						123.4m : 70cm zone of argillic alteration; upper contact 40° trace to nil pyrite.	
						(132.2-163.7m): Predominantly volcaniclastic with interbedded black shales, grey or green cherts.	
						Intermittent chloritic alteration persists to 158.6m and fades towards this depth; very sparse, disseminated pyrite 1 - 3%; from 159.9m : soft sediment slumping;	
						136.4m : 70cm; grey fractured ?cherty ?rhyolite or rhyodacite with rounded to subrounded grains of silica.	
						137.8m : 80cm; clasts in matrix of black mudstone.	
						138.5m : weak chloritic alteration expecially of clasts : upper contact 25°.	
						139.5m : 25cm; cherty, grey green horizon; upper ?bedding contact 65°.	
						141.1m : 110cm; black muddy shale with clasts; clasts are subangular to rounded, pink, grey-green or white, occasionally jasperoid; probably mainly of lava and tuff dominantly of acid composition.	
						(143.8-148.8m): Zone of weak chloritic alteration and bleaching:	
						147.7m : 1m grey-green band of fractured chert.	
						(148.8-151.4m): Zone of fine-grained volcaniclastic/?lapilli tuff in matrix of black mudstone; fractured, quartz-carbonate fill; sparse sphalerite-galena.	
						(151.4-157.6m): Zone of pinkish, weakly chloritic, altered volcaniclastics with thin slivers of black ?shale.	
						155.5m : 15cm grey and pink cherty horizon.	
						158.6m : foliation - bedding : 55°.	

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 1 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(158.6-159.9): Shale, muddy, black, net vein fractured, contorted and slumped, with clasts of volcanic material. Mainly carbonate fill in net vein fractures.	
						(159.9-163.4m): Zone of slumped, contorted volcaniclastics, black shales and tuffaceous sandstone (?carbonaceous).	
						161.7m : ?bedding : 52°.	
						(163.4-178m): Black shales: with lesser interbedded bands of ?tuffaceous sandstone; slump folded.	
						@ 165.1m : bedding : 45°; displaced by microfaults : 26°.	
						166.9m : bedding : 8°	
						167.2m : facing downhole - graded bedding-fair	
						167.3m : 20cm breccia zone	
						172.2m : bedding : 5°	
						174 m : bedding : 12°	
						174.7m : bedding : 65°	
						176.5m : bedding : 10°	
						177 m : bedding : 56°	
						Facing data:	
						@ 166.4m : facing downhole; graded bedding - fair	
						170.4m : facing downhole; graded bedding - poor	
						177.1m : facing downhole; graded bedding - poor	
						End of hole : 178m.	

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AUSTRALIAN ANGLO AMERICAN LIMITED
DRILLHOLE LOG
Summary Sheet

Page
of

PROJECT	COMSTAFF PTY. LTD.	AREA	PINNACLES	DRILLHOLE TYPE	D/D
CO-ORDS	22.5S 15.5W	DEC^LN^ -70°	AZIMUTH 270° M	RL	DH No. PIN 2
DATE COMMENCED	27.2.77	DATE COMPLETED 11.3.77	DRILLED BY LONGYEAR	DRILL RIG	LONGYEAR 38
Non Coring to:	3m	HQ Core to: –	NQ Core to: 3 – 231m	BQ Core to:	EOH 231m

SURVEY DATA

Instrument: Eastman Kodak Single Shot

DEPTH	DECLINATION Uncorr	DECLINATION Corr	AZIMUTH	DEPTH	DECLINATION Uncorr	DECLINATION Corr	AZIMUTH
28.5m	–	-67.1°	273° M	150.0m	–	-61°	276° M
60.0m	–	-64.9°	275° M	180.0m	–	-55.2°	274° M
90.0m	–	-64.5°	275° M	210.0m	–	-53.7°	272° M
120.0m	–	-62.0°	276° M	231.0m	–	-51.4°	272° M

LOG SUMMARY

ROCK TYPE	MINERALIZATION Style	Grade	Intersection width (Corr)
3 m HQ casing left in hole.			
Total drilled : 321m			
Total recovered : 223.7m			
% Recovery : 96.8%			
(3-70.60) Intergrading, altered vitric tuffs, ?ignimbrites and volcaniclastics.			
(70.60-93.30) Quartz – felspar – porphyry.			
(93.30-95.90) Altered, interbedded tuffs, ?ignimbrites and volcaniclastics.			
(95.90-150.10) Mainly altered volcaniclastics; disseminated aggregates of sphalerite, galena.			
(150.10-165.80) Lode zone; patchy galena sphalerite pyrite mineralization; very minor chalcopyrite; in parts cherty.			
165.80-176.30: Altered sheared ignimbritic volcaniclastics.			
176.30-180.80: Dark green chloritic dacitic-andesitic tuff; trace Pb-Zn-pyrite mineralization.			
180.80-183.20: Buff transition zone.			
183.20-196.60: Interbedded, altered volcaniclastics and black mudstone (?shale)			
196.60-204.50: Laminated, slumped black shales.			
204.50-222: Interbedded black shales and thin tuff bands; slumped.			
222 – 231: Dark grey lithic-crystal tuffs; ?dacitic-andesitic.			

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APPENDIX 1.

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 | TYPE Diamond | CO-ORDINATES 22.5S/15.5W | INCLINATION -70° | DIRECTION 270° mag.

DATE START | DATE FINISH | LOGGED BY | DRILL Longyear 38 | FINAL DEPTH 231m

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
0	6		3.8			(0.0 - 70.60) Sequence of intergrading highly altered vitric tuffs,	
6	9		1.8			?ignimbrites and possibly volcaniclastics.	
9	12		3.0			Colour green-grey to buff-green, generally massive pyrite	
12	15		3.0			variable : 1-5%.	
15	18		2.9				
18	21		3.0			(0.0 - 20.30) Massive pale green grey vitric crystal tuff ?felspar crystals	
21	24		3.0			generally altered to Kaolin fractured, occ. vuggy.	
24	27		2.9			@ 6.10m : bedding 75 in sandy tuff layer.	
27	30		3.0				
30	33		2.9			(20.30m - 31.60) Massive ?tuff lava; well jointed; manganese	
33	36		2.8			coatings on joints; fine-grained disseminated pyrite : ca 1 - 3%.	
36	39		3.0				
39	42		2.9			(31.60 - 33.20) Highly altered yellow-green, volcaniclastic rock.	
42	45		2.6				
45	49		3.0			(33.20 - 35.70) Light grey-green, waxy, highly altered ?tuff pyrite : to 5%	
48	51		3.0				
51	54		3.0			(35.70 - 37.90) Light yellow-green, highly altered ?volcaniclastic rock	
54	57		3.0			passing downwards into wispy ?ignimbrite (pinkish) @ 37.20m-pyrite 3-5%	
57	60		2.9				
60	63		2.9			(37.90 - 39.30) Pinkish, highly altered, festained ?ignimbrite passing into	
63	66		3.0			thin band of pale green, highly altered ?tuff.	
66	69		2.9				
69	72		3.0			(39.30 - 39.8) Highly altered ?tuff; f.g. disseminated pyrite - 2-3%	
72	75		2.9				
75	78		3.0			(39.8 - 42.60) Pinkish, highly altered, faintly foliated ?ignimbrite or	
78	81		3.0			volcaniclastic - wisps & patches of dark green sericite-illite-	
81	84		3.0			hydro-muscovite pyrite aggregates @ 40.60m: f.g. dissem. pyrite in	
84	87		3.0			material : ca 3-5% 40.70m : foliation : 32° (angle to core axis)	
87	90		3.0			42.60m : lower contact : 52°	
90	93		2.9				
93	96		3.0			(42.60 - 43.40) Pale green highly altered ?vitric crystal tuff, faint	
96	99		2.95			relic net-vein fracturing; fine-grained, euhedral pyrite disseminated	
99	102		2.8			throughout; also in sparse small aggregates : total content 3-5% pyrite.	
102	105		3.0				
105	108		2.9				
108	111		2.95				

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APPENDIX 1.

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 TYPE CO-ORDINATES INCLINATION DIRECTION

DATE START DATE FINISH LOGGED BY DRILL FINAL DEPTH

DEPTH FROM	TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION
111	114		2.9			(43.40 - 47.30)Volcaniclastics, pale yellow-green to pink, highly altered;
114	117		3.0			sparse patches of dark green, soapy, sericite-illite aggregates and K-
117	120		3.0			felspar crystal ?over printing; fine-grained disseminated pyrite
120	123		3.0			ca 3%; @ 44.50m; f.g. pyrite in 0.5cm joint
123	126		2.9			
126	129		2.95			(47.30 - 48.80) Pale yellow green, highly altered vitric crystal tuff;
129	132		2.9			fine-grained pyrite dissem. in matrix, also in small aggregates; total :
132	135		2.95			5% approx.
135	138		3.0			
138	141		3.0			(48.80 - 50.70)Yellow green, highly altered ?volcaniclastic with diffuse
141	144		2.9			altered fragments @ 50.70m fragmented core - ?brecciated - ?Fault.
144	147		3.0			
147	150		2.9			(50.70 - 52.20) Green, highly altered ?vitric tuff; almost completely altered
150	153		3.0			to a mass of sericite-illite.
153	156		3.0			
156	159		3.0			(52.20 - 66.30) Volcaniclastic, pink, highly altered, with wisps and small
159	162		3.0			patches of sericite-illite ?after?fiami; weak foliation developed;
162	165		2.6			@ 54.3 Foln: 35.; f.g. euhedral pyrite dissem. throughout; 2-3% approx.
165	168		3.0			Yellow green, tuffaceous thin zones with altered felspar crystals @:
168	171		2.9			54.70; 55.60; 56.60 - 57.50; 58 - 58.50m K-felspar ?over printing
171	174		3.0			common 59.40m. Gradual colour change to greenish grey from 61.80m.
174	177		3.0			Light coloured clasts with diffuse edges, possibly of acidic composition
177	180		2.95			more prominent 63.00 - 66.20m.
180	183		2.9			
183	186		3.0			(66.30 - 67.80) Green, highly altered ?crystal tuff with wisps and fragments
186	189		3.0			of soapy sericite-illite aggregates.
189	192		3.0			
192	195		3.0			(67.90 - 70.60) Beds of grey green, weakly foliated ?ignimbrite or
195	198		3.0			volcaniclastics; highly altered, with sericite-illite matrix @ 68.60m :
198	201		2.9			foliation : 35 - 45°. f.g. dissem. pyrite throughout : 2-3%.
201	204		2.95			
204	207		2.9			
207	210		2.85			
210	213		3.0			
213	216		2.9			
216	219		2.95			

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
219	222		2.9			(70.60 - 93.30) Quartz felspar porphyry: light grey green, with large	
222	225		3.0			sub to euhedral quartz phenocrysts and diffuse crystals of white felspar;	
225	228		3.0			fine-grained pyrite in fractures enclosed in quartz crystals, and small,	
228	231		3.0			disseminated aggregates : 3 - 5% approx. Frequent medium bleaching	
						around fractures; fractures are dominantly carbonate-lined, with lesser	
Footage drilled 231m						quartz; trace brown sphalerite in fractures @76.50m; gal-sphal in	
" recovered 223.7						fractures @ 81.40m.	
% recovery		96.84%					
						(79.30 - 81.0) Pinkish, ?altered zone with diffuse white crystals and small	
						patches of dark green sericite-illite.	
						81.50 - 82.0m - mottled, pink-green; carbonate veining more frequent	
						83.00: 20cm - buff pink zone around carbonate-filled 0.5cm fracture	
						86.60 - 87.10- f.g. galena lining in fractures	
						87.10: 20cm - fractured fragmented zone	
						@ 87.10 ?Fault : 56°	
						89.00 - 93.0m: Buff - khaki-pink zone	
						Lower contact zone ?transitional, fragmented, over 6 m from 87.30m;	
						thin carb fractures, some with galena-sphalerite and dark green chlorite	
						comm. 91.30 - 93.30.	
						(93.30 - 95.90) Zone of highly altered, green-grey and pinkish interbedded	
						tuffs, ?ignimbrites and volcaniclastics, and occasional carbonate-lined	
						fractures, which may contain smears and aggregates of sphalerite and	
						galena: highly altered, foliated.	
						94.20m: foliation/schistosity : 45°	
						wisps and patches of dark green, soapy sericite-illite material	
						f.g. euhedral pyrite dissem. throughout: ca 3 - 5%.	
						Brown sphalerite/galena aggregatesin irregular thin fractures.	
						@ 93.30 20m zone of diffuse felspar crystals.	
						Carb. lined fine shears;	

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(95.90 - 150.10) Mainly altered volcaniclastics, with thin bands of tuff; f.g. pyrite dissem. throughout - ca 3-5%; small disseminated aggregates of sphalerite/galena ; also as occasional fracture fill with carbonate; @ 103.20 : 30m dark green highly altered ?tuff. ?Bedding 80° @ 103.20m	
						105.50m:30 m dark green altered ?tuff; fol'n. 45°.	
						(105.50 - 117.70) Pinkish (105.50 - 110.60) to pinkish green zone; ignimbritic in parts;- pyrite - sphalerite/galena aggregates contained within ?white/buff clasts.	
						113.60m:30m zone of sheared tuff with augen of quartz-sphalerite-galena aggregates - 1cm diameter. Fol'n/shear : 45°	
						113.60m: 2.3m zone of sphalerite/galena mineralization.	
						114.30 - 40cm zone of schistose?tuffaceous volcaniclastics with augen (?clases) and veinlets of galena/sphalerite.	
						117.60 : approx. 1.2m of pale green ?vitric ?tuff with galena/sphalerite in fractures	
						120.70 : 1.3m of quartz veins with sphalerite/galena aggregates and minor carbonate;silicification of host rock.	
						122.30 - 50cm zone of highly altered xl ?tuff wisps of black green chlorite in matrix and in fractures	
						125.60 : 20m of sphalerite/galena aggregates in ground mass and fractures	
						126.40 : zone of schistose,sheared yellow green ?tuff with sphalerite/ galena aggregates - fol'n/shear 64°.	
						from 126.60, mainly volcaniclastics, often coarse; with white and pink altered clasts; thin streaks of dark chlorite and small aggregates of sphalerite/galena.	

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APPENDIX 1.

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS

From 132.80m: 4.20m zone of pink fine-grained unit ?acid lava with diffuse xls of white felspar; small aggregates of sphalerite/galena; lower contact 12° @ 137m.

@ 137m - 1m zone of shearing and breccias - ?fault, some galena/sphalerite aggregates.

137m - 150.10 - zone of coarse pyroclastics; altered; fragments often diffuse; pink, white and buff, fine-grained, of possible acid volcanic composition; streaks of black-greenchlorite; possible weak K-felspar over printing. Fine grained, euhedral, disseminated pyrite : 2-5%; sparse galena/sphalerite aggregates in ground-mass, fractures and occasionally in clasts.

150.10 - 165.80 - lode zone: 150.10m -152.60m -pale yellow green ?vitric tuff, intensely altered zone, f.g. sericite-illite matrix with some 'ghost' fragments. Pyrite ca 2-3%. 2cm wide streaks of pyrite.

@ 152.60m: shear) 38° with 5cm zone of shearing and carbonate fill;
) brown sphalerite, less galena in associated fractures.

150.10 - 154.50 - zone of highly altered silicified sheared tuffaceous volcaniclastics, fractured with carbonate lining; aggregates of f.g. sphalerite/galena in fractures and interstitial;galena also as grey "paint" on shear planes. Possible shears @154m- 55°)
@154.40m) with assoc. aggregs.
sphalerite/galena mineralization.

154.40 - 156.90 - Grey chert-fractured;carb-quartz lined ; also dark chlorite lining; aggregates of brown sphalerite; lesser galena; sparse cpy;- pyrite 5-10%.

156.90 - 157.40 - dark grey green rock / equigranular ; wispy sparse illite-sericite chlorite zones; possible origin : silicified, cherty vitric tuff : highly altered; sparse, pdy sphalerite/galena in scattered aggregates, fracture fill and paint on shears.

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(157.40 - 159.70) Shear zone with patchy silicification, K-felspar alteration, brecciation and carbonate alteration. 158.80 - 10m Breccia zone; carb. filled - 53°; stringers, aggregates and fracture fill of sphalerite/galena mineralization, possibly trace Barite pyrite - 10%.	
						(159.70 - 160.20) 50cm grey hard chert, sparse sulphides.	
						(160.20 - 161.40) Pale yellow green, highly altered, shear ?volcaniclastic rock - foliation 46° @ 160.60m; @ 160.40 - ?fault - carb. filled - 50°.	
						(161.40 - 162.10) Grey, cherty zone; sparse, patchy sphalerite/galena in streaks and aggregates. @ 162.10 : 60m shear zone : with carbonate, sericite-illite and sparse sulphide mineralization; shear/schistosity: 47°;	
						(162.70 - 165.80) Grey-pink silicified, sheared, altered volcaniclastics with several narrow zones of grey ?chert; localized fracturing with carbonate and/or sphalerite/galena fil or lining; trace cpy. associated with sparse scattered aggregates of sphalerite/galena. 165.10: 50cm cherty zone 165.50 -40cm sheared, highly altered vitric tuff, dark green, soapy, with aggregates of galena/sphalerite.	
						(165.80 - 176.30) Highly altered, sheared, ignimbritic volcaniclastics, pale grey - yellow green; cut by russet coloured, carbonate filled fractures; wisps of dark green sericite-illite material - ?fiame relics @ 167.20m foliation 50° f.g. med. gr. dissem. pyrite - 1-3% scattered sparse small aggregates of sphalerite/galena mineralization, galena also as paint on joints; @172.60m: foliation - ?shear 50° @ 174 minor aggregate of chalcopyrite.	

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AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 TYPE CO-ORDINATES INCLINATION DIRECTION
DATE START DATE FINISH LOGGED BY DRILL FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS

(176.30 - 180.80) Dark green, evengrained, chloritic, dacitic-andesitic ?tuff; @ 177.50 - faint shearing - 60°; sparse, narrow fissures, filled with yellow-brown carbonate; sparse disseminated euhedral pyrite 1-3%; rare patchy aggregates of sphalerite/galena mineralization.

(180.80-183.20) Buff and green, irregularly and moderate to weakly altered transition zone:
180.60: 50m buff altered zone of acid fragmenta ls becoming progressively weaker and more intermittent from 181m to 197m.

(183.20-196.60) Interbedded yellow green to buff volcaniclastics and black shales (?mudstone); weakly altered to 188m; thence intermittent, weak; alteration (?carbonate chlorite) pyrite 1-3%; fracturing with light brown carbonate fill to 186m.
@ 185.60m: 20m of sphalerite/galena aggregates.
186.1-187.5: zone of pink, jasperoidal chert.
@ 187.80 10 cm black shale
@ 188.30 45 cm fractured black shale with carbonate fracture fill - trace sphalerite in fractures
188.70: volcaniclastic acidic fragments, yellowish, weak sericite alteration
188.90: 50 cm grey and pink chert.
189.80: 90 cm black shale, fractured, with buff-brown carbonate fracture fill.
190m - 50 cm grey cherty zone passing into 25 cm pink volcaniclastic rock.
191m - 50 cm grey cherty zone
191.90m - 25 cm fractured chert, grey passing into pink slightly altered volcanic fragmental rock
194.30 - 196.60 - volcaniclastics (?acid composition) in black shaly (?mudstone) matrix
@ 196.20:- 40cm - weak sericite/illite zone.

(196.60-204.50) Zone of interbedded, slumped black shales with thin bands of carbonate rich buff-brown tuffs and volcaniclastics.
Foliation - 76° @ 196.70m
Bedding: 53° @ 198.50m
Foliation/bedding 50° @ 201.50 in slightly altered, tuffaceous volcaniclastic bed.

146074

AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION
DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(204.50-222) Interbedded black shales and thin khaki-grey ?tuff bands in parts slumped, contorted	
						@ 205 bedding 43°	
						@ 206.40 ?facing down in load casts & graded bedding - poor	
						@ 212.60 40 cm zone of fracturing - light brown carbonate fill in fractures	
						@ 214.20 ?facing up graded bedding - poor; bedding 53°.	
						@ 217.70: facing down, graded bedding - poor	
						(222-231) Dark grey ?tuff lithic-crystal; ?weak K-felspar overprinting. massive, structureless, possibly dacitic-andesitic composition, sparse fracturing, with light brown carbonate -quartz fill	
						@ 223.70: bedding 40°	
						End of hole 231m	

146075

APPENDIX 1.

Page 8

075

AUSTRALIAN ANGLO AMERICAN LIMITED

PROJECT:

BOREHOLE No. PIN 2 | TYPE | CO-ORDINATES | INCLINATION | DIRECTION

DATE START | DATE FINISH | LOGGED BY | DRILL | FINAL DEPTH

DEPTH FROM	DEPTH TO	DRILLED METRES	REC. METRES	SAMPLE INT.	SAMPLE No.	DESCRIPTION	ASSAY RESULTS
						(204.50-222) Interbedded black shales and thin khaki-grey ?tuff bands in parts slumped, contorted	
						@ 205 bedding 43°	
						@ 206.40 ?facing down in load casts & graded bedding - poor	
						@ 212.80 40 cm zone of fracturing - light brown carbonate fill in fractures	
						@ 214.20 ?facing up graded bedding - poor: bedding 53°.	
						@ 217.70: facing down, graded bedding - poor	
						(222-231) Dark grey ?tuff lithic-crystal: ?weak K-felspar overprinting, massive, structureless, possibly dacitic-andesitic composition, sparse fracturing, with light brown carbonate -quartz fill	
						@ 223.70: bedding 40°	
						End of hole 231m	

146076

Appendix 2

Assay Results
DDH PIN 1

Note : Ba assays incomplete
121 - 179 m : not assayed for Ba.

.077

146078 DDH PIN 1

EAA. PIN I. DDH.

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/33	Our Ref. P:481:
Date In 1.8.77	Date Out 12.8.77
Client: COMSTAFF PTY.LTD.	
Samples Identification: As per sheets.	

ANALYTICAL REPORT

REMARKS

These samples have been checked.

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
(Aqua Regia).	Ag	20%	2ppm	0.2
[illegible]	Cu Pb Zn	10%	300ppm	2

AAS Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.

Sorting Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.

Colorimetric Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity -- Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.

PRECISION is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 4 pages, have been obtained in accordance with

NATA SIGNATORY

078

146079 DDH PIN 3

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

Typist:P.Cardozo
P14811/1

Analyst	EC	CP	SN	CP	
Sample No.	Ag	Cu	Pb	Zn	Depth
EAA T5001 *	1.0	38	260	58	0 – 6.5 m
02	1.4	220	350	84	9.5
03	2.0	190	1000	250	12.5
04	0.8	160	1000	280	15.45
05	1.2	80	1450	390	18.55
06	2.0	74	>2000	560	21.00
07	1.0	54	1050	330	22.00
08	1.0	50	280	340	23.00
09	0.8	30	900	380	24.00
10 *	0.6	22	700	270	25.00
INTERNAL STANDARD					
11	0.6	32	750	240	26.00
12	1.2	28	420	270	27.50
13	2.0	24	>2000	1020	28.50
14	0.6	12	220	250	29.50
15	2.4	100	370	330	30.50
16	0.8	40	150	120	31.50
17	0.8	20	100	120	32.50
18	0.4	8	52	120	33.50
19	0.2	8	60	120	34.60
20 *	0.4	96	120	250	35.20
21	0.4	50	100	150	36.20
22	0.2	16	160	180	37.20
23	0.4	30	140	170	38.20
24	0.4	16	100	300	39.20
EAA T5025	0.4	12	50	[illegible]	40.20

requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

[illegible] NATA signatory

073

146080

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

P14811/2

Analyst

Sample No.	EC Ag	CP Cu	SN Pb	CP Zn	
EAA T5026	0.6	22	290	520	40·2 - 41·2
27	0.4	22	260	1500	42·2
28	0.4	20	220	580	43·2
29	0.6	12	94	160	44·2
30 *	0.4	8	70	84	45·2
31	0.4	8	66	84	46·2
32	0.4	10	66	110	47·3
33	0.2	12	62	160	48·3
34	0.6	76	28	170	49·3
35	0.4	10	26	80	50·3
INTERNAL STANDARD					
36	0.2	92	48	140	51·3
37	0.4	24	38	140	52·3
38	0.4	10	76	220	53·3
39	0.2	6	56	170	54·7
40 *	0.2	12	40	150	55·7
41	0.2	16	20	110	56·7
42	0.4	6	26	64	57·7
43	0.4	6	26	82	58·7
44	0.8	6	38	200	59·9
45	0.8	14	36	350	60·9
46	0.2	52	42	150	61·9
47	2.4	160	340	240	62·9
48	0.2	22	52	92	63·6
49	0.2	6	38	94	64·6
EAA T5050 *	0.2	6	26	90	65·6

*equested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

080

146081

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

P14811/3

Analyst

Sample No.	EC Ag	CP Cu	SN Pb	CP Zn	
EAA T5051	0.6	10	28	110	65·6 - 66·6
52	0.2	8	24	80	67·6
53	0.6	6	46	90	69·6
54	4.4	46	1050	7000	70·6
55	2.8	28	270	6800	71·0
56	0.2	10	36	420	72·0
57	0.4	4	26	150	73·0
58	0.4	6	24	140	74·0
59	1.2	28	190	140	75·2
60 *	0.8	170	66	220	76·2
INTERNAL STANDARD					
61	0.2	130	48	410	77·2
62	1.2	250	160	700	78·2
63	1.0	58	54	720	79·1
64	1.0	46	54	450	79·7
65	2.4	56	>2000	1900	80·5
66	1.0	14	350	310	81·5
67	0.8	14	600	380	82·5
68	0.4	14	190	130	83·5
69	0.8	20	150	160	84·5
70 *	1.0	64	240	4000	85·5
71	1.4	88	210	3400	86·5
72	0.4	26	88	320	87·5
73	0.2	14	82	130	88·5
74	1.4	210	150	2200	89·5
EAA T5075	1.0	170	106	780	90·6

requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

081

146082 PIN 1

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

P14811/4

Analyst		EC	CP	SH	CP	
Sample No		Ag	Cu	Pb	Zn	
EAA	T5076	0.8	540	150	230	90.6 – 91.0
	77	0.8	58	86	92	92.0
	78	0.8	32	86	190	93.0

082

146083

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65-4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/33	Our Ref. P14811	Date In 1.8.77	Date Out 12.8.77

Client: COMSTAFF PTY.LTD.

Typist:P.Cardozo

ATOMIC ABSORPTION ASSAY

Analyst		RW				Analyst				
Limit of detection		0.01%				Limit of detection				
Precision ± %		5%				Precision ± %				
Sample No.		Pb%				Sample No.				
EAA T5006		0.35	18.55	21.00						
EAA T5013		0.23	27.5	28.5						
EAA T5065		0.33	79.7	80.5						

All results expressed as a percentage unless otherwise indicated.
"X" indicates that the content of the element sought is below the limit of detection.
"--" means not determined

P. C[illegible]

N.A.T.A. SIGNATORY

083

146084

EAA RRN. PIN I.

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.
21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/11	Our Ref. P14266
Date In 8.3.77	Date Out 16.3.77
Client: CONSTAFF PTY. LTD.	
Samples Identification: As per sheet.	

ANALYTICAL REPORT

REMARKS

* = These samples have been checked.

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
AAS ($HClO_4$)	Cu Pb Zn	10%	300ppm	2
AAS (Aqua Regia)	Ag	20%	2ppm	0.2
LG 5	Au	20%	10ppm	0.05
Code 09	Ba	10%	1000ppm	10

AAS *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.*

Colorimetric *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 1 *pages, have been obtained in accordance with the Association's terms of registration*

NATA SIGNATORY

084

146085

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

Typist:P.Cardozo

P14266/1

Analyst / Sample No.		BG / Ba	CP / Cu	Depth.	EC / Pb	SN / Zn	SN / Ag	EC / Au
EAA	T4801 *	1200	96	93-94m.	1200	1100	2.4	x
	4802	1160	84	95	1300	400	4.0	x
	4803 *	660	350	96	>2000	1900	6.0	x
	4804	540	2650	97·3	1100	>1%	6.0	x
	4805 *	960	40	98·3	600	2000	2.0	x
	4806	900	450	99·5	1700	6600	6.0	x
	4807	920	150	100·5	240	2400	1.8	x
	4808	620	350	100·5-101·5	850	>1%	6.8	x
EAA	T4809 *	760	1100	100·5-101·3	900	>1%	8.2	x
INTERNAL STANDARD								

requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

085

146086

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/11	Our Ref. P14266
Date In 8.3.77	Date Out 16.3.77
Client COMSTAFF PTY. LTD.	

Typist:P.Cardozo

ATOMIC ABSORPTION ASSAY

Analyst			RW		RW	Analyst				
Limit of detection			0.01%		0.01%	Limit of detection				
Precision ± %			5%		5%	Precision ± %				
Sample No.			Pb%		Zn%	Sample No.	Depth			
EAA T 4803			0.23		-		95 - 96			
4804			-		2.0		96-97·3			
4808			-		2.0		100·5-101·5			
EAA T 4809			-		2.0		100·5-101·3			

All results expressed as a percentage unless otherwise indicated.
"X" indicates that the content of the element sought is below the limit of detection.
"–" means not determined

P C[signature]

NATA SIGNATORY

086

146087

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

P14811/4

Analyst / Sample No.	EC Ag	CP Cu	SH Pb	CP Zn	
see below 79	1.0	42	300	1400	102·3 — 103·3
80	1.8	430	180	4000	104·0
81	0.6	74	70	940	105·0
82	0.4	36	64	820	106·0
83	0.6	34	82	1200	107·0
84	1.0	112	64	3800	108·0
85	1.8	460	72	1800	109·0
INTERNAL STANDARD					
86	1.8	450	86	1400	110·0
87	1.4	210	58	350	111·0
88	1.4	370	80	320	112·0
89	0.8	96	82	600	113·0
90	0.8	56	66	840	114·0
91	0.8	96	160	880	115·0
92	0.6	42	116	410	116·0
93	0.6	10	50	160	117·0
94	0.6	8	32	150	118·0
95	0.4	6	30	160	119·0
96	0.6	8	24	120	120·0
EAA T5097 *	0.4	4	20	160	121·0

.087

146088

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

NATA

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/34	Our Ref. PI4900
Date In 18.8.77	Date Out 31.8.77
Client: COMSTAFF PTY.LTD.	
Samples Identification: As per sheets.	

ANALYTICAL REPORT

REMARKS

* = These samples have been checked.

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
AAS ($HClO_4$)	Cu Pb Zn	10%	300ppm	2
AAS (Aqua Regia)	Ag	20%	2ppm	0.2

AAS *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.*

Colorimetric *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 5 *pages, have been obtained in accordance with the Association's terms of registration.*

P. C—

NATA SIGNATORY

088

146089

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

Typist V Szvetlik

P14900-1

Analyst

Sample No.	CP Cu	EC Pb	CP Zn	EC Ag	Depth.
PIN-1-T5098 *	10	20	80	0.6	121 – 122
099	6	28	86	0.8	123
100	12	24	86	1.0	124
101	8	40	104	0.8	125
102	6	22	42	0.8	126
103	8	34	160	0.2	127
104	4	20	84	1.0	128
105	8	20	92	0.8	129
106	6	24	102	0.6	[illegible]
107 *	6	30	86	0.6	[illegible]
INTERNAL STANDARD					
108	16	36	84	0.4	132
109	8	24	60	0.4	133·2
110	8	20	56	0.8	134·2
111	6	24	38	0.6	135·2
112	10	46	390	0.8	136·7
113	6	30	120	0.4	137·4
114	6	60	220	0.4	138·8
115	36	490	3600	1.2	139·5
116	6	38	78	0.4	140·5
117 *	14	42	150	0.6	141·5
118	6	230	470	0.8	142·6
119	12	300	4400	1.0	143·6
120	14	100	660	1.0	144·8
121	4	48	60	0.2	145·8
PIN-1-T5122	6	330	96	0.2	146·8

...ot requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

089

146090

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

Typist:P.Cardozo

P14900-2

Analyst

Sample No.	CP Cu	EC Pb	CP Zn	EC Ag	
PIN-1-T5123	8	350	940	1.2	146.8 – 147
124	8	250	1900	1.0	148
125	10	270	130	0.4	149
126	14	420	2200	1.2	150.8
127 *	40	460	9600	1.6	151
128	18	450	~1%	2.0	152
129	4	56	200	0.4	153
130	12	240	5600	1.0	154
131	4	20	180	0.6	155
132	6	40	1600	0.4	155.4 – 156.4
INTERNAL STANDARD					
133	10	290	190	0.6	156.4 – 157.4
134	18	420	9000	1.0	157.4 – 158
135	10	84	480	0.2	159.6
136	50	470	>1%	2.0	160
137	36	1000	1700	1.8	162
138 *	30	580	900	1.4	163
139	30	270	510	1.8	164
140	52	330	1600	3.0	165
141	90	280	620	5.0	166
142	32	450	1500	2.6	167
143	34	240	600	3.0	168
144	40	410	310	2.4	169
145	28	220	430	2.8	170
146	36	190	600	2.6	171
147	42	290	380	1.6	172
PIN-1-T5148 *	44	260	680	3.0	173

requested G.T. 1% greater than 1% T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

090

146091

GEOMIN LABORATORIES

REPORT No. SHEET No.

SYDNEY — DARWIN — KALGOORLIE — PERTH

NATA P14900-3

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

Analyst

Sample No.	CP Cu	EC Pb	CP Zn	EC Ag	
P[illegible]-1-T5149	34	180	430	2.4	173 – 174
150	36	200	500	2.8	175
151	44	270	840	2.6	176
152	40	200	460	1.6	177
153	44	150	220	2.0	178
[illegible]-1-T5154	20	340	130	2.6	178 – 179.

091

146092

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65-4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/34	Our Ref. P14900
Date In 18.8.77	Date Out 31.8.77
Client COMSTAFF PTY.LTD.	

Typist:P.Cardozo

ATOMIC ABSORPTION ASSAY

Analyst		RW			RW	Analyst				
Limit of detection		0.01%			0.01%	Limit of detection				
Precision ± %		5%			5%	Precision ± %				
Sample No.		Pb%			Zn%	Sample No. Depth				
[illegible] T5128	..	-			1.20	151·8-152·4				
[illegible] T5136		-			1.30	159·6-160·9				

092

146093

BARIUM ASSAYS

EAA

Your Ref. 77/33	Our Ref. P14811
Date In 1.8.77	Date Out 16.8.77
Client COMSTAFF PTY.LTD.	
Samples Identification As per sheets.	

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.
21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

PIN I DDH.

ANALYTICAL REPORT

REMARKS
* = These samples have been checked.

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
Code 09	Ba	10%	1000ppm	10

AAS *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.*

Colorimetric *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 4 *pages, have been obtained in accordance with the Association's terms of registration.*

P. C [signature]

NATA SIGNATORY

093

146094

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

Typist:P.Cardozo

P14811/1

Analyst

Sample No.	Ba	Depth
EAA T5001 *	320	0 - 6·5
02	760	9·5
03	780	12·5
04	800	15·45
05	720	18·55
06	740	21·0
07	700	22·0
08	620	23·0
09	720	24·0
10 *	560	25·0
INTERNAL STANDARD		
11	600	26·0
12	620	27·5
13	540	28·5
14	540	29·5
15	480	30·5
16	520	31·5
17	600	32·5
18	580	33·5
19	600	34·5
20 *	540	35·2
21	560	36·2
22	740	37·2
23	740	38·2
24	680	39·2
EAA T5025	660	40·2

...requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

Th... ...companied b... cover sheet signed by the registered NATA signatory

034

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

NATA

REPORT No. SHEET No.

P14811/2

Analyst

Sample No.		XW Ba	
EAA	T5026	800	40·2 – 41·2
	27	700	42·2
	28	680	43·2
	29	660	44·2
	30 *	600	45·2
	31	600	46·2
	32	540	47·3
	33	680	48·3
	34	720	49·3
	35	780	50·3
INTERNAL STANDARD			
	36	680	51·3
	37	700	52·3
	38	700	53·3
	39	680	54·7
	40 *	640	55·7
	41	600	56·7
	42	580	57·7
	43	600	58·7
	44	500	59·9
	45	440	60·9
	46	620	61·9
	47	580	62·9
	48	680	63·6
	49	540	64·6
EAA	T5050 *	580	65·6

...: requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

146096

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No. P14811/3

Analyst

Sample No.		BW Ba	
EAA T5051		540	65·6 – 66·6
52		560	67·6
53		540	69·0
54		400	70·0
55		340	71·0
56		500	72·0
57		560	73·0
58		500	74·0
59		460	75·2
60	*	400	76·2
INTERNAL STANDARD			
61		480	77·2
62		420	78·2
63		400	79·1
64		760	79·7
65		580	80·5
66		760	81·5
67		640	82·5
68		660	83·5
69		600	84·5
70	*	640	85·5
71		920	86·5
72		1100	87·5
73		1160	88·5
74		1360	[illegible]
EAA T5075		940	[illegible]

* requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

U96

146097

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. SHEET No.

P14811/4

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

Analyst: RW

Sample No.		Ba	
EAA	T5076	660	90·6 – 91·0
	77	760	
	78	680	
	79	620	
	80 *	760	
	81	860	
	82	800	
	83	600	
	84	640	
	85	580	
INTERNAL STANDARD			
	86	580	
	87	520	
	88	520	
	89	560	
	90 *	620	
	91	660	
	92	480	
	93	420	
	94	400	
	95	420	
	96	440	
EAA	T5097 *	400	

* requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

Appendix 3

Assay Results

DDH PIN 2

Note : Barium assays incomplete

0 - 149) not assayed for Ba
165.8 - 231)

PINNACLES METRIC GRID

DRILL CORE ASSAYS

DDH PIN 2.

[illegible]-2-T5155	54	60	38	1.0	0 – 6 m
156	16	60	28	0.6	9
157	12	70	16	0.4	12
158 *	48	80	38	0.4	15
INTERNAL STANDARD					
159	120	70	38	0.6	18
160	42	190	44	0.6	21
161	160	950	180	0.6	24
162	108	1000	180	0.4	27
163	106	900	1700	0.4	30
164	58	1650	96	0.4	33
165	24	260	64	0.4	36
166	8	200	120	0.4	39
167	18	200	130	0.4	42
168 *	26	200	300	0.6	45
169	8	50	200	0.2	48
170	62	62	220	0.2	51
171	8	70	240	0.2	54
172	6	30	80	0.2	57
PIN-2-T5173	4	24	70	0.2	60

099

146100

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

P14900-4

Analyst

Sample No.	CP Cu	EC Pb	CP Zn	EC Ag	
PIN-2-T5174	12	44	90	0.4	60 - 63
175	22	240	52	0.8	66
176	22	>2000	410	8.0	69
177	12	480	88	0.8	70
178 *	6	76	150	0.2	70.6
179	6	30	36	0.4	71.6
180	6	20	44	0.4	72.6
181	8	20	26	0.4	73.6
182	6	20	30	x	74.6
183	10	46	48	0.2	75
INTERNAL STANDARD					
184	6	24	44	0.2	76.6
185	14	36	98	0.2	77
186	8	1000	56	0.6	78
187	12	32	210	0.2	79
188 *	8	34	58	0.2	81
189	8	78	110	0.4	82
190	10	68	160	0.2	83
191	12	90	74	0.2	84
192	8	30	48	0.2	85
193	4	38	52	0.4	86
194	14	>2000	170	1.6	87
195	6	50	76	0.4	88
196	8	34	44	0.2	89
197	6	36	36	0.4	90
PIN-2-T5198 *	16	>2000	640	3.0	91

— not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

100

146101

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

NATA P14900-5

Analyst

Sample No.	CP Cu	EC Pb	CP Zn	EC Ag	
PIN-2-T5199	8	38	44	0.2	91.3 - 92.3
200	6	800	190	0.6	93.3
201	18	900	78	10.0	94.3
202	24	>2000	2000	2.4	95.3
203	10	1100	430	1.0	95.9
204	6	550	350	0.6	97.0
205	8	1100	700	1.0	98.0
PIN-2-T5206	12	>2000	920	2.0	99.0
PIN 2-T5207	10	850	1600	0.6	100.0
208	12	420	2900	0.8	101.0
INTERNAL STANDARD					
209	10	190	4500	0.4	102.0
210	8	104	980	0.8	103.0
211	8	150	2200	2.4	104.0
212	6	76	1400	0.6	105.0
213	6	250	580	0.8	106.0
214	6	50	140	0.4	107.0
215	12	58	390	0.4	108.0
216	10	98	880	0.2	109.0
217	10	420	380	0.8	110.0
PIN 2-T5218 *	10	290	190	0.6	111.0
* PIN-1-T5133	16	240	4300	0.6	

not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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146102

DDH YIN 2

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847 — NATA

Phone: 65-4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/34	Our Ref. P14900
Date In 18.8.77	Date Out 31.8.77
Client COMSTAFF PTY.LTD.	

Typist:P.Cardozo

ATOMIC ABSORPTION ASSAY

Analyst		RW			RW	Analyst				
Limit of detection		0.01%			0.01%	Limit of detection				
Precision ± %		5%			5%	Precision ± %				
Sample No.		Pb%			Zn%	Sample No. / Depth				
YIN2 T5176		1.15			-	66 - 69				
YIN2 T5194		0.42			-	86-87				
YIN2 T5198		0.25			-	90 -91·3				
YIN2 T5202		0.39			-	94·3 - 15·3				
YIN2 T5206		0.36			-	98 -99				

All results expressed as a percentage unless otherwise indicated.

102

146103

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847 NATA

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/42	Our Ref. P15301
Date In 22.11.77	Date Out 6.12.77
Client: COMSTAFF PTY. LTD.	
Samples Identification: As per sheets.	

ANALYTICAL REPORT

REMARKS * = These samples have been checked.

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
AAS ($HClO_4$)	Cu Pb Zn	10%	300ppm	
AAS (Aqua Regia)	Ag	20%	2ppm	[illegible]

AAS *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.*

Colorimetric *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 5 *pages, have been obtained in accordance with the Association's terms of registration.*

NATA SIGNATORY

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146104

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

Typist:P.Cardozo

P15301/1

Analyst

Sample No.	MS Cu	EC Pb	CP Zn	CP Ag	
EAA T5219 *	16	1500	190	3.4	111 – 112.3
20	28	>2000	480	7.8	113.3
21	84	>2000	4500	3.2	114.3
22	82	1600	8800	3.6	115.3
23	24	>2000	3600	7.8	116.3
24	16	300	160	1.4	117.6
25	10	290	250	0.8	118.6
26	18	360	300	1.2	119.6
27	10	580	310	1.4	120.7
28 *	8	420	450	0.8	121.7
INTERNAL STANDARD					
29	12	750	720	2.0	122.3
30	92	>2000	1800	3.6	123.3
31	12	1450	490	2.0	124.3
32	28	1750	2600	3.0	125.6
33	10	116	720	1.0	126.4
34	18	320	1400	1.2	127.4
35	24	160	1400	1.0	128.4
36	12	88	1200	0.8	129.4
37	12	330	2400	1.2	130.4
38 *	22	160	1400	1.2	131.4
39	24	88	700	1.0	132.8
40	12	58	400	0.6	133.8
41	12	360	800	1.0	134.8
42	12	950	500	1.2	135.8
EAA T5243	54	450	1500	1.6	137.0

...t requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

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146105

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

P15301/2

Analyst Sample No.	MS Cu	KC Pb	SN Zn	CP Ag	
EAA T5244	210	410	7800	4.2	137 – 138
45	16	310	1900	1.4	139
46	24	98	380	1.0	140
47	22	200	1800	1.0	141
48 *	12	220	760	0.8	142
49	10	160	190	1.0	143
50	16	580	330	1.4	144
51	22	160	390	0.8	145
52	42	64	250	0.6	146
53	40	86	500	0.6	147
INTERNAL STANDARD					
54	102	430	1900	1.4	148
5255	170	104	1400	1.0	149

105

146106

PIN 2. DDH [illegible] EMA

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/24	Our Ref. P14671
Date In 27.6.77	Date Out 4.7.77
Client COMSTAFF PTY LTD.	
Samples Identification As per sheet	

ANALYTICAL REPORT

REMARKS * = These samples have been checked.

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
AAS ($HClO_4$)	Cu Pb Zn	10%	300ppm	2
Code 09	Ba	10%	1000ppm	10
AAS (Aqua Regia)	Ag	20%	2ppm	0.2
LG5	Au	20%	10ppm	0.05

AAS *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.*

Colorimetric *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 1 *pages, have been obtained in accordance with the Association's terms of registration.*

NATA SIGNATORY

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

Typist: H. de Bruyn.

P14671 - 1

Analyst

Sample No.	Depth	CP Cu	EC Pb	CP Zn	KW Ba	EC Au	EC Ag
EAA T 5256	* 149 - 150·1	240	88	960	360	x	1.4
57	150·1 - 151·1	70	260	840	420	x	1.2
*See below →	151·1 - 152·1	120	330	2600	440	x	2.2
58	152·1 - 153·1	34	750	2200	360	x	2.0
59	154·5	26	1100	880	340	x	1.6
60	155·5	560	1000	3600	340	x	6.0
61	156·5	470	1250	9200	140	x	1.6
62	156·9	850	>2000	>1%	180	x	4.0
63	157·4	320	>2000	>1%	300	x	4.4
64	158·4	400	>2000	>1%	520	x	15
65	* 159·7	520	>2000	>1%	400	x	12
INTERNAL STANDARD							
66	160·2	360	>2000	~1%	340	x	4.8
67	161·4	54	1200	1500	420	x	2.4
68	162·1	250	>2000	4400	300	x	10.0
69	162·7	90	>2000	>1%	380	x	7.0
70	163·7	170	>2000	4100	440	x	6.0
71	164·7	260	950	5400	340	x	3.0
EAA T 5272	165·8	42	>2000	1600	280	x	6.0
* EAA T 4800	151·1 - 152·1 *	120	330	2600	440	x	2.2

requested G T 1% greater than 1% T/F to follow X below limit of detection S/P sent previously I.S insufficient sample SNR sample not received

107

146108

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (WA) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65-4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref.	77/24	Our Ref.	P14671
Date In	27.6.77	Date Out	4.7.77
Client	COMSTAFF PTY LTD.		

ATOMIC ABSORPTION ASSAY

Analyst		RW				Analyst		RW		
Limit of detection		0.01%				Limit of detection		0.01%		
Precision ± %		5%				Precision ± %		5%		
Sample No.		Pb %			Depth..	Sample No.		Zn %		
EAA T 5262		0.49			156.5 – 156.9			2.70		
63		0.39			157.4			2.00		
64		1.40			158.4			1.20		
65		1.80			159.7			1.80		
66		0.37			160.2			1.05		
68		0.35			161.4 – 162.1			-		
69		0.63			162.7			1.20		
70		0.24			163.7			-		
T 5272		0.50			164.7 – 165.8			-		

All results expressed as a percentage unless otherwise indicated.
"X" indicates that the content of the element sought is below the limit of detection.
"-" means not determined

P. ... (signature)
N.A.T.A SIGNATORY

108

146109

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847 — NATA

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/42	Our Ref. P15301
Date In 22.11.77	Date Out 6.12.77
Client: COMSTAFF PTY. LTD.	
Samples Identification: As per sheets.	

ANALYTICAL REPORT

REMARKS * = These samples have been checked.

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
AAS ($HClO_4$)	Cu Pb Zn	10%	300ppm	2
AAS (Aqua Regia)	Ag	20%	2ppm	0.2

AAS *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.*

Colorimetric *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 5 *pages, have been obtained in accordance with the Association's terms of registration.*

NATA SIGNATORY

DDH VIN 2

5273	24	1250	1500	2.0	165.8-
74	30	440	700	1.4	- 164.8
75 *	270	64	90	1.0	- 170.8
76	180	48	60	0.6	171.8
77	42	42	56	0.4	172.6
78	84	98	150	0.6	173.6
79	400	950	760	2.8	174.6
80	76	490	110	1.8	175.6
81	12	106	80	0.8	176.3
82	10	48	220	1.0	177
83	8	40	150	0.8	178
84	12	34	150	0.6	179
EAA T5285 *	8	34	100	0.4	180

-n requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

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146111

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. SHEET No.

P15301/3

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

Analyst

Sample No.	MS Cu	CP Pb	CP Zn	CP Ag	
EAA T 5286	4	64	120	0.6	180 – 180.8
87	4	46	150	0.4	181.8
88	4	70	60	0.4	182.8
89	8	200	150	0.6	183.2
90	6	56	110	0.6	184
91	28	230	350	1.2	185
92	4	300	700	0.8	185.6
93	6	>2000	9400	2.6	186.1
94	6	58	110	0.2	187.5
95 *	56	>2000	400	2.0	187.8
INTERNAL STANDARD					see below *
96	98	1950	6000	3.2	188.3 – 188.9
97	10	130	300	0.8	189.8
98	14	390	1500	1.0	190.7
299	84	>2000	>1%	4.8	191.9
5300	12	320	1200	0.8	193.0
01	8	320	200	0.8	194.3
02	20	2000	5400	2.0	195.3
03	20	540	3700	1.2	196.6
04	38	900	1900	2.0	197.6
05 *	24	410	580	1.0	198.5
06	28	330	560	1.0	199.5
07	20	550	1700	3.6	200.5
08	12	280	800	0.8	201.5
09	14	210	560	0.6	202.5
EAA T 5310	16	200	600	1.0	203.5

not requested G.T. 1% greater than 1% T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

111

146112

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

REPORT No. SHEET No.

P15301/4

Analyst

Sample No.	CP Cu	MS Pb	CP Zn	CP Ag	Depth
EAA T 5311	20	170	320	1.0	203.5 - 204.5m
12	20	58	120	0.8	- 205
13	38	40	150	0.8	- 206
14	42	30	280	0.8	- 207
15 *	36	66	170	0.8	- 208
16	36	130	410	1.0	- 209
17	40	140	190	1.0	- 210
18	44	160	370	0.8	- 211
19	36	130	220	0.8	- 212
20	24	88	360	1.2	- 213
INTERNAL STANDARD					
21	38	88	170	0.8	214
22	30	44	160	0.6	215
23	32	42	140	0.6	216
24	28	60	140	0.8	217
25 *	34	48	160	0.8	218
26	34	38	85	0.6	219
27	46	50	1200	0.8	220
28	40	96	320	1.0	221
29	24	190	520	0.8	222
30	18	46	170	0.8	223
31	16	68	160	1.0	224
32	18	48	130	1.0	225
33	18	46	140	1.2	226
34	18	50	130	1.2	227
EAA T 5335 *	16	44	130	1.2	228

Not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory.

112.

146113

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P15301/5

Analyst

Sample No.	CP Cu	MS Pb	CP Zn	CP Ag	
EAA T 5336	16	56	76	1.2	228-229
37	16	32	80	1.2	230
EAA T [illegible]38	20	32	80	1.4	231
EAA T [illegible]39 *	24	600	3600	1.4	1878-1883

INTERNAL STANDARD

not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

146114

GEOCHEMICAL AND MINERALOGICAL LABORATORIES (W.A.) PTY. LTD.

21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

NATA

Phone: 65-4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. 77/42	Our Ref. P15301
Date In 22.11.77	Date Out 6.12.77
Client COMSTAFF PTY.LTD.	

Typist:P.Cardozo

ATOMIC ABSORPTION ASSAY

Analyst		PC			PC	Analyst				
Limit of detection		0.01%			0.01%	Limit of detection				
Precision ± %		5%			5%	Precision ± %				
Sample No.		Pb%			Zn%	Sample No.				
[illegible] 5220		0.67			-					
21		0.39			-					
23		0.35			-					
30		0.22			-					
93		0.26			-					
95		0.21			-					
EAA T 5299		0.46			1.45					

All results expressed as a percentage unless otherwise indicated.
"X" indicates that the content of the element sought is below the limit of detection.
"—" means not determined

N A T A SIGNATORY

114

146115

Appendix 4

Petrographic Report on DDH PIN 1 and CP3

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146116

Petrographic report on DDH Pin I and CP 3 from the Comstaff/Preussag Exploration License in Tasmania, Australia.

by

T. Finlow-Bates

Hannover

December, 1977

Introduction

Twenty three samples (PR1-23) from two drill cores penetrating a suite of volcanic rocks were submitted for identification (Pin I and CP 3,for depths see Annex 2).The samples were collected in sequence down the hole.

Summary of results

The samples are a suite of dacite lavas, tuff lavas and glassy pyroclastics that have suffered varying degrees of hydrothermal alteration. The lavas tend to come from the base of the hole and the glassy shard bearing pyroclastics from the top.

Comparison with Que River samples

To the extent that the samples from Que River and the Preussag Concession both contain acid pyroclastics and dacitic lavas the similarities are striking. However, at Que River it seems to be the reworked acid tuffs that ore precursors of major minerdization. Only samples PR 22, PR 23 and perhaps PR 11 and PR 17 bear any resemblance to this facies. The dacites PR 1, PR 13, PR 14, PR 15, PR 16, PR 21 and PR 20 are not unlike some of the porphyritic dacitic rocks at Que River but do contain more phenocrystic quartz. In making comparisons like this however, it should be remembered that there are limits on how different two suites of hydrothermally altered, ferromagnesian poor dacites can be. The glassy shard rich pyroclastics abundant in the Preussag leases are notably absent at Que River.

As a concluding comment it can be noted that the alteration at Que River is generally stronger than at the Preussag leases and the rock-types more difficult to classify.

Samples PR 1 (DS 23 338); PR 13 (DS 23 350);
PR 14 (DS 23 351); PR 15 (DS 23 352);
PR 16 (DS 23 353); PR 21 (DS 23 358);
PR 20 (DS 23 351)

Name: Variably altered dacites and dacitic tuff lavas

In each case the primary rock appears to be composed of partially resorbed phenocrysts of quartz and sodic plagioclase set in a feldspathic/quartz or glassy matrix. Some contain what appear to be rock fragments of dacitic composition. Many of the feldspar phenocrysts are sericitized and the matrices of these samples are variably altered to cherty silica, sericite and carbonate.

The following brief comments on each sample are given to mighlight the differences between samples.

PR 1 - totally sericitized feldspar phenocrysts; matrix of sericite and fine quartz

PR 13 - weakly sericitized sometimes zoned feldspar phenocrysts; some feldspar remains in the quartz-sericite-chlorite matrix.

PR 14 - sericitation very minor: irregular texture suggests the sample may have been a tuff lava with formerly a glassy matrix.

PR 15 - seems to be a more sheared and brecciated version of number PR 14 but also exhibits much stronger sericitization and carbonatization. A little pyrite is also present.

PR 16 - not dissimilar to PR 15 but carbonate (dolomite subordinate siderite) is the main alteration product. Kaolinite is dispersed through the matrix-sericite is notably minor.

PR 21 - sericite and carbonate about equally important. May have ome been versicular. Vesicles are now the site of quartz-pyrite-chlorite and carbonate

PR 20 - totally sericitized feldspars in a secondary recrystallized quartz matrix.

Systematic petrography

Samples PR 2 (DS 23 339); PR 3 (DS 23 340);
PR 4 (DS 23 341); PR 5 (DS 23 342)

Name - Totally devitrified and sericitized acid glassy pyroclastics (partially collapsed pumice?)

The samples now consist of very fine (0.01 mm) chert-like quartz and streaky patches of sericite enclosing abundant relicts of glass shards. The latter are now composed of somewhat coarser-grained (0.01 - 0.1 mm) irregular grains of quartz. Many of the more sericite rich patches show streaky texture and probably represent blocks of solid glass. Some spherical structures also remain and it seems, likely that many of the shard patches were once also glass spherules and the sample thus represents a collapsed pumaceous pyroclastic.
During devitrification and sericitization the samples have become weakly pyritized.

Samples PR 7 (DS 23 344); PR 9 (DS 23 346); PR 10 (DS 23347)
PR 12 (DS 23 349)

Name - Totally devitrified and sericitized acid glassy pyroclastics - probably originally pumaceous.

The main difference between these samples and samples 2 - 4 is that the main framework is sericitic (+ kaolin) and cherty material is less. What were cavities are now filled with a mosaic of quartz.

Samples PR 8 (DS 23 345); PR 18 (DS 23 355)

<u>Name</u> - Strongly foliated sericite-dolomite-siderite secondary rock.

These rocks are composed of strongly foliated streaky layers and elongate zones of sericitic mica interleaved with parallel discontinous veinlike zones of dolomite and subordinate siderite. Minor quartz and sphalerite are associated with some of the carbonate. X-ray diffraction analysis indicated that minor anhydrite, feldspar and alunite are probably intimately mixed with the sericite.

In plane light rare relict "streaky" structures can be seen that are not unlike some features in samples PR 2- 4. A glassy acid igneous rock may thus be considered as the most likely parent rock.

Sample PR 6 (DS 23 343)

<u>Name</u> - Strongly cloritized glassy pyroclastic

Weakly cloritized zones 4 - 5 millimetres wide of devitrified (now cherty quartz) glassy shard material are separated by slightly thinner zones (2 - 4 mm) of very pale green chlorite, minor sericite and carbonate. The sericite and carbonate occasionally accompanied by a trace of quartz and sphalerite form later "ptygma-like" veins, less than a millimetre wide.

Except that the dominant alteration product is chlorite this rock was probably not unlike samples PR 2.- 4. Although one might be tempted to suggest a more basic composition for PR 6 compared to PR 2 - 4 we are of course unsure how much material has been introduced. The cherty devitrification certainly indicates that some of the glass [illegible] quite acid

Sample PR 22 (DS 23 359); PR 23 (DS 23 360)

Name - Altered reworked acid tuffs

These samples consist of a jumbled mass of subrounded grains of quartz and silicified shards set in a secondary matrix. Sericite is an abundant component in the matrix of both samples but carbonate and kaolin is also present in PR 22. Both also exhibit minor pyritization.

Sample PR 11 (DS 23 348); PR 17 (DS 23 354)

Name - Strongly altered "silty" rocks of uncertain primary composition

These samples now consist of silty grains of subangular to rounded (sometimes elongate) grains of quartz set in a matrix of sericite, dolomite, siderite (and from x-ray diffraction alunit, feldspar, anhydrite). The rocks are somewhat sheared and cut by secondary veins of quartz and carbonate. From the shape and texture of the quartz grains it seems possible that the rock is a hydrothermally altered reworked acid tuffaceous rock.

Sample PR 19 (DS 23 356)

Name - Quartz-barite-sphalerite- galena-pyrite rock

A framework of colourless (presumably Fe-free) sphalerite encloses coarse (up to 1 mm) irregular grains of quartz and barite. Within the sphalerite are formless blebs of galena and scattered euhedra of pyrite. Some of the pyrite grains have suffered some resorbtion.

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4.22 BGR Hannover, den 29. 11. 1977

Annex 1

<u>Betr.</u>: Vulkanite Australien (Preussag Konzession)
<u>hier</u>: Mineralbestand

<u>Bezug</u>: Abt.-Nrn. 4/18001-023; R 24378-384

An 7 ausgewählten Proben wurde folgender Mineralbwstand röntgenografisch bestimmt:

R	PR	Haupt-komponenten	Neben-komponenten	Spuren	
24378	11	Quarz	Dolomit Kaolinit	Musk.(-Illit) Chlorit	Feldspat Alunit Siderit
9	14	Feldspat Quarz		Dolomit?	
80	15	Quarz Dolomit		Feldspat Musk.-Illit	Anhydrit Kaolinit Siderit
1	16	Quarz Dolomit	Feldspat Kaolinit	Siderit Anhydrit?	Pyrit Chlorit Musk.-Illit
2	17	Quarz Dolomit	Muskovit Siderit	Alunit	Anhydrit Feldspat Pyrit Kaolinit
3	18	Dolomit	Quarz Siderit Muskovit		Anhydrit Feldspat Alunit
4	21	Quarz Feldspat		Kaolinit Calcit? Musk.(-Illit) Pyrit	Alunit Chlorit Siderit

Annex 2

DDH Pin I	No. PR	Depth
	1	6 m
	2	16 m
	3	23.8 m
	4	42.5 m
	5	58 m
	6	70 m
	7	75.7 m
	8	79 m
	9	82 m
	10	99 m
	11	116 m
	12	103 m
	13	130.5 m
	14	137.5 m
	15	141.5 m
	16	147.8 m
	17	178.5 m
	18	97 .5 m
DDH CP 3	19	Erz aus Chester
	20	179 m
	21	275.5 m
	22	576 m
	23	foot wall schist

Appendix 5

Drill Logs

E. Z. Drilling - Pinnacles

Contains Drill Logs for Holes PP31, 34, 36, 39, 40,
41, 45, 46, 48, 50,
51, 52, 59.

Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Bore No. P P 31

Sheet No. 1

RECORD OF DIAMOND DRILL CORES

Location of Bore	Reduced Level	Co-ordinate Position	Direction	Angle	Object of Bore
Pinnacles - Surface - loc? [illegible]	1729' (Local)	112998'N 102859.5'E	271° Pin. Grid	-50°	To test for mineralisation below Brown's Shaft. Length : 611'

	Date	Depth of Bore	Advance	Amount of Core
	1948			
18.9 m	[illegible] 7	50'	50'	0'
35.4 m	8	105	55	1
	9	150	45	7
44.2 m	22	160	10	1
45.1 m	23	180	20	15
47.6 m	27	212	32	15
	28	218	6	9
59.7 m	29	225	7	3
84.4 m	30	234	9	6
	[illegible] 3	241	7	7
112.2 m	4	256	15	15
	5	257	1	1
	6	263	6	6
113.4 m	7	275	12	12
	10	298	23	23
129.1 m	11	318	20	20
149.3 m	12	337	19	14
	13	363	26	17
	14	387	24	-
	17	397	10	8
153.3 m	18	419	22	16
	19	445	26	25
155 m	20	472	27	27
	21	500	28	28
	24	513	13	9
160.3 m	25	521	8	5
	26	538	17	17
160.9 m	27	563	25	25
167.0 m	28	593	30	30
	[illegible] 1	608	15	15
186.2 m	2	611	3	3

Footage From	Footage To	Description of Core
0'	62'	No core
62'	116'	Pieces fine grained tuff and of quartz
116'	145'	Tuff silicified in part
145'	148'	Tuff coarse fragmental in part
148'	156'	Ash bed - odd pieces quartz
156'	196'	Lava flow
196'	277'	Hard siliceous pyroclastic 203'3"-210'9" shows traces of Pb and Zn
277'	368'	Similar last section, less siliceous & little coarser fragmental type
368'	372'	Tuffaceous Quartzite
372'	423½'	Definite sediments grading from medium tuff to black slate strong traces of sulphides in parts.
423½'	467'	Fine grained lava with porphyritic-like texture, odd splashes of Pb and Zn
467'	503'	Hard siliceous pyroclastic some pyrite mineralisation
503'	510'	Inter banded slate & sandstone with fine dissem. pyrite & little coarse Zn
510'	526'	White chert dissem. pyrite and some Zn
526'	528'	Slate with dissem. pyrites
528'	548	Tuff sandstone pyrite & splashes of Zn.
548'	611'	Fine grained massive pyroclastic - pyrite traces.

Location of Core Assayed From	To	Amount of Core	Pb %	Zn %	Fe %	Cu %	Ag ozs.	Au dwts
203'3"	210'9"	1'4"	Nil	Nil		0.17	Nil	[illegible]
372'0"	378'[illegible]"	3'3"	Nil	Nil		Nil	0.1	[illegible]
378'0"	384'0"	5'1"	Nil	Nil		Nil	Nil	[illegible]
384'0"	396'0"	3'3"	Nil	Nil		0.02	Nil	[illegible]
396'3"	400'6"	1'7"	Nil	Nil		0.05	<0.1	[illegible]
400'6"	404'0"	1'3"	Nil	Nil		0.61	<0.1	[illegible]
421'6"	425'6"	1'5"	Nil	4.5		0.04	Nil	[illegible]
503'0"	510'0"	7'8"	Nil	1.6		0.08	0.2	[illegible]
510'0"	519'0"	1'7"	Nil	0.6		0.01	0.1	[illegible]
519'0"	523'0"	3'10"	Nil	Nil		Nil	0.2	[illegible]
523'0"	526'0"	1'0"	Nil	Nil		Nil	Nil	[illegible]
526'0"	528'6"	2'5"	Nil	Nil		Nil	0.3	[illegible]
528'6"	533'0"	4'4"	Nil	Nil		0.29	Nil	[illegible]
533'0"	538'0"	4'9"	Nil	2.0		0.02	Nil	[illegible]
538'0"	543'0"	4'11"	Nil	2.4		0.07	0.1	[illegible]
543'0"	548'0"	5'0"	Nil	5.6		0.19	0.4	[illegible]
AVERAGES.								
503'0"	519'0"	9'3"	Nil	1.04		0.04	0.1	[illegible]
533'0"	548'0"	14'8"	Nil	3.3		0.09	0.2	[illegible]

CLINOSTAT SURVEYS.

Depth	Angle
0'	-50°
100'	-48½°
200'	-48½°
300'	-42½°
400'	-40½°
500'	-38½°

A X CORE

146127

Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Bore No. 2.P.34

Sheet No. 1

RECORD OF DIAMOND DRILL CORES

A 36810

Location of Bore	Reduced Level	Co-ordinate Position	Direction	Angle	Object of Bore
Pinnacles – Surface Block N/103	1420' (Local)	110227'E 101300'N	79.° Pin. Grid	-12°	To test mineralisation below Costean Block N/103 Length : 363'

Date 1943	Depth of Bore	Advance	Amount of Core	Footage From	Footage To	Description of Core
Jul 30	55'	55'	3'	0'	312'	Light grey variety of massive pyroclastic sparsely sprinkled with pyrite.
Aug 1	108	53	17			125'–135' traces of Pb & Zn
2	158	50	20			157'–158' " " " "
5	190	32	15			234'–242½' splashes of Pb & Zn
6	223	33	20			280'–286'5" semi-massive pyrite
7	243	20	20	312'	329'	Fine grained chert – traces pyrite Zn & Pb
8	268	25	25	329'	331'	Similar to last section sulphides more abundant.
9	280	12	11	331'	363'	Fine grained light grey silicified tuff or chert, showing scattered clots and streaks of PbS, ZnS and fine grained dissem. pyrite.
12	298	18	15			
13	312	14	9			
14	323	11	9			
15	337	14	11			
19	350	13	9			
20	362	12	10			

Location of Core Assayed From	To	Amount of Core	Pb %	Zn %	Fe %	Cu %	Ag ozs.	Au dwt
234'0"	238'3"	4'2"	Nil	3.0		0.32	0.4	Nil
238'3"	242'6"	4'3"	Nil	1.7		0.12	Nil	Nil
280'0"	280'5"	0'5"	Nil	Nil		0.1	0.3	Nil
312'0"	316'0"	2'8"	Nil	2.8		0.35	Nil	Nil
316'0"	319'0"	2'7"	Nil	5.2		0.6	Nil	Nil
319'0"	324'0"	3'2"	Nil	2.1		0.2	Nil	Nil
324'0"	329'0"	4'1"	Nil	2.1		0.1	Nil	Nil
329'0"	331'0"	1'2"	8.7	14.8		1.52	1.4	0.
331'0"	336'6"	3'5"	Nil	3.0		0.2	0.3	Nil
336'6"	340'0"	3'0"	Nil	3.0		0.25	Nil	Nil
340'0"	342'6"	1'4"	Nil	2.6		0.17	Nil	Nil
AVERAGES.								
234'0"	242'6"	8'6"	Nil	2.35		0.2	0.2	Nil
312'0"	329'0"	12'6"	Nil	2.8		0.3	Nil	Nil
329'0"	331'0"	1'2"	8.7	14.8		1.52	1.4	0.
331'0"	342'6"	7'9"	Nil	3.0		0.2	<0.1	Nil
312'0"	342'6"	21'5"	<0.1	3.6		0.3	0.1	<0.

CLINOSTAT SURVEYS.

Depth	Angle
0	-12°
100	-10°
200	-9°
300	-7°

X. CORE

From my inspection of EZ core ... with Franco ... the so called grey chert could be rhyolite possibly. RMS

146128

Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Bore No. P.P. 36

Sheet No. 1

RECORD OF DIAMOND DRILL CORES

Location of Bore	Reduced Level	Co-ordinate Position	Direction	Angle	Object of Bore
Pinnacles - Surface Block L/163	1420' (Local)	110227'N 101808'E	70° Pin. Grid	-30°	To test Mineralisation below P.P.34 Length : 506'

elev.	Date 1948	Depth of Bore	Advance	Amount of Core
85.3	Jul 28	10'	10'	1'
	29	54	44	2
	Aug 2	64	10	1
-121.9	3	109	45	4
	4	154	45	9
	5	169	15	3
-122.7	6	199	30	15
	9	222	23	19
	10	242	20	18
-127.4	11	254	12	12
	12	269	15	14
	17	289	20	18
	18	303	14	11
-153.3	19	318	15	11
	20	340	22	-
-154.2	23	360	20	16
	24	370	10	7
	25	405	35	27
	26	419	14	12
	31	438	19	17
	Sept 1	460	22	20
	2	468	8	5
	3	485	17	-
	6	494	9	8
	7	506	12	10

Footage From	Footage To	DESCRIPTION OF CORE
0'	380'	Light coloured massive pyroclastic with slight traces of PbS, ZnS and FeS_2
380'	400'	Medium grey massive pyroclastic brecciated in parts. Calcite veined with Pb-Zn mineralisation
400'	402½'	Transition zone to tuffaceous slate, odd specks ZnS.
402½'	418'	Tuffaceous type of slate, some bedding showing. Rock is silicified in part - small amounts of ZnS.
418'	444'	Whitish grey schist with patches of good Pb, Zn and pyrite mineralisation.
444'	506'	Light greenish grey type of massive pyroclastic fairly siliceous. Apart from first mineralisation negligible. Lode channel from 373' to 445' and the Pb and Zn occur as small patches or thin stringers and veinlets.

Location of Core Assayed From	To	Amount of Core	Pb %	Zn %	Fe %	Cu %	Ag ozs.	Au dwts
373'0"	378'0"	4'0"	2.0	1.2		0.13	2.2	<0.
378'0"	383'0"	3'11"	0.7	0.8		0.02	0.9	Ni
383'0"	388'0"	4'6"	0.9	0.6		0.02	0.3	Ni
388'0"	393'0"	5'0"	Nil	0.5		0.03	0.2	Ni
393'0"	398'0"	5'4"	Nil	0.7		0.02	0.1	Ni
398'0"	402'6"	5'4"	<0.1	0.8		0.03	0.1	N
402'6"	408'0"	4'5"	Nil	0.6		0.002	0.2	N
408'0"	413'0"	4'0"	Nil	0.8		0.018	0.1	N
413'0"	418'0"	3'9"	0.5	1.9		0.036	0.1	N
418'0"	423'0"	4'2"	Nil	6.1		0.32	0.2	<0
423'0"	427'6"	3'0"	Nil	6.0		0.22	0.3	N
427'6"	430'3"	2'1"	3.5	7.3		0.90	<0.1	N
430'3"	435'9"	5'4"	Nil	2.7		0.18	0.2	N
435'9"	440'9"	4'2"	Nil	1.1		0.12	0.1	N
440'9"	445'0"	3'4"	Nil	1.9		0.10	0.3	N
AVERAGES.								
373'0"	413'0"	31'11"	0.5	0.7		0.04	0.6	<0.
413'0"	445'0"	26'6"	0.3	3.2		0.275	0.1	<0.
413'0"	435'9"	19'0"	0.4	4.2		0.37	0.15	<0.
418'0"	430'3"	9'11"	0.7	6.4		0.23	0.2	<0.

CLINOSTAT SURVEY.

Depth	Angle
0	30°
100	26°
200	24½°
300	22°
400	20°

A. X. CORE

146129

Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

For section
See Z016

RECORD OF DIAMOND DRILL CORES

Hole No. 8839

Sheet No. 1

SPECIFICATIONS

Mine: Pinnacles
Location: Surface
N. Coord.: 10399 N
E. Coord.: 2025 E
R.L.: 1520'
Direction: 90° Pin. Grid
Angle: -25°
Length: 150'
Size Hole:

SURVEY DATA

Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test the northern extension of the mineralisation seen in the open cut.

RESULT: No survey

PLOTT
40 Plan
X.S.
L.S.
100 Plan
X.S.
L.S.

PROGRESS

Date	Depth	Advance	Amount of Core
14	18	18	7
15	27	9	6
16	49	22	20
20	58	9	6
21	81	23	15
22	113	32	16
23	150	37	14

Description

From	To	ROCK
0	1' (0.3 m)	White medium grained variety of the massive pyroclastic.
1	24' (7.3 m)	Fine tuffaceous sandstone and slates with fine grained disseminated pyrite and streaks of Pbs. and Zns.
24	49' (14.9 m)	Silicified massive pyroclastic (grey chert) mineralised disseminated and streaks of pyrite and thin veinlets of Pbs. and Zns.
49	120' (36.6 m)	Grey fine grained variety of the massive pyroclastic sheared in part and silicified in part weak sulphide mineralisation.
120	150' (45.7 m)	Grey coloured porphyritic variety of the massive pyroclastic - no mineralisation.

ANALYTICAL DATA

From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %	
1	6	2' 1"	N	N	0.07	0.5	N		
6	11	1' 10"	N	N	0.07	0.4	N		
11	16	1' 6"	N	N	0.07	0.3	<0.1		
16	20	1' 11"	N	N	0.02	0.5	N		
20	24	1' 6"	N	N	0.10	0.7	<0.1		
24	27	2' 9"	N	3.0	0.25	0.7	2.6		
27	30	2' 9"	N	1.8	0.15	0.4	3.2		
WEIGHTED AVERAGE									
24	30	6'	N.	2.4	0.2	0.6	2.9	+6.0'	D.T.

DI	
Footage	

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Bore No. P.P.40

Sheet No.

A 26610

RECORD OF DIAMOND DRILL CORES

Location of Bore	Reduced Level	Co-ordinate Position	Direction	Angle	Object of Bore
Pinnacles-Surface	1507'	110242' N 102043' E	84° Min. Grid	-6°	To sample lode channel at Costean Level 7 (Block [illegible]/163) Length: 80'

metres	Date 1948	Depth of Bore	Advance	Amount of Core
– 1.5	Sept 28	33'	33'	21'
– 4.9m	29	63'	30'	31'
– 6.1m	Oct 1	80'	11'	8'
– 7.8m				
– 8.7m				
– 9.3m				
– 16.8m				
– 24.4m				

DESCRIPTION OF CORE

Footage From	To	Description
0'	16'	Light to dark grey massive Pyroclastic - dissem. f.g. pyrite
16'	20'	Fine grained tuff (ss?) weak mineralisation
20'	25'5"	Grey chert well streaked with Zns, Pbs and pyrite medium grade ore.
25'5"	28'8"	As for last section but not as rich
28'8"	30'6"	As for last section but medium grade ore
30'6"	55'	Silicified massive pyroclastic not as much as chert, streaks of PbS & ZnS and pyrite
55'	80'	Silicified massive pyroclastic with fine grained dissem. and streaks of pyrite and occasional streaks of ZnS & PbS

X. R. B. Core

Core logged magnetically. See Ledger pp. 3.

Core good ... with ... quality

Location of Core Assayed From	To	Amount of Core	Pb %	Zn %	Fe %	Cu %	Ag ozs.	Au dwt
20' 0"	25' 5"	5'4"	9.8	17.8		1.35	2.3	22.
25'5"	28'8"	2'6"	1.7	6.0		0.50	0.7	5.
28' 8"	30' 6"	1'3"	7.9	16.5		0.92	1.5	2.
30' 6"	35' 0"	3'3"	Nil	3.5		0.35	0.6	Nil
35' 0"	40' 0"	2'11"	2.5	4.0		0.50	0.5	Nil
40' 0"	45' 0"	4'3"	2.4	4.0		0.40	0.6	Nil
45' 0"	50' 0"	4'8"	Nil	1.5		0.40	0.5	Nil
50' 0"	55' 0"	3'1"	Nil	Nil		0.23	0.5	Nil
AVERAGES.								
20' 0"	30' 6"	9'1"	6.9	13.9		1.02	1.7	13.
30' 6"	45' 0"	10'5"	1.3	3.8		0.42	0.6	Nil
20' 0"	45' 0"	19'6"	3.7	8.0		0.67	1.1	5.

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Hole No. PP41

RECORD OF DIAMOND DRILL CORES

Sheet No. 1

SPECIFICATIONS

Mine: Pin[illegible]
Location: Sur[illegible]
N. Coord.: 110101' N
E. Coord.: 102055' E
R.L.: 1493'
Direction: 90° in. Grid
Angle: -36°
Length: 170'
Size Hole: XRB

— 36°

SURVEY DATA

Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test for extension of ore found in south open cut.

RESULT: No survey

PLOTT: 40 Plan, X.S., L.S.; 100 Plan, X.S., L.S.

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PROGRESS

Date	Depth	Advance	Amount of Core
16	80	55	40
17	115	35	28
18	150	35	30
22	170	20	7

Description

From	To	
0	89 (27.1m)	Light grey to dark greenish grey agglomeratic variety of the massive pyroclastic - pyrite mineralisation and little Pbs and Zns.
89	93 (28.3m)	Vughy grey chert showing sulphides of lead and zinc interbedded massive pyroclastic and grey chert showing some Pb.-Zn. mineralisation
120½	142½ (43.4m)	band of sediments grading from slate silicified in part in upper portion through increasing grain size to sandstone at bottom sediments probably tuffaceous. bedding well displayed in part. This section shows zones of mineralisation containing blebs of sphalerite 3" pyrite vein at 140'.
142½	170 (51.8m)	Medium grey variety of massive pyroclastic with odd specks of [illegible].

ANALYTICAL DATA

From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %	
44'0"	46'6"	1' 9"	Nil	2.8	0.16	0.1	Nil		
55'6"	63'6"	8' 9"	Nil	0.9	0.08	0.1	Nil		
89'6"	93'0"	2' 6"	0.5	2.4	0.22	0.4	Nil		
107'6"	112'0"	4' 6"	0.2	2.0	0.14	0.4	1.0		4.5
112'0"	117'0"	4'10"	1.2	2.8	0.35	0.6	Nil		[illegible]
117'0"	124'6"	5' 0"	Nil	2.9	0.23	0.4	Nil		[illegible]
124'6"	127'6"	2' 1"	4.0	6.7	0.44	1.1	Nil		[illegible]
127'6"	129'6"	1'11"	Nil	1.0	0.10	0.2	Nil		[illegible]
129'6"	136'0"	6' 2"	0.4	1.6	0.06	0.1	Nil		[illegible]
136'0"	142'6"	6' 6"	1.5	2.6	0.15	0.1	Nil		6.5

AVERAGES

From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.
107'6"	142'6"	[illegible]	0.9	2.7	0.20	0.4	0.1
112'0"	127'6"		1.2	3.6	0.31	0.6	Nil

Footage

Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

RECORD OF DIAMOND DRILL CORES

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Hole No. PP45

Sheet No. 1

SPECIFICATIONS

Mine: Pinnacles
Location: Surface
N. Coord.: 111803 N
E. Coord.: 102 163 E
R.L.: 1536'
Direction: 270°
Angle: -42° — 42°
Length: 60'
Size Hole:

SURVEY DATA

Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test for mineralisation below costean block P119

RESULT:

PLOT: 40 Plan, X.S., L.S.; 100 Plan, X.S., L.S.

PROGRESS				Description			ANALYTICAL DATA										DI
Date	Depth	Advance	Amount of Core	From	To		From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %		Footage
13	60 (18.3m)	60				Hole abandoned because of bad ground. No core recovered. No survey											

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Bore No. P. P. 46

Sheet No. 1

A 36919

RECORD OF DIAMOND DRILL CORES

Location of Bore	Reduced Level	Co-ordinate Position	Direction	Angle	Object of Bore
Pinnacles - Surface	1522'	111928'N 102133'E	270° Pin. Grid	-49°	To test below mineralisation showing in Costean Block N/12 Length : 150'

metric	Date	Depth of Bore	Advance	Amount of Core	Description of Core (Footage From To)	Location of Core Assayed: From	Location of Core Assayed: To	Amount of Core	Pb %	Zn %	Fe %	Cu %	Ag ozs.	A dw
	1948													
-10.3m	Nov 24	18'	18'	5'	0' 34' Massive pyroclastic light to	55'6"	59'6"	3' 3"	<0.1	5.0		1.18	1.2	N
	26	40	22		medium grey	59'6"	61'3"	2' 0"	Nil	5.5		0.55	0.7	N
-30.9-	28	52	12	6	34' 101½' Tuff medium to fine grained	61'3"	67'0"	3' 7"	6.5	16.0		1.33	1.6	N
	30	56	4	2	with bands of grey. Chert (Sil.	67'0"	75'0"	6' 0"	Nil	2.0		0.14	0.6	O
	Dec. 6	93	37	32	slate) some good sulphide (quartz?)									
	7	133	40	26	mineralisation.				AVERAGES.					
-45.7m	8	150	17	12	101½' 150' Greenish grey variety of the	55'6"	67'0"	8'10"	3.3	10.6		1.2	1.3	N
					massive pyroclastic with a	55'6"	75'0"	14'10"	1.9	7.1		0.74	1.0	O
					little sulphide mineralisation.									

X. R. B. Core

Core logged magnetically
See ledger pp5.

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

RECORD OF DIAMOND DRILL CORES

Hole No. PP48

For XS See X017

Sheet No. 1.

SPECIFICATIONS	
Mine:	Pinnacles
Location:	Surface
N. Coord.:	111793 N
E. Coord.:	102002 E
R.L.:	1520'
Direction:	90° Pln. Grid
Angle:	-38° — 38°
Length:	76'
Size Hole:	XRB

SURVEY DATA					
Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test the southerly extension of the tuff band exposed in costean in Block M120 for mineralisation.

RESULT: No survey

PLOT: 40 Plan, X.S., L.S.; 100 Plan, X.S., L.S.

PROGRESS					Description			ANALYTICAL DATA										Footage
Date	Depth	Advance	Amount of Core		From	To		From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %		
1. 17	10	10	5		0	76' (23·2 m)	ROCK Light coloured variety of the massive pyroclastic. N.B. hole abandoned owing to bad ground; about 21' ft. of core recovered. Objective not reached. No mineralisation intersected.											
18	18	8	1	6														
19	23	5																
20	31	8	1															
21	51	20	2															
26	64	13	6	6														
31	76	12	3															

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Hole No. PP50

Sco 4023

RECORD OF DIAMOND DRILL CORES

Sheet No. 1

SPECIFICATIONS

Mine: Pinnacles
Location: Surface
N. Coord.: 112083 N
E. Coord.: 102028 E
R.L.: 1515
Direction: 90° Plm. Grid
Angle: -38°
Length: 121'
Size Hole: XRB

SURVEY DATA

Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test for mineralisation in northerly extension of the tuff band exposed in block N120

RESULT: No survey
No mineralisation Core recovery only about 12 ft.

PLOT: 40 Plan, X.S., L.S.; 100 Plan, X.S., L.S.

PROGRESS				Description			ANALYTICAL DATA									
Date	Depth	Advance	Amount of Core	From	To		From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %	Footage
A9						ROCK										
b. 7	31	31	6	0	121' (36.9m)	Pale yellow variety of massive pyroclastic some parts a porphyritic felsite.										
8	61	30	1													
9	92	31	5													
10	100	8	2													
14	116	16	9'													
15	121	5	2"													
			14' 11"													

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

RECORD OF DIAMOND DRILL CORES

See X017

Hole No. PP51 136

Sheet No. 1

SPECIFICATIONS

Mine: Pinnacles
Location: Surface
N. Coord.: 111798 N
E. Coord.: 101896 E
R.L.: 1497'
Direction: 90° Pin. Grid
Angle: -35°
Length: 390'
Size Hole: AX

SURVEY DATA

Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test below costean N119 and the tuff band exposed in N120 in depth

RESULT:

PLOT: 40 Plan, X.S., L.S.; 100 Plan, X.S., L.S.

PROGRESS

Date	Depth	Advance	Amount of Core
16	80	80	25
17	124	44	31
18	150	26	18
21	159	9	7
22	168	9	8
23	182	14	13
24	194	12	8
28	210	16	11
1	224	14	12
2	243	19	16
4	259	16	14
7	269	10	9
8	290	21	14
9	301	11	8
14	315	14	12
15	329	14	13
16	349	20	19
17	365	16	15
18	378	13	11
21	390	12	11

Description

From	To	ROCK
0	260' (79.3 m)	Medium grey variety of the massive pyroclastics Agglomeratic in places-some sedimentary phases see dips.
260	268 (81.7)	Coarse grey grit
268	285 (86.9)	Tuff or sandstone distinctly sedimentary bedded see dips.
285	343 (104.6 m)	Predominant sedimentary - bedding showing in places. Mixed tuff and Agglomerate. Traces of sphalerite.
?343	390 (118.9 m)	Medium grey variety of the massive pyroclastics. No mineralisation.

SURVEYS

0	-35°
100	-32°
200	-31½°
300	-27°

ANALYTICAL DATA

From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %

Footage: 225' 269'

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

RECORD OF DIAMOND DRILL CORES

Hole No. PP52

Sheet No. 1.

SPECIFICATIONS

Mine: Pinnacle
Location: Surface
N. Coord.: 112042 N
E. Coord.: 102339 E
R.L.: 1579'
Direction: 290½° Pin. Grid
Angle: -48° (-45)
Length: 62'
Size Hole: XRD

SURVEY DATA

Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test for mineralisation below Brown's ? Shaft Block P122. ? Thomas's

RESULT: No survey. Hole lost at 62'

PLOT: 40 Plan, X.S., L.S.; 100 Plan, X.S., L.S.

PROGRESS Date (1949)	Depth	Advance	Amount of Core	Description From	To	Description	ANALYTICAL DATA From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %		Footage
						ROCK											
c. 15	20	20	9	0	62 (18.8m)	Medium grey variety of the massive pyroclastics.											
16	40	20	2 6														
17	60	20	1			Few specks of pyrite no other mineralisation about 4 ft. of core recovered. //											
21	61	1															
	61 9	9	1														

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Electrolytic Zinc Company of Australasia Limited

WEST COAST DEPARTMENT

Hole No. PP59

RECORD OF DIAMOND DRILL CORES

See 2024

Sheet No. 1

SPECIFICATIONS

Mine:	Pinnacles
Location:	surface
N. Coord.:	112153 N
E. Coord.:	102,036
R.L.:	1515'
Direction:	110½° Pin. Grid
Angle:	-30°
Length:	400'
Size Hole:	AX

SURVEY DATA

Footage	Dir'tion	Angle	Footage	Dir'tion	Angle

OBJECT: To test for mineralisation at depth below Brown's Shaft Block P 122

Hemas's

RESULT:

PLOTT

40 Plan
X.S.
L.S.
100 Plan
X.S.
L.S.

PROGRESS

19	Date	Depth	Advance	Amount of Core
rch	24	100	100	2
	28	163 (49.7)	63	6
	29	197 (60.0)	34	22
	30	235 (71.6)	38	31
	31	272 (82.9)	37	32
ril	1	300 (91.4)	28	25
	14	304 (92.7)	4	4
	19	320 (97.5)	16	16
	20	332 (101.2)	12	12
	21	350 (106.7m)	18	17
	26	363 (110.6)	13	12
	27	382 (116.4m)	19	13
	28	400 (121.9m)	18	15

Description

From	To	ROCK
0	154 (46.9m)	Weathered massive pyroclastics core recovery about 7'ft. !!
154	308½ (94.0)	Medium to dark-grey variety of massive pyroclastic - odd calcite veins with splashes of Pbs. and Zns.
308½	330 (100.6)	Medium grey variety of the massive pyro - some carbonate
330	351 (107m)	Medium grey variety of massive pyroclast. with bands of silicified sandstone. Few scattered specks of Pbs. and Zns.
351	375½ (114.5m)	Light grey agglomeratic variety of the massive pyroclastic odd specks of Zns.
385½	390½ (119.0m)	Light to medium grey variety of massive pyro. - odd specks of Zns.
390½	400 (121.9m)	Medium grey variety of massive pyroclastics

CLINOSTAT SURVEYS

0	-30°
100	-28°
200	-26½°
300	-22½°

ANALYTICAL DATA

From	To	Amount of Core	Pb %	Zn %	Cu %	Ag ozs	Au dwts.	Fe %		Footage

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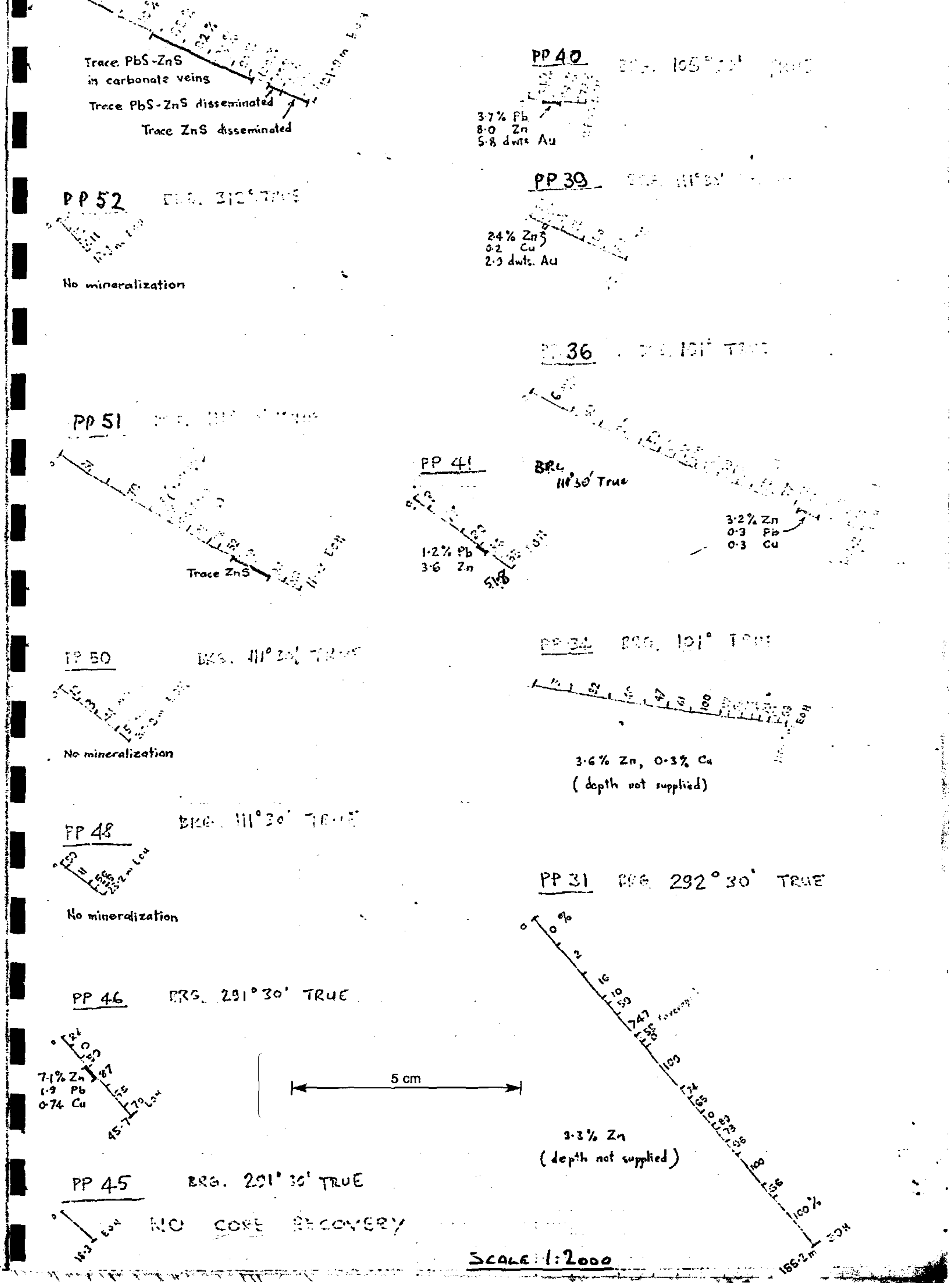
Trace PbS-ZnS in carbonate veins
Trace PbS-ZnS disseminated
Trace ZnS disseminated
PP 40
3·7% Pb
8·0 Zn
5·8 dwts Au
PP 52
No mineralization
PP 39
2·4% Zn
0·2 Cu
2·3 dwts. Au
PP 36
PP 51
Trace ZnS
PP 41
BRG. 111°30' True
1·2% Pb
3·6 Zn
3·2% Zn
0·3 Pb
0·3 Cu
PP 50
BRG. 111°30' TRUE
No mineralization
BRG. 101° TRUE
3·6% Zn, 0·3% Cu
(depth not supplied)
PP 48
BRG. 111°30' TRUE
No mineralization
PP 31
BRG. 292°30' TRUE
PP 46
BRG. 291°30' TRUE
7·1% Zn
1·9 Pb
0·74 Cu
5 cm
3·3% Zn
(depth not supplied)
PP 45
BRG. 291°30' TRUE
NO CORE RECOVERY
165·2 m EOH
SCALE: 1:2000

Appendix 6

Pinnacles - Whole Rock Analyses

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THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

Form 38

REPORT AN 3204/75

Sample Nº	% SiO_2	% Al_2O_3	Total Fe % as Fe_2O_3	% MgO	% CaO	% Na_2O	% K_2O		
TD 501	75.0	13.5	2.2	0.5	<0.1	0.1	3.5		
" 03	71.0	17.5	2.8	1.2	"	0.2	2.3		
" 05	73.0	17.5	2.9	1.1	"	0.2	2.0		
" 07	73.0	16.5	2.3	0.5	"	0.1	1.8		
" 09	73.0	17.0	2.6	0.8	"	<0.1	2.4		
" 11	74.0	14.5	1.5	1.0	"	"	3.5		
" 12	75.0	12.3	2.3	1.2	"	"	4.0		
" 14	77.0	14.5	1.4	1.0	"	"	3.7		
" 16	77.0	13.5	1.9	1.3	"	"	3.7		
" 18	80.0	12.5	1.7	1.2	"	"	4.0		
" 20	82.0	12.8	2.2	0.4	"	"	3.7		
" 22	84.0	11.0	1.4	0.5	"	"	3.0		
" 24	80.0	12.7	2.0	0.6	"	"	3.1		
" 26	81.0	12.3	2.2	0.7	"	"	3.4		
" 28	80.0	12.7	1.4	0.7	"	"	3.6		
" 30	82.0	11.8	1.4	0.5	"	"	3.2		
" 32	77.0	13.5	2.0	1.0	"	"	4.1		
" 34	89.0	5.3	1.1	0.2	"	"	1.8		
" 36	76.0	13.5	2.3	0.8	"	"	4.0		
" 38	76.0	12.5	2.6	1.8	"	"	3.7		
" 40	82.0	9.3	2.1	0.5	"	"	3.2		

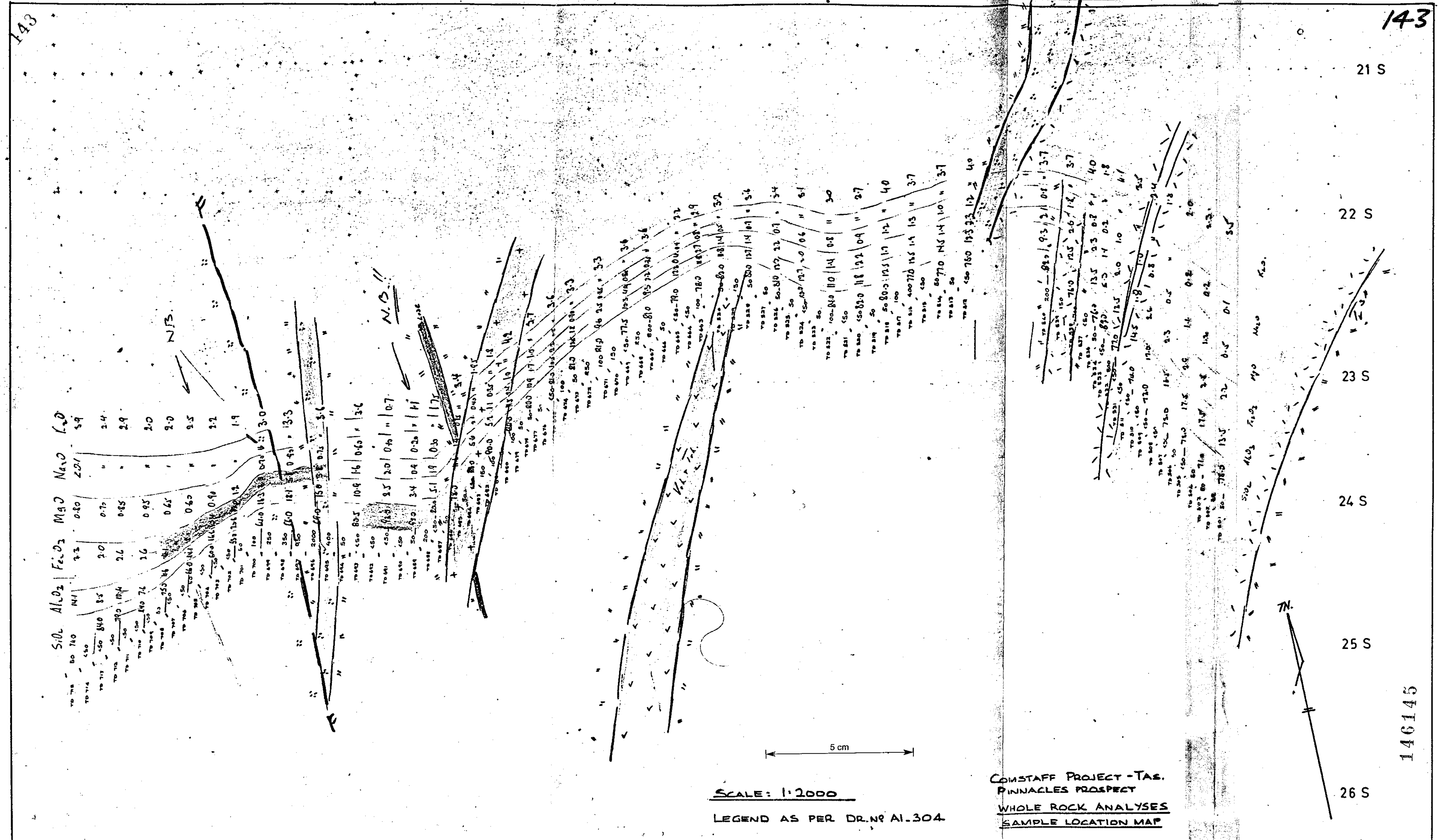
Scheme H1

H1 2+X

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

REPORT AN 3472/75

Sample Nº	% SiO_2	% Al_2O_3	% Fe a Fe_2O_3	% CaO	% MgO	% Na_2O	% K_2O	[illegible]	[illegible]
TD 663	78.0	11.8	2.7	<0.1	0.80	<0.1	2.9		
" 665	79.0	12.3	0.4	"	0.40	"	2.2		
" 667	81.0	9.3	2.2		0.25	"	3.6		
" 669	77.5	10.3	4.9		0.55	"	3.6		
" 671	81.0	9.6	2.5	"	0.85	"	3.3		
" 673	81.0	10.5	1.8		0.70	"	3.3		
" 675	81.0	10.5	2.2	"	0.80	"	3.6		
" 677	80.0	10.9	1.7	"	1.0	"	3.7		
" 679	80.0	11.5	2.4	"	1.0	"	4.2		
" 681	90.0	5.2	1.1	"	0.35	"	1.8		
" 683	85.0	5.6	2.1		0.40	"	1.95		
" 685	78.0	11.6	1.9		0.75	"	3.4		
" 687	88.0	5.1	1.9	"	0.30	"	1.75		
" 689	92.0	3.4	0.9	"	0.20	"	1.1		
" 691	93.0	2.5	2.0		0.10	"	0.7		
" 693	80.5	10.9	1.6	"	0.60	"	3.6		
" 695	69.0	15.0	3.8	"	0.75	"	3.6		
" 697	66.0	18.1	5.1	"	0.90	"	3.3		
" 699	64.0	16.3	8.5	"	0.70	"	3.0		
" 701	53.0	20.6	12.0	"	1.2	"	1.9		
" 703	60.0	16.6	10.4	"	0.95	"	2.2		
" 705	66.0	14.1	8.1	"	0.60	"	2.5		
" 707	75.0	11.6	4.1	"	0.65	"	2.0		
" 709	84.0	7.6	2.6	"	0.95	"	2.0		
" 711	79.0	10.4	2.6	"	0.55	"	2.9		
" 713	84.0	5.5	2.0	"	0.70	"	2.4		HI 27
" 715	74.0	14.1	3.3	"	0.80	"	3.9		



21 S
22 S
23 S
24 S
25 S
26 S
SiO2 Al2O3 Fe2O3 MgO Na2O K2O
N.B.
TN.
5 cm
SCALE: 1:2000
LEGEND AS PER DR.Nº A1.304
COMSTAFF PROJECT - TAS.
PINNACLES PROSPECT
WHOLE ROCK ANALYSES
SAMPLE LOCATION MAP
146145

144

146146

FIG. 1.

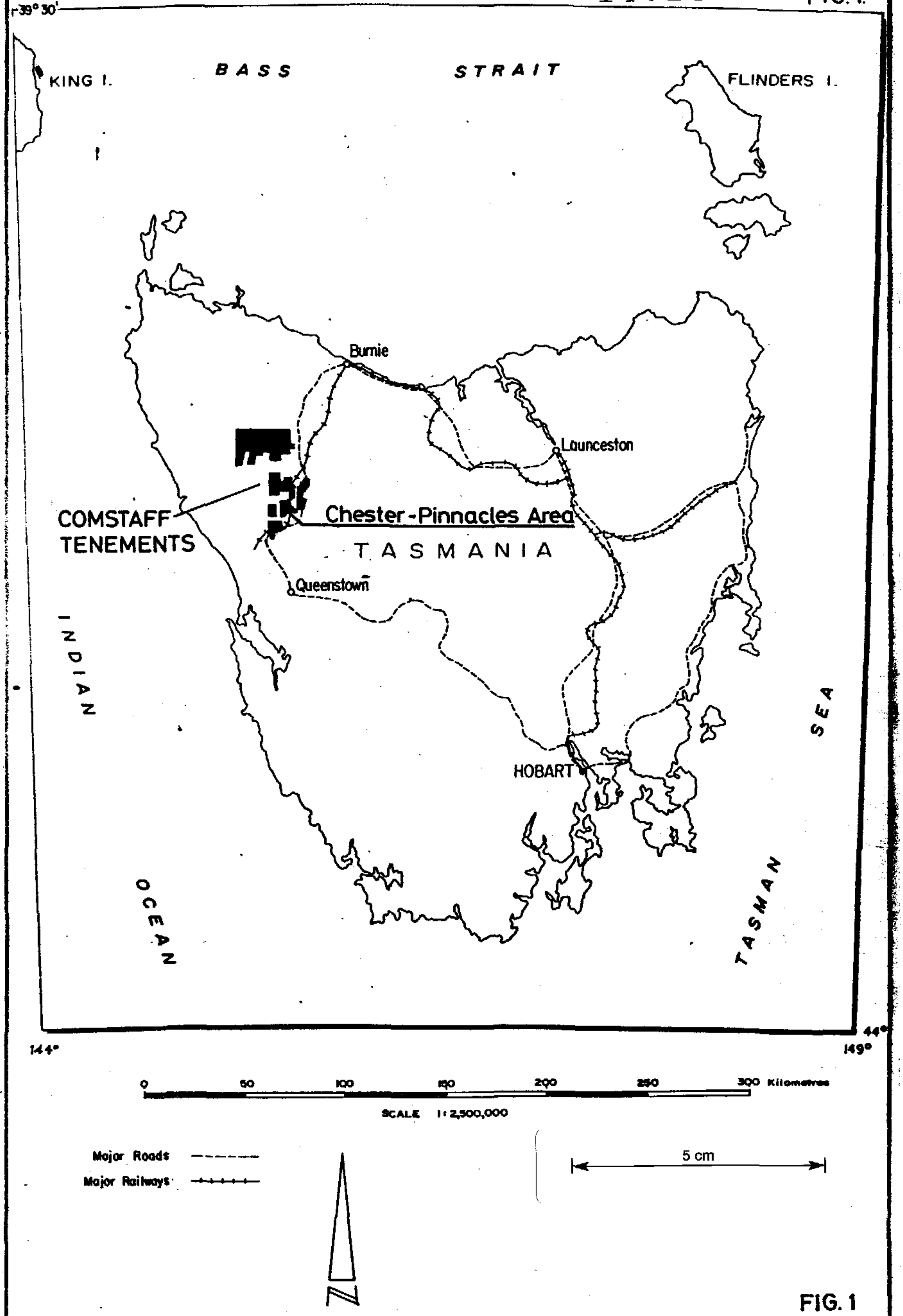
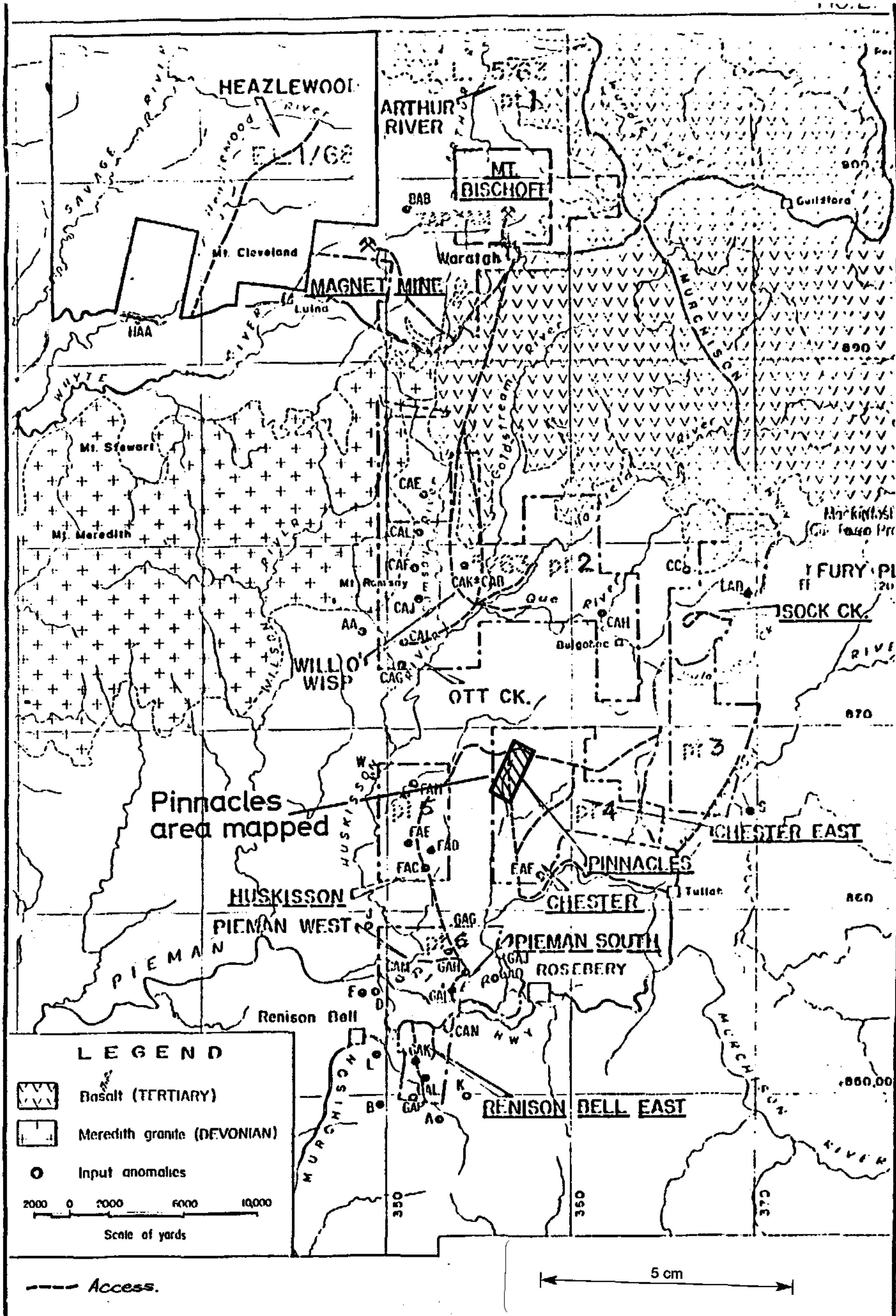


FIG. 1

Prepared: A.S.C.	PREUSSAG AUSTRALIA PTY. LTD.	Date: Dec. 1977
Drawn: A S C	COMSTAFF PROJECT - TAS. LOCATION MAP	A4-173

145

146147



Map compiled from Comstaff Pty. Ltd. map.

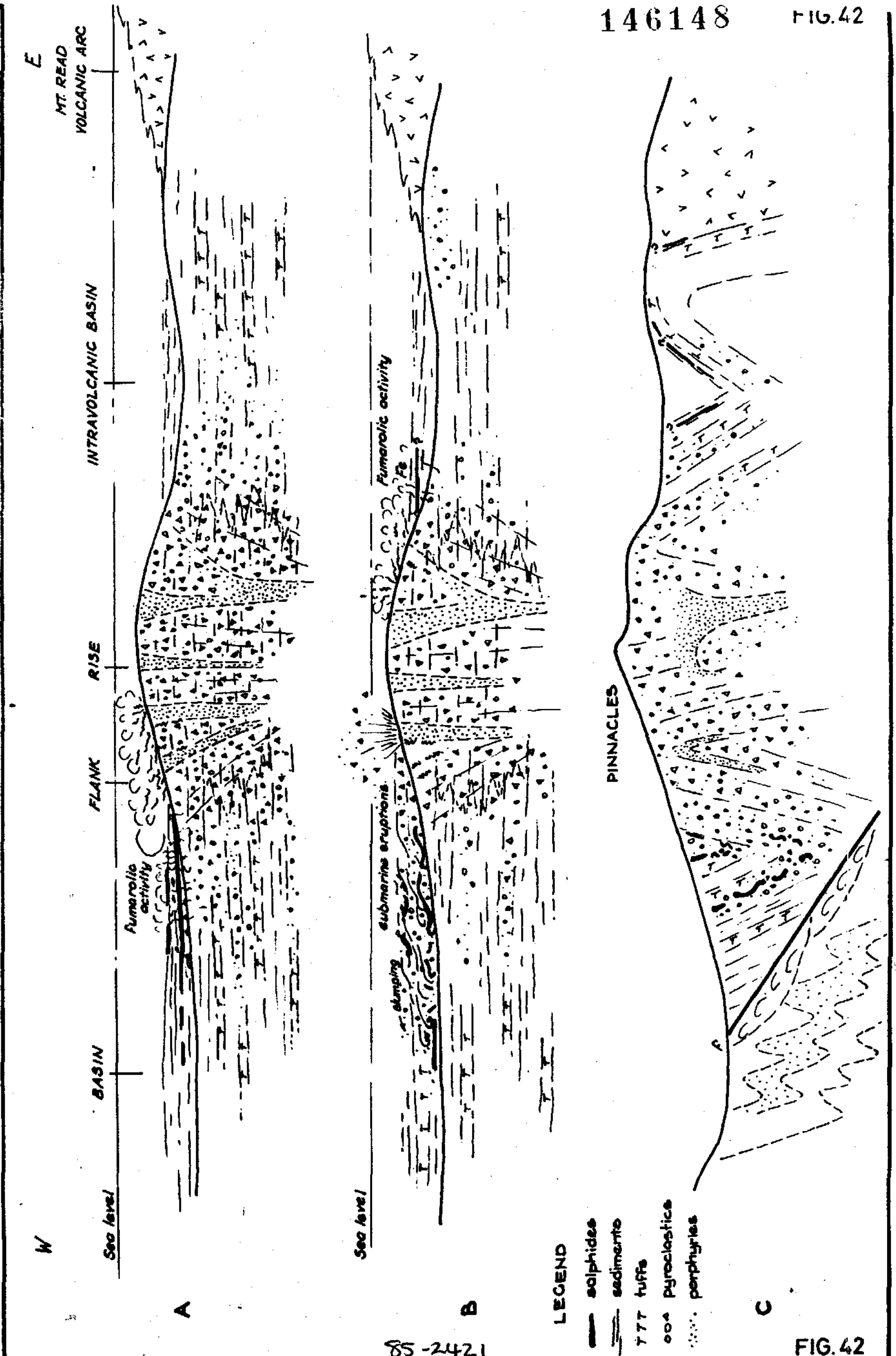
FIG.2.

Prepared: G.K.K.	PREUSSAG AUSTRALIA PTY. LTD. N.W. TASMANIA	Date: Jan. '78
Drawn:		A4-044

145A

146148

FIG.42



85-2421

FIG. 42

Prepared: G.K.K.	PREUSSAG AUSTRALIA PTY. LTD.	Date: FEB 78
Drawn: AJ	PINNACLES PROSPECT – SKETCH SECTIONS DEVELOPMENT OF GEOLOGICAL SETTING	A4 187

146149

REPORT NO. TAS/9

DECEMBER, 1977

85-2421 Vol 2/3

PREUSSAG AUSTRALIA PROPRIETARY LIMITED

COMSTAFF JOINT VENTURE
TASMANIA, AUSTRALIA

PROGRESS REPORT ON THE PINNACLES AREA

VOLUME II - ILLUSTRATIONS
(No's 1 - 26)

GERHARD KRUMMEI

146150

PREUSSAG AUSTRALIA PROPRIETARY LIMITED
COMSTAFF JOINT VENTURE
TASMANIA, AUSTRALIA
PROGRESS REPORT ON THE
PINNACLES AREA
VOLUME II - ILLUSTRATIONS
(No's 1 - 26)

ILLUSTRATIONS

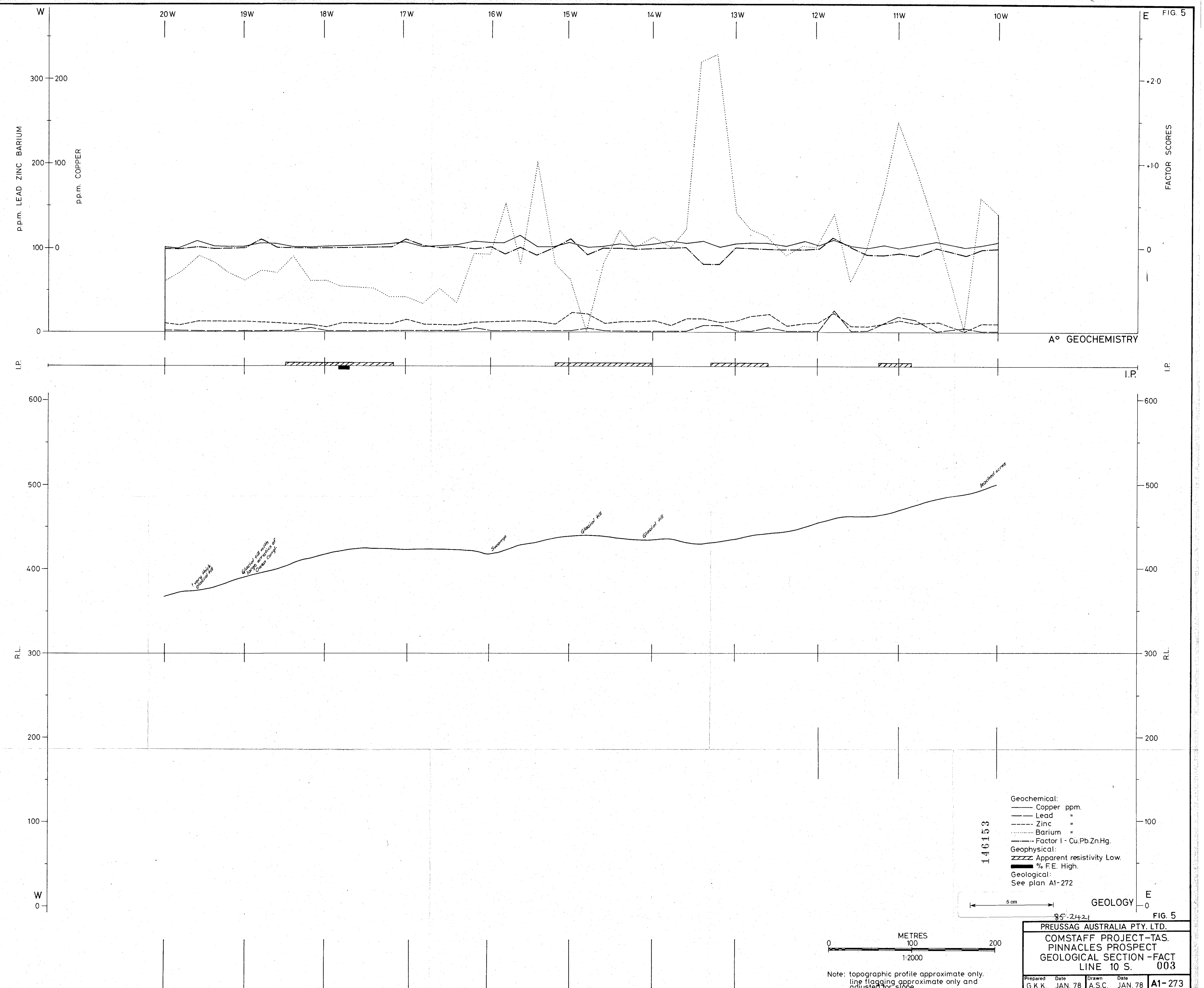
List of Maps

Geological legend ~ provisional.
Vrh Volcanics ~ rhyolitic.
Vd -"- ~ dacitic.
Van -"- ~ andesitic.
Va -"- ~ "acid"
Ag "Agglomeratic" (Mainly flow pyroclastics)
Aga -"- ~ "acid"
Agd -"- ~ dacitic.
Agan Agglomerate ~ andesitic.
Agi -"- ~ "intermediate".
T Tuff ~ undifferentiated.
TL -"- ~ lapilli.
TLi -"- ~ Lithic.
Ta -"- ~ "acid" or felsic.
Tv -"- ~ vitric.
Ti -"- ~ "intermediate" or mafic.
Tand -"- ~ andesitic.
Tx -"- ~ crystal.
congl. Conglomerate.
mst Mudstone.
sh. Shale.
arg Argillite.
slst Siltstone.
st Sandstone.
chert Chert.
gwk Greywacke.
Q Quartz - secondary
QV Quartz veining - primary.
CV Carbonate filled veining.
nods. Nodules.
alt Altered.
S Sericitic.
C Carbonate.
chl Chloritic.
py Pyrite.
Kl Kaolin.
Si Silicification.
gal Galena.
sphal Sphalerite.
cpy Chalcopyrite.
mal Malachite.
Ba Barite
lim st. Limonite stained.
Mn st. Manganese stained.
NVF Net vein fracturing.
fl. Float.
Outcrop.
Floaters or scree.
Bedding.
Foliation / cleavage.
Joint.
Direction and plunge of lineation.
-"- -"- of coarse rodding.
-"- -"- of anticlinal axis.
-"- -"- of synclinal axis.
Direction of younging / facing.
Fault or shear
Contact
T4392 2.14.10 Stream sediment sample. Cu. Pb. Zn.
Peak.
Drill hole collar.
Structure.
Mineralization.
Lithology
METRES
0 40 80 120 160 200
1:2,000
5 cm
85-2421
PREUSSAG AUSTRALIA PTY. LTD.
FIG. 3
COMSTAFF PROJECT - TAS.
PINNACLES PROSPECT
SURFACE GEOLOGY - FACT
001
Prepared G.K.K. Date Feb. '78
Drawn A.S.C. Date Feb. '78
A1 - 272
THOMAS' TUNNEL
BROWN'S WORKINGS
McGUINNESS' WORKINGS
STRONG'S ALLUVIAL GOLD WORKINGS
1000 S
1100 S
1200 S
1300 S
1400 S
1500 S
1600 S
1700 S
1900 S
2100 S
2200 S
2300 S
2400 S
2500 S
2600 S
2700 S
2800 S

146151

FIG. 3


LONGITUDINAL SECTION LINE
OWEN SHEAR
1000 S
1100 S
1200 S
1300 S
1400 S
1500 S
1600 S
1700 S
1900 S
2000 S
2100 S
2200 S
2300 S
2400 S
2500 S
2600 S
2700 S
2800 S
1:2000
METRES
0 40 80 120 160 200
LEGEND
QUATERNARY
Glacial drift
MIDDLE - UPPER CAMBRIAN (ROSEBERY GROUP)
Banded shales & siltstones; minor bands of sandstone claystone & tuff
Mainly dacitic to andesitic (mafic) crystal lithic & lapilli tuffs; weak chloritic alteration
Altered acid tuffs (T) & coarse poorly sorted pyroclastics; (Aga): sericitic alteration
UPPER PROTEROZOIC - LOWER CAMBRIAN
Highly altered, poorly sorted, coarse, acid flow pyroclastics (Aga) minor altered tuffs (Tv) & black shale; sericitic alteration
Autobrecciated rhyolites
Rhyolitic tuffs
Mafic, chloritic, altered, dacitic to andesitic crystal & lapilli tuffs & flow pyroclastics; disturbed ? minor shales & argillites, chloritic alteration
Quartz porphyry, quartz feldspar porphyry
Zone of grey chert, ?boulders with pyrite, trace of sphal. & gal.; silicic alteration
Zinc, lead & copper lode; chloritic & silicic alteration; sericitic alteration
Banded black & grey shales, siltstones; bedded sulphides minor altered acid tuffs, lesser patchy sericitic and/or chloritic alteration
Mainly banded, folded argillites & re worked altered tuffs; patchy chloritic & sericitic alteration
Transition zone of altered, slumped sediments, tuffs & pyroclastics; increasing chloritic, patchy sericitic alteration
Mainly mafic intermediate ? andesitic reworked tuffs (Tan) lapilli tuffs; agglomerate & lava (Van).
Bedding
Foliation/schistosity
Fault
py Pyrite
sph. Sphalerite
gal. Galena
cpy Chalcopyrite
mal Malachite
limst. Limonite stain.
85-2421
FIG. 4
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT - TAS
PINNACLES PROSPECT
SURFACE GEOLOGY
INTERPRETATION
002
Prepared G.K.K. Date FEB. 78
Drawn A.J,AC Date FEB 78
A1-303
5 cm
146152
FIG. 4



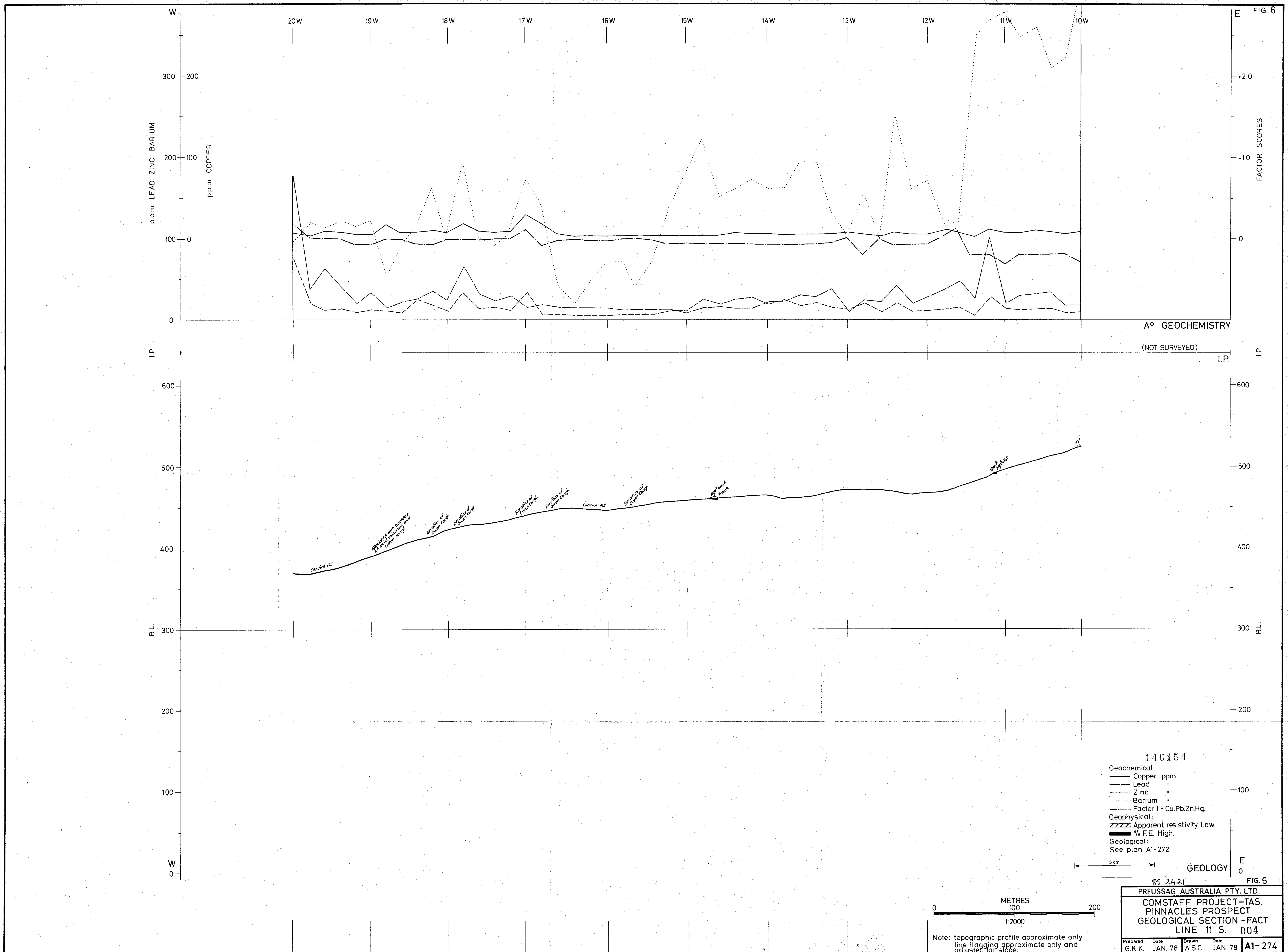
146153

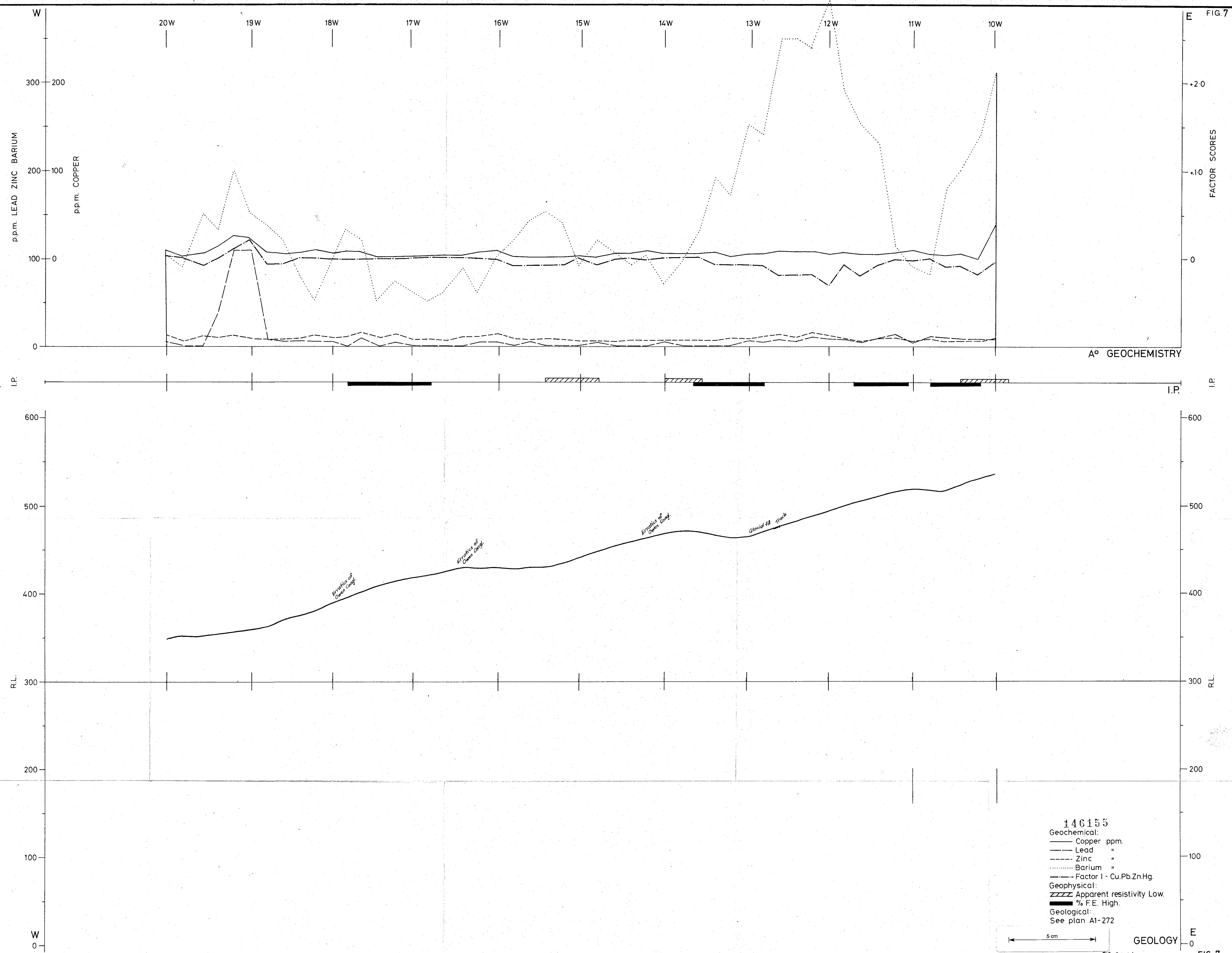
85-2421

FIG. 5

Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.

PREUSSAG AUSTRALIA PTY. LTD.			
COMSTAFF PROJECT–TAS. PINNACLES PROSPECT GEOLOGICAL SECTION –FACT LINE 10 S. 003			
Prepared G.K.K.	Date JAN. 78	Drawn A.S.C.	Date JAN. 78
A1–273			


W
E
FIG. 6
20W
19W
18W
17W
16W
15W
14W
13W
12W
11W
10W
p.p.m. LEAD ZINC BARIUM
p.p.m. COPPER
FACTOR SCORES
300
200
100
0
+2·0
+1·0
A° GEOCHEMISTRY
I.P.
(NOT SURVEYED)
Glacial fill
Glacial fill with boulders of acid volcanics and Owen congl.
Erratics of Owen Congl.
Glacial fill
Track
R.L.
600
500
400
300
200
100
146154
Geochemical:
Copper ppm.
Lead "
Zinc "
Barium "
Factor I - Cu.Pb.Zn.Hg.
Geophysical:
Apparent resistivity Low.
% F.E. High.
Geological:
See plan A1-272
5 cm
GEOLOGY
85-2421
METRES
0
100
200
1:2000
Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT-TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION -FACT
LINE 11 S. 004
Prepared G.K.K.
Date JAN. 78
Drawn A.S.C.
Date JAN. 78
A1-274



Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.

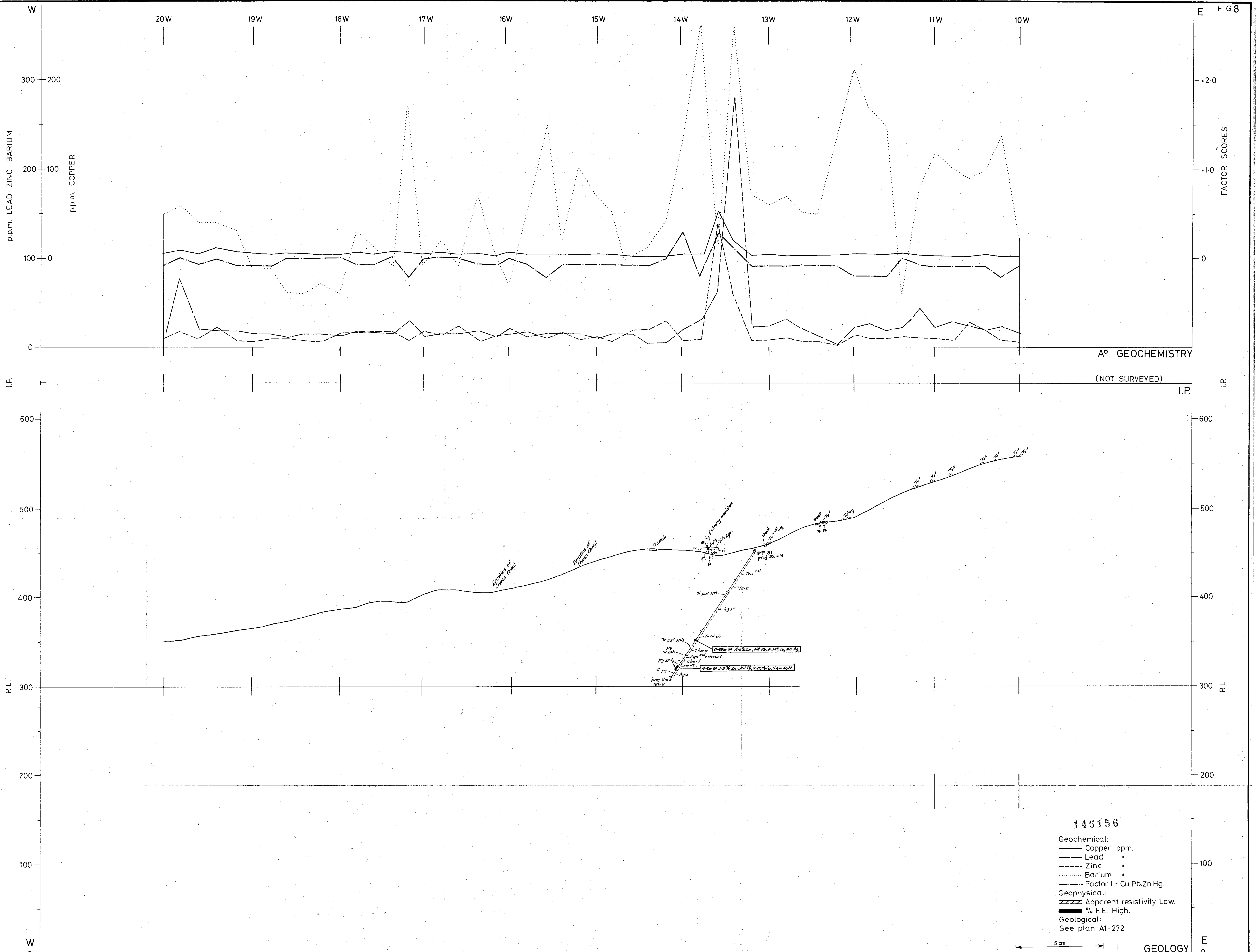
85-2421

FIG. 7

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION - FACT
LINE 12 S. 005

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1-275



85-2421

FIG. 8

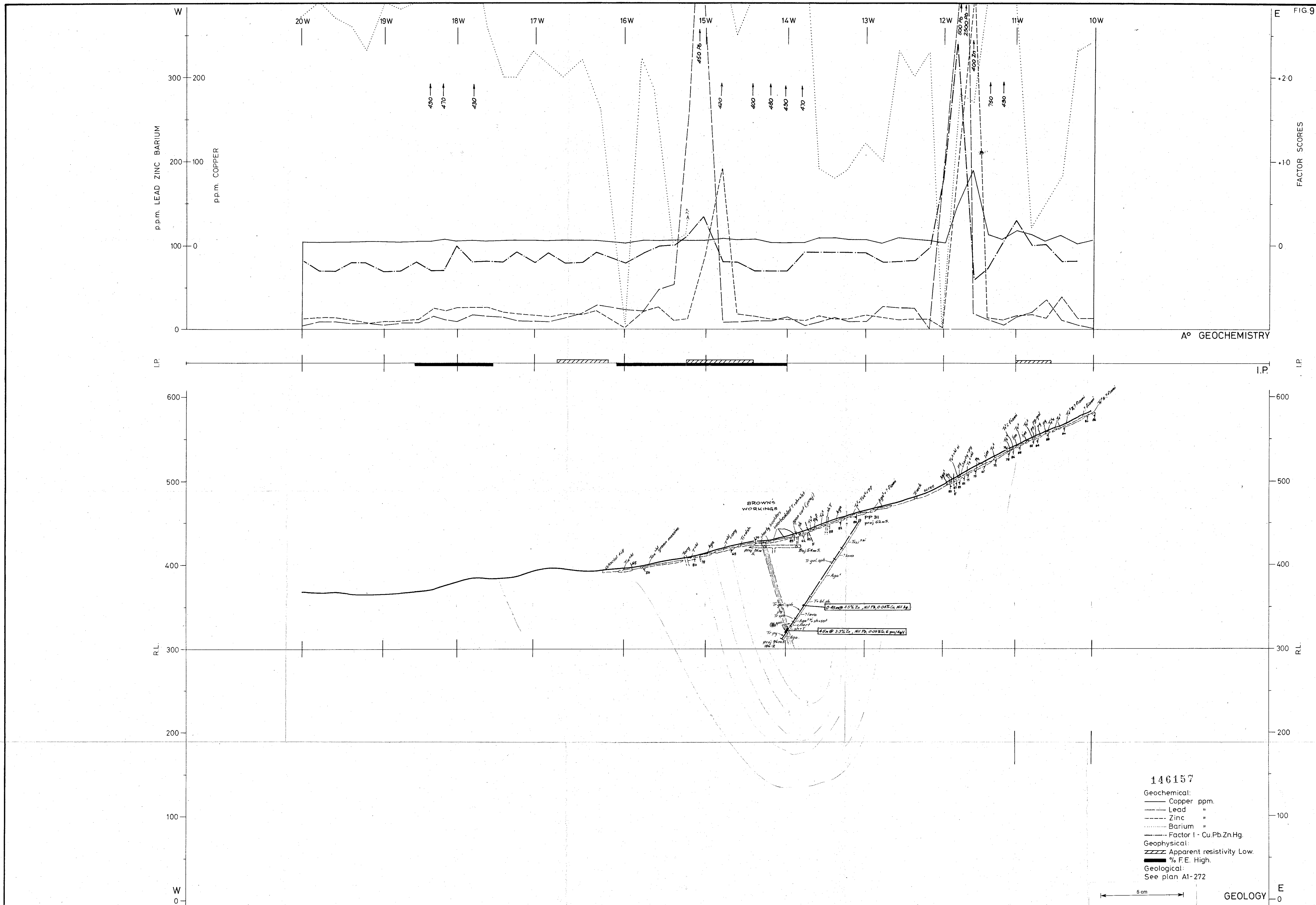
PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION -FACT
LINE 13 S. 006

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1-276

METRES
0 100 200
1:2000

Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.



METRES
0 100 200
1:2000

Note: topographic profile approximate only.
line flagging approximate only and adjusted for slope.

FIG. 9

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION – FACT
LINE 14 S. 007

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1-277

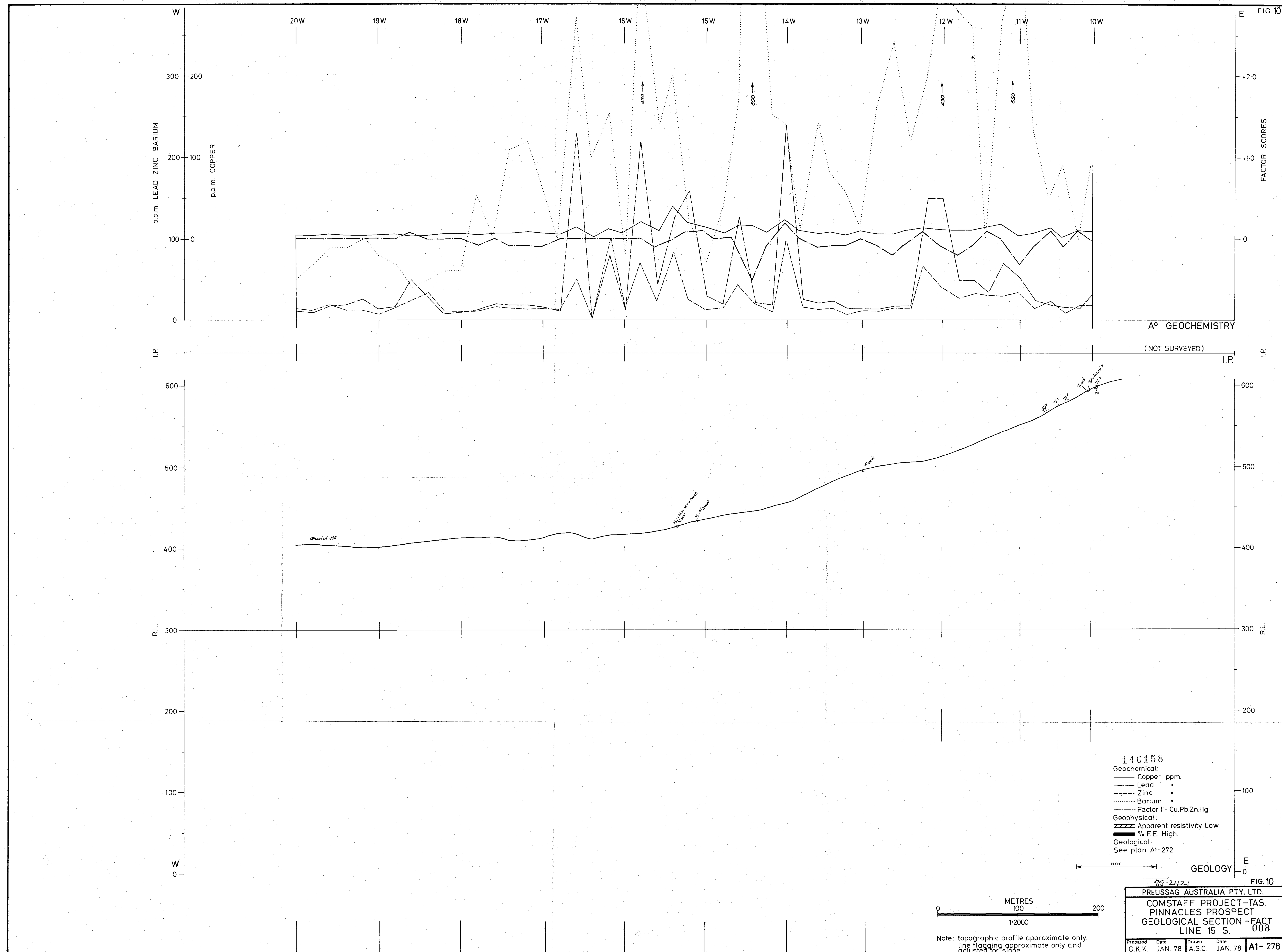


FIG. 10
W
E
20W
19W
18W
17W
16W
15W
14W
13W
12W
11W
10W
p.p.m. LEAD ZINC BARIUM
p.p.m. COPPER
FACTOR SCORES
300
200
100
0
+2·0
+1·0
430
600
430
550
A° GEOCHEMISTRY
I.P.
(NOT SURVEYED)
I.P.
600
500
400
300
200
100
R.L.
Glacial fill
Rock
146158
Geochemical:
Copper ppm.
Lead "
Zinc "
Barium "
Factor I - Cu.Pb.Zn.Hg.
Geophysical:
Apparent resistivity Low.
% F.E. High.
Geological:
See plan A1-272
5 cm
GEOLOGY
85-2421
METRES
0
100
200
1:2000
Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.
FIG. 10
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION - FACT
LINE 15 S.
008
Prepared G.K.K.
Date JAN. 78
Drawn A.S.C.
Date JAN. 78
A1- 278

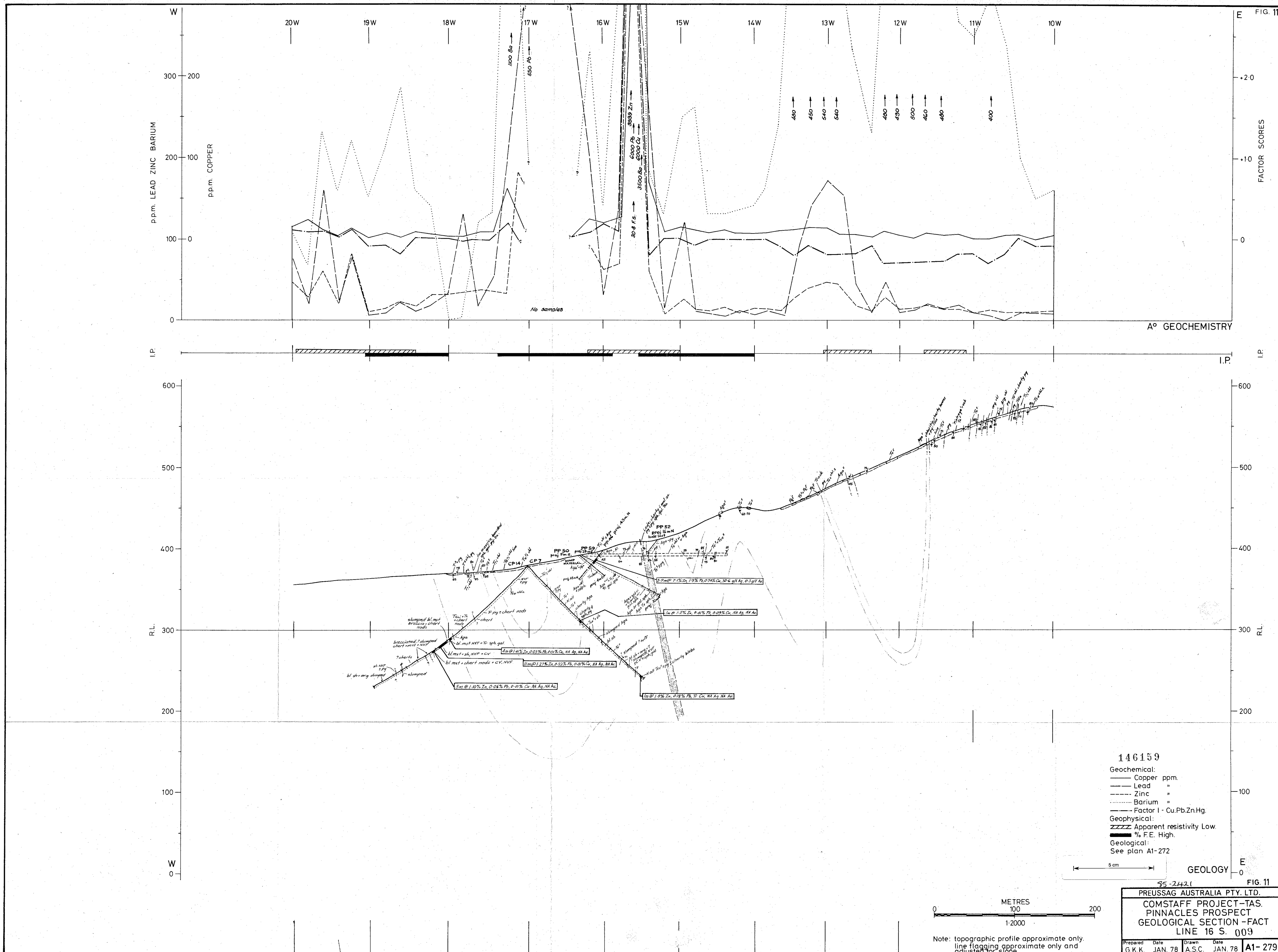


FIG. 11
W
E
20W
19W
18W
17W
16W
15W
14W
13W
12W
11W
10W
p.p.m. LEAD ZINC BARIUM
p.p.m. COPPER
FACTOR SCORES
1100 Ba
550 Pb
3939 Zn
6000 Pb
6000 Cu
3500 Ba
30.8 F.S.
480
450
540
540
480
490
500
460
480
400
No samples
A° GEOCHEMISTRY
I.P.
R.L.
CP14
CP7
PP50
PP59
PP52
GEOLOGY
146159
Geochemical:
Copper ppm.
Lead "
Zinc "
Barium "
Factor I - Cu.Pb.Zn.Hg.
Geophysical:
Apparent resistivity Low.
% F.E. High.
Geological:
See plan A1-272
5 cm
METRES
1:2000
Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT-TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION - FACT
LINE 16 S.
009
Prepared G.K.K.
Date JAN. 78
Drawn A.S.C.
Date JAN. 78
A1-279

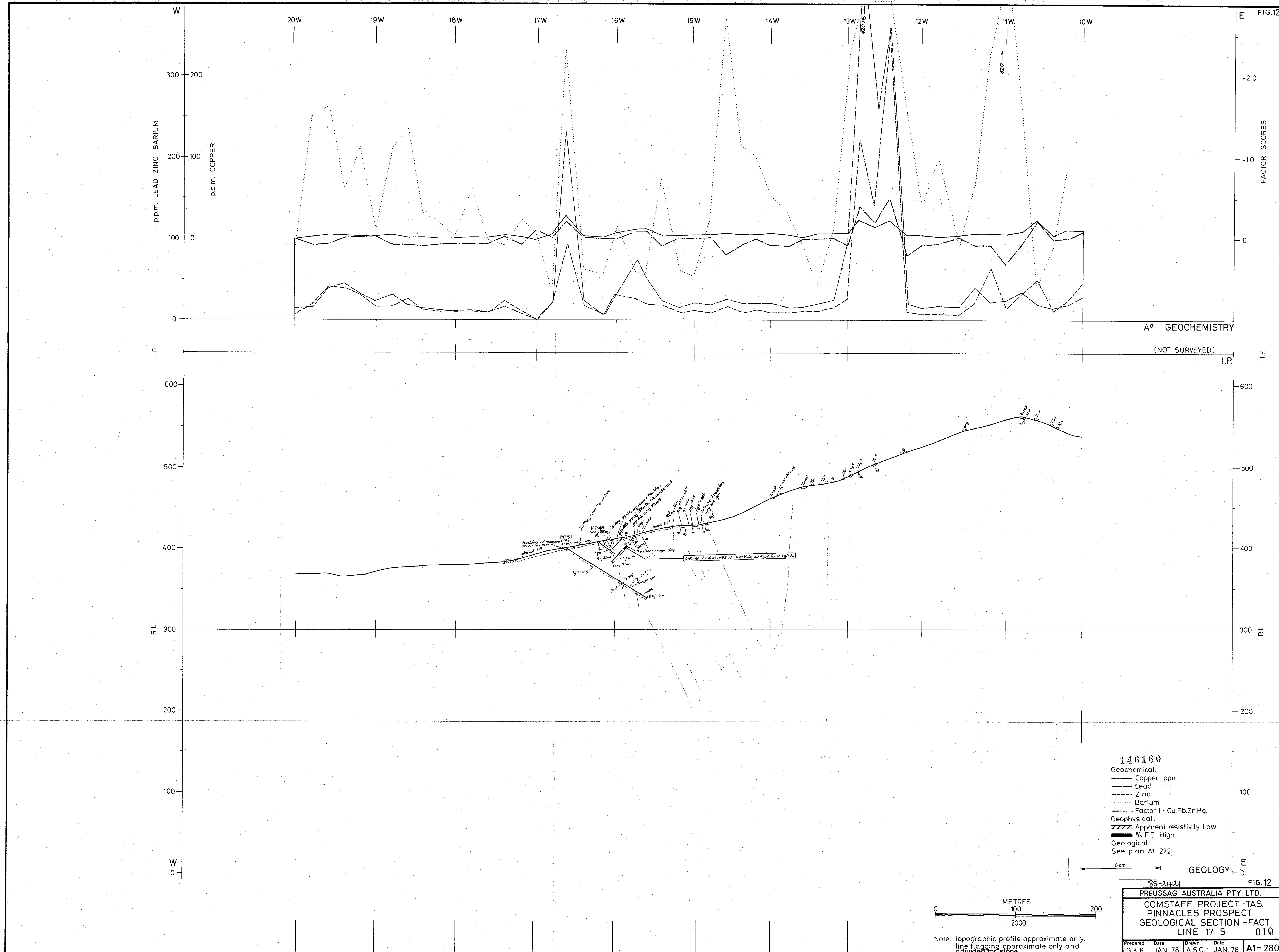
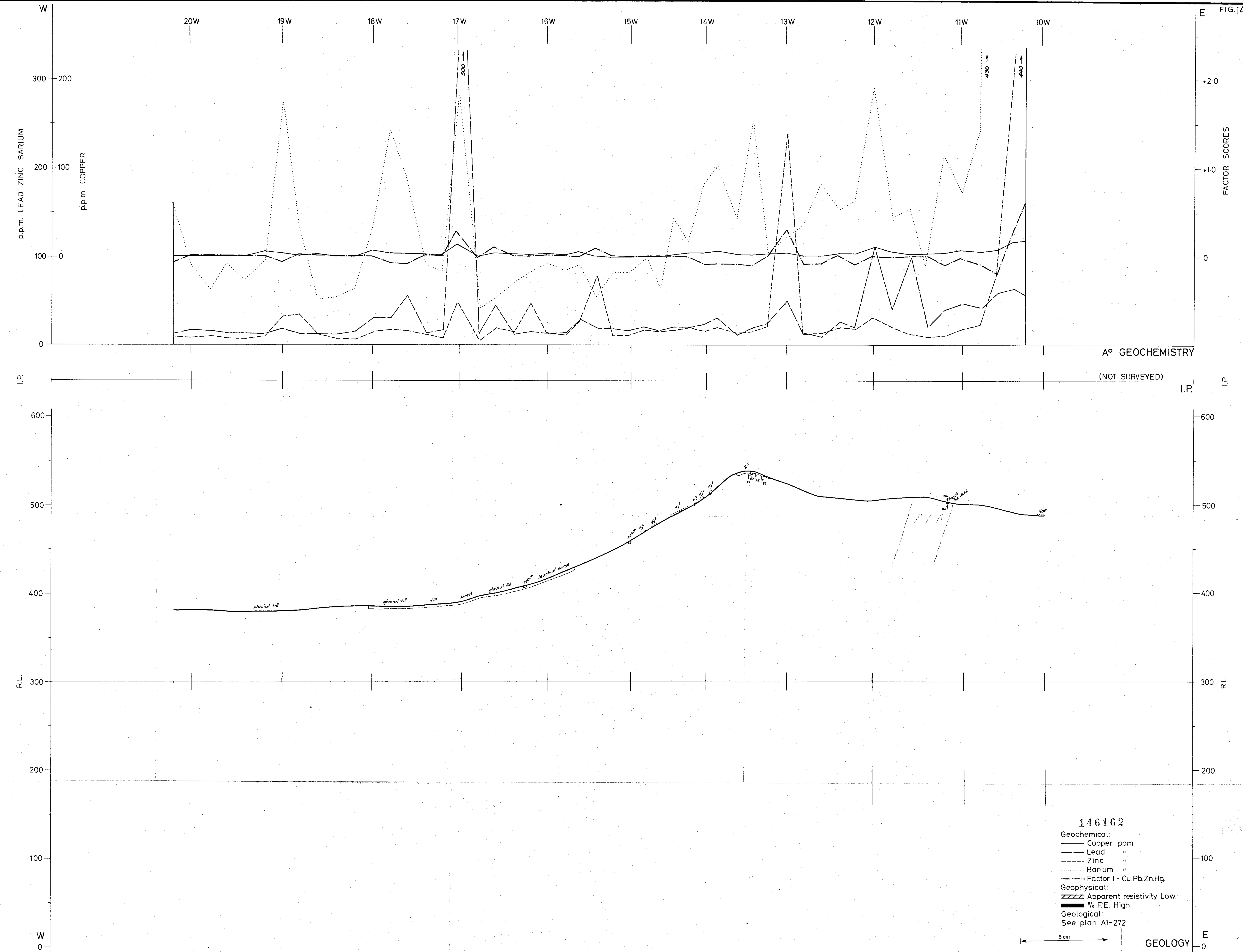


FIG. 12

PREUSSAG AUSTRALIA PTY. LTD.			
COMSTAFF PROJECT-TAS. PINNACLES PROSPECT GEOLOGICAL SECTION - FACT LINE 17 S. 010			
Prepared G.K.K. Date JAN. 78	Drawn A.S.C. Date JAN. 78	A1- 280	


FIG. 13
W
E
19W
18W
17W
16W
15W
14W
13W
12W
11W
10W
420
440
p.p.m. LEAD ZINC BARIUM
p.p.m. COPPER
FACTOR SCORES
300
200
100
0
+2·0
+1·0
A° GEOCHEMISTRY
I.P.
CP 12
glacial till
slumped sediments and tuffs
banded scree
Projected position of Owen Shear
R.L.
600
500
400
300
200
100
0
146161
Geochemical:
Copper ppm.
Lead "
Zinc "
Barium "
Factor I - Cu.Pb.Zn.Hg.
Geophysical:
Apparent resistivity Low.
% F.E. High.
Geological:
See plan A1-272
5 cm
GEOLOGY
85-2421
METRES
0
100
200
1:2000
Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.
FIG. 13
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT-TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION - FACT
LINE 18 S.
011
Prepared G.K.K.
Date JAN. 78
Drawn A.S.C.
Date JAN. 78
A1-281



85-2421

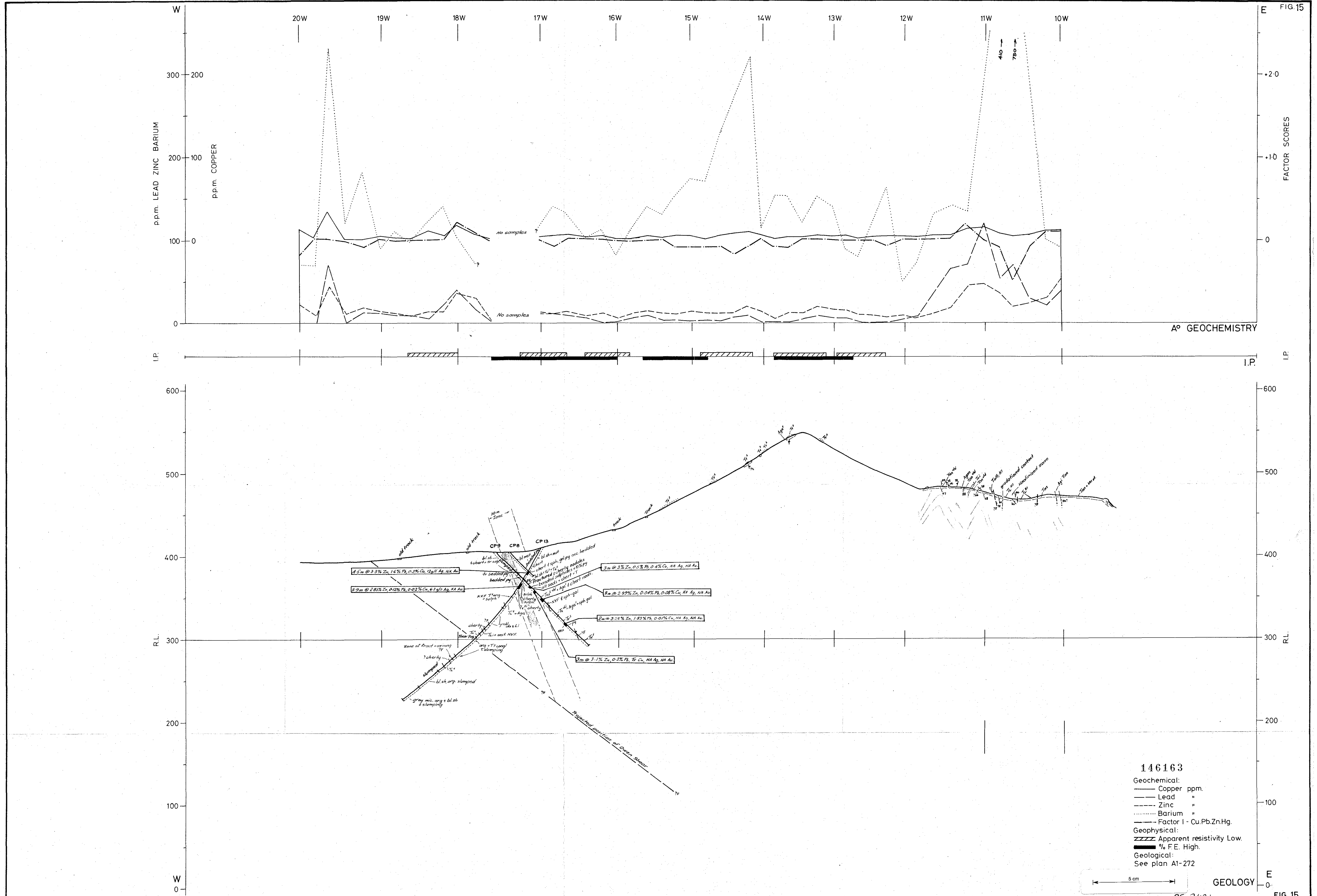
FIG. 14

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT-TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION - FACT
LINE 19 S. 012

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1-282

Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.



Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.

85-2421

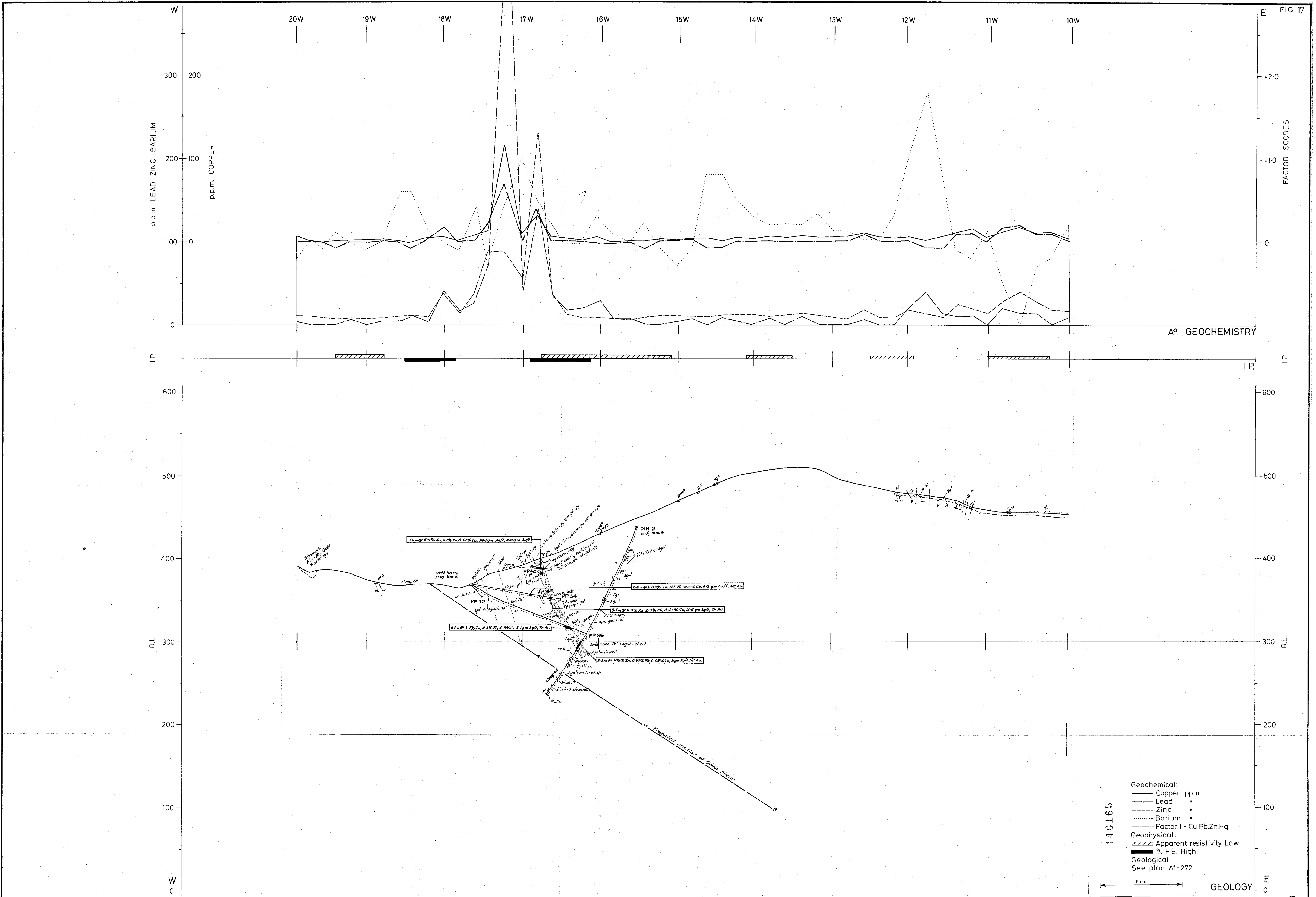
FIG. 15

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION – FACT
LINE 20 S. 013

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1-283


FIG. 16
W
E
20W
19W
18W
17W
16W
15W
14W
13W
12W
11W
10W
1250
1250
500
p.p.m. LEAD ZINC BARIUM
p.p.m. COPPER
FACTOR SCORES
300
200
100
0
+2·0
+1·0
A° GEOCHEMISTRY
I.P.
(NOT SURVEYED)
600
500
400
300
200
R.L.
PP 39
proj 40 m N.
PIN. I.
Track
proj. mst si NVF
bl.sh.
costean
1·8m @ 2·4% Zn, Nil Pb, 0·2% Cu, 18·5 g/t Ag, 4·5 g/t Au.
1·8m @ 2·0% Zn, 0·09% Pb, 0·07% Cu, 7·5gm Ag/t, Nil Au.
sph, gal in F
sph, gal
dissem. py. cpy
carb
cherty lode
slumped
slumped sh + T
bl. sh + Tsst.
?F
Projected position of Owen Slope
Geochemical:
Copper ppm.
Lead "
Zinc "
Barium "
Factor I - Cu.Pb.Zn.Hg.
Geophysical:
Apparent resistivity Low.
% F.E. High.
Geological:
See plan A1-272
5 cm
GEOLOGY
146164
85-2421
METRES
0
100
200
1:2000
Note: topographic profile approximate only line flagging approximate only and adjusted for slope.
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION – FACT
LINE 21 S.
014
Prepared G.K.K. Date JAN. 78
Drawn A.S.C. Date JAN. 78
A1-284



85-2421

FIG. 17

METRES
0 100 200
1:2000

Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION – FACT 015
LINE 22 S.

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1- 285

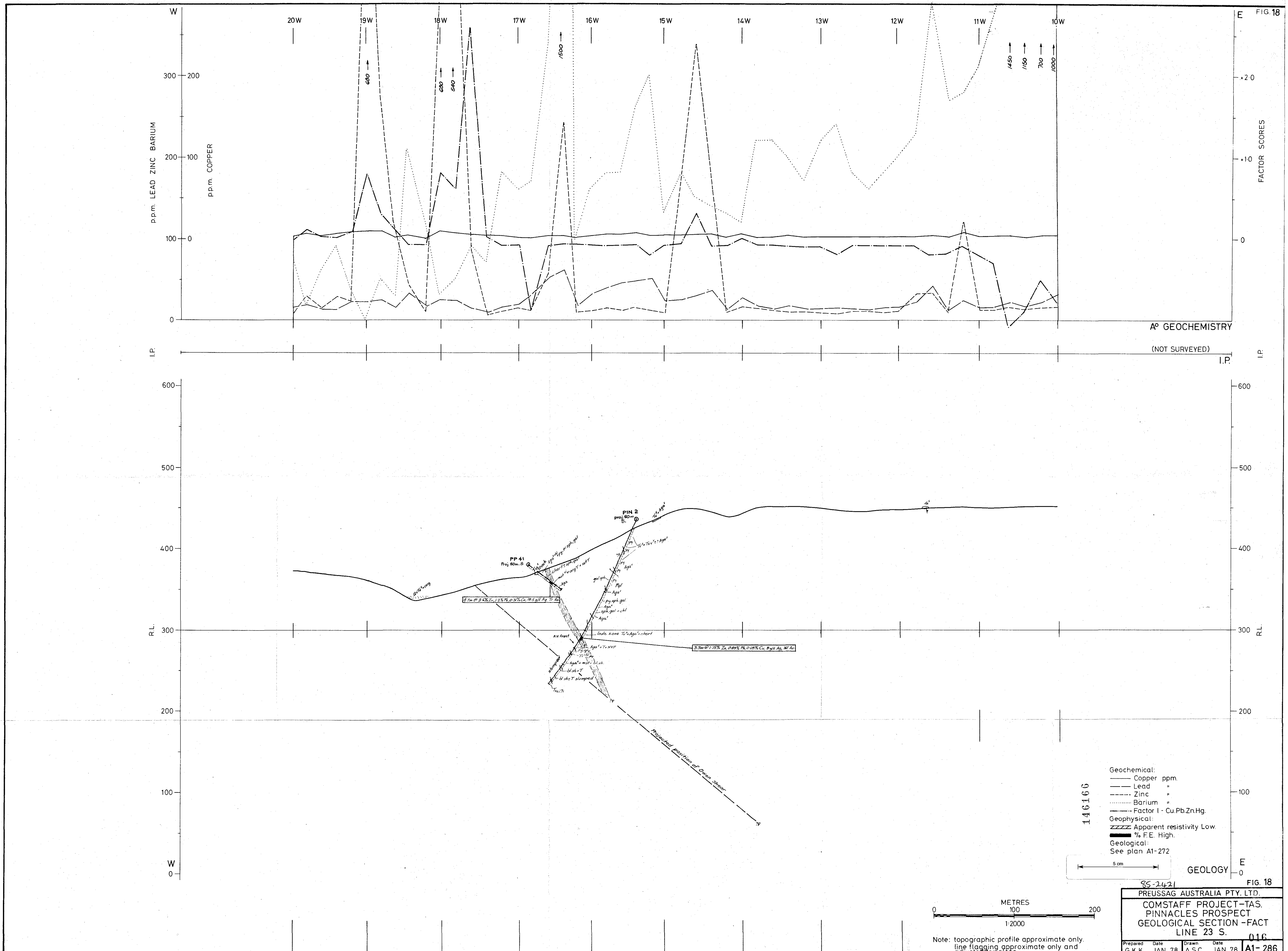
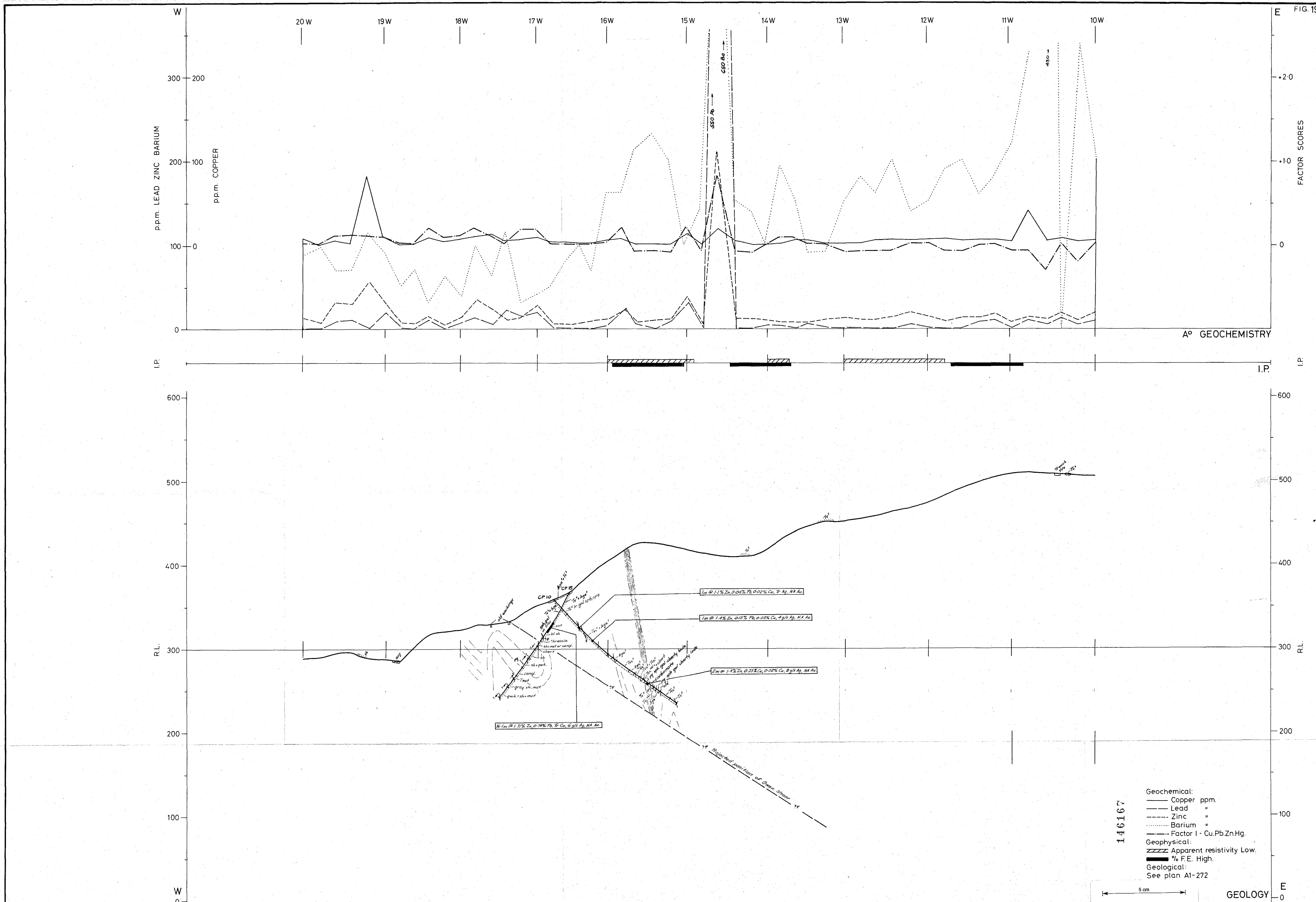


FIG. 18
W
E
20W
19W
18W
17W
16W
15W
14W
13W
12W
11W
10W
p.p.m. LEAD ZINC BARIUM
p.p.m. COPPER
FACTOR SCORES
300
200
100
0
+2·0
+1·0
680
540
1500
1450
1150
700
1000
A° GEOCHEMISTRY
I.P.
(NOT SURVEYED)
R.L.
600
500
400
300
200
100
PIN 2
PP 41
Projected position of Owen Shear
Geochemical:
Copper ppm.
Lead "
Zinc "
Barium "
Factor I - Cu.Pb.Zn.Hg.
Geophysical:
Apparent resistivity Low.
% F.E. High.
Geological:
See plan A1-272
5 cm
GEOLOGY
146166
METRES
0
100
200
1:2000
Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.
85-2421
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT-TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION -FACT
LINE 23 S.
016
Prepared G.K.K. Date JAN. 78
Drawn A.S.C. Date JAN. 78
A1- 286



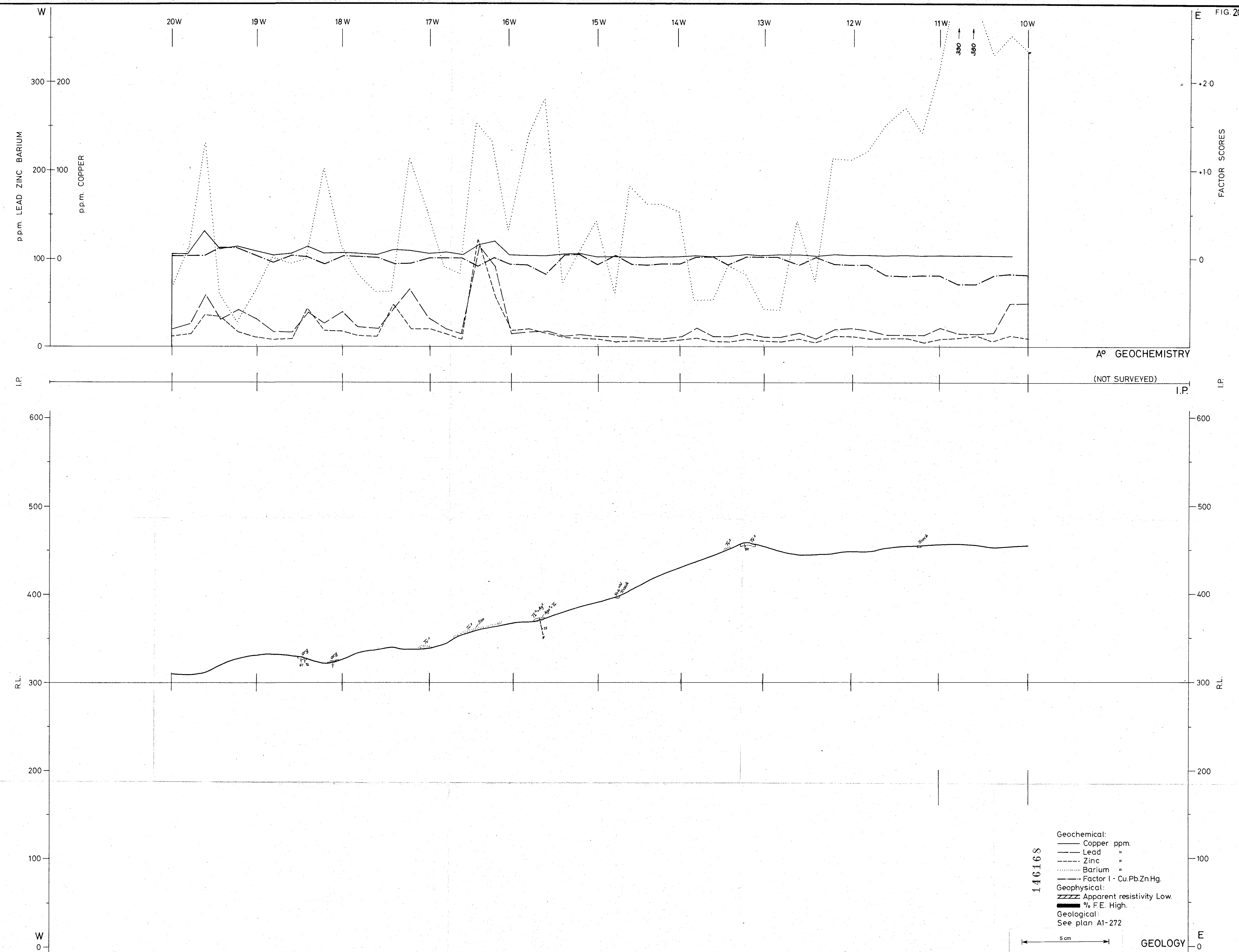
85-2421

FIG. 19

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION – FACT
LINE 24 S. 017

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1-287



Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.

85-2421

FIG. 20

PREUSSAG AUSTRALIA PTY. LTD.				
COMSTAFF PROJECT-TAS. PINNACLES PROSPECT GEOLOGICAL SECTION -FACT LINE 25S. 018				
Prepared G.K.K.	Date JAN. 78	Drawn A.S.C.	Date JAN. 78	A1- 288

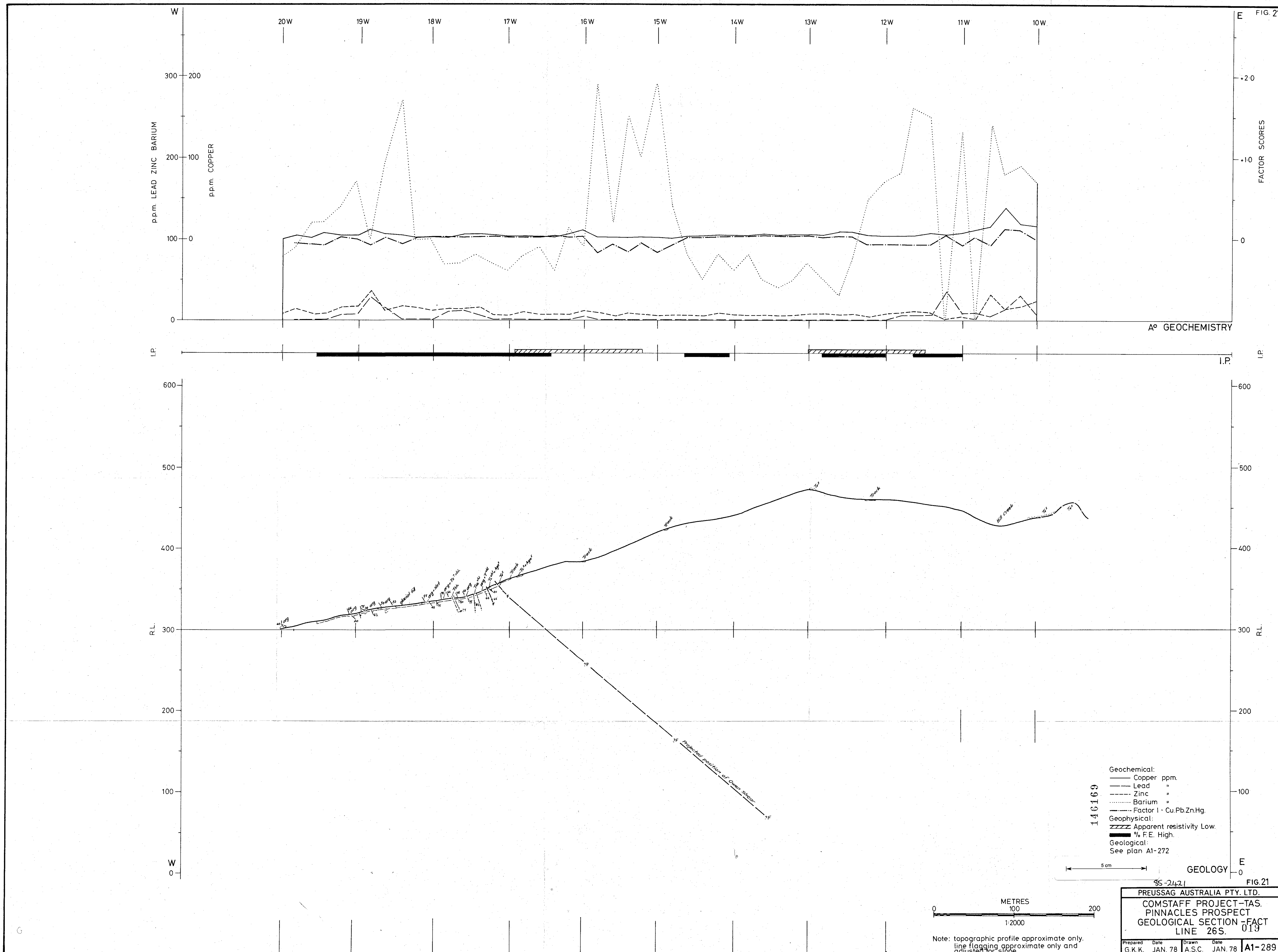
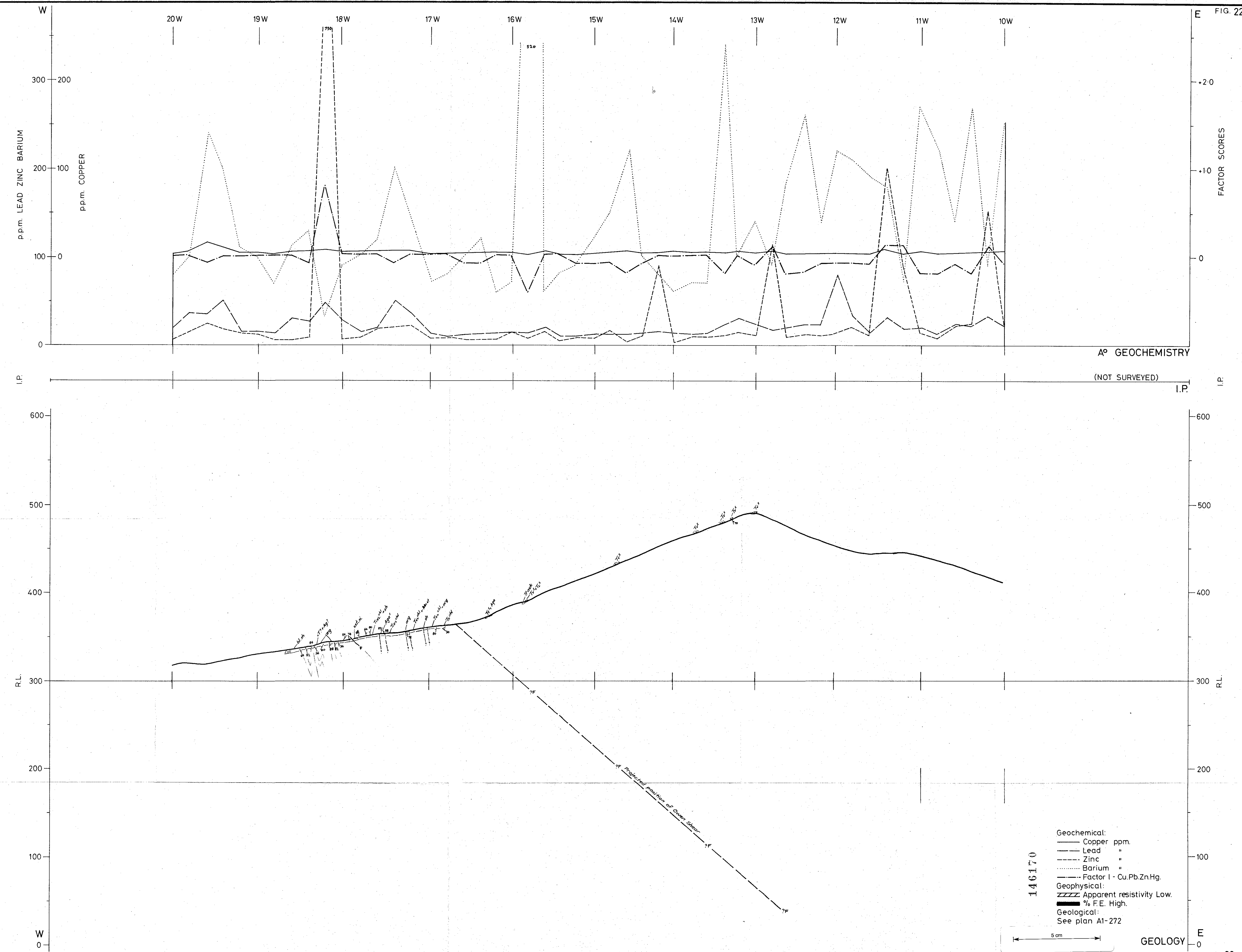


FIG. 21
W
E
20W
19W
18W
17W
16W
15W
14W
13W
12W
11W
10W
p.p.m. LEAD ZINC BARIUM
p.p.m. COPPER
FACTOR SCORES
A° GEOCHEMISTRY
I.P.
R.L.
Track
Hill Creek
Projected position of Owen Shear
GEOLOGY
Geochemical:
Copper ppm.
Lead "
Zinc "
Barium "
Factor I - Cu.Pb.Zn.Hg.
Geophysical:
Apparent resistivity Low.
% F.E. High.
Geological:
See plan A1-272
146169
5 cm
METRES
0
100
200
1:2000
Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT-TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION - FACT
LINE 26S.
019
Prepared G.K.K. Date JAN. 78
Drawn A.S.C. Date JAN. 78
A1-289



85-2421

FIG. 22

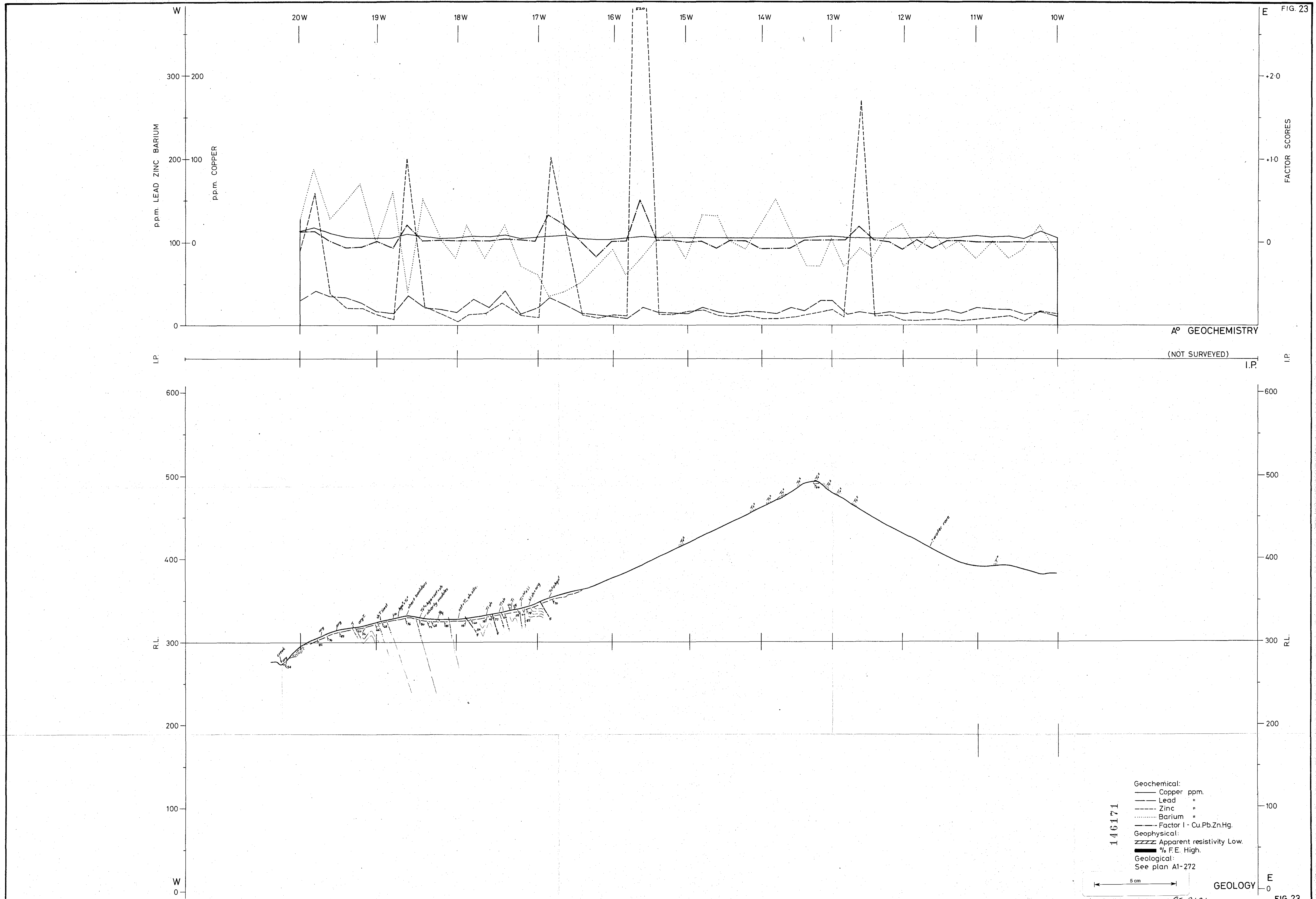
PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION - FACT
LINE 27 S. 020

METRES
0 100 200
1:2000

Note: topographic profile approximate only.
line flagging approximate only and adjusted for slope.

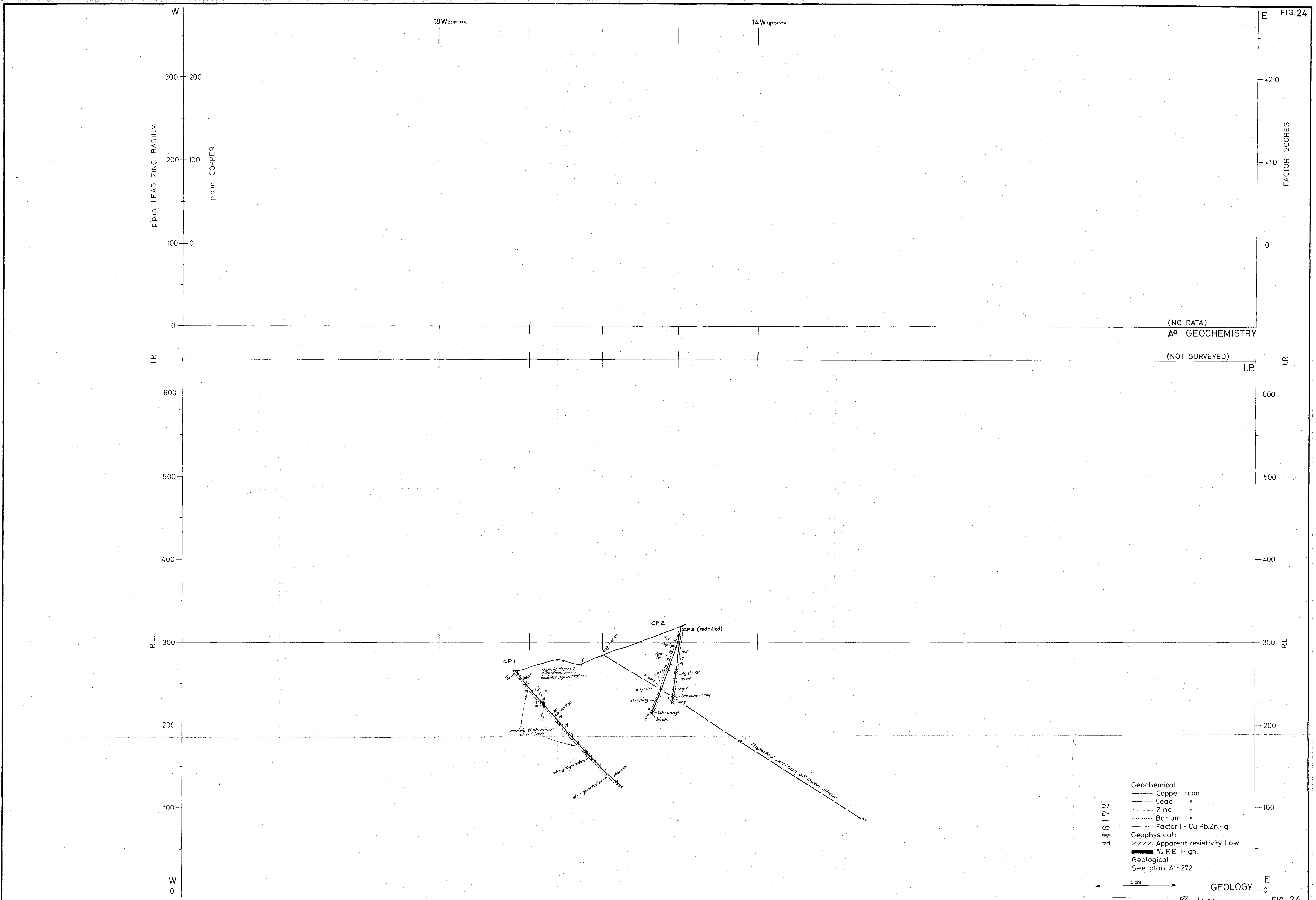
Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1- 290



85-2421

FIG. 23

PREUSSAG AUSTRALIA PTY. LTD.				
COMSTAFF PROJECT–TAS. PINNACLES PROSPECT GEOLOGICAL SECTION –FACT LINE 28 S. 021				
Prepared G.K.K.	Date JAN. 78	Drawn A.S.C.	Date JAN. 78	A1- 291



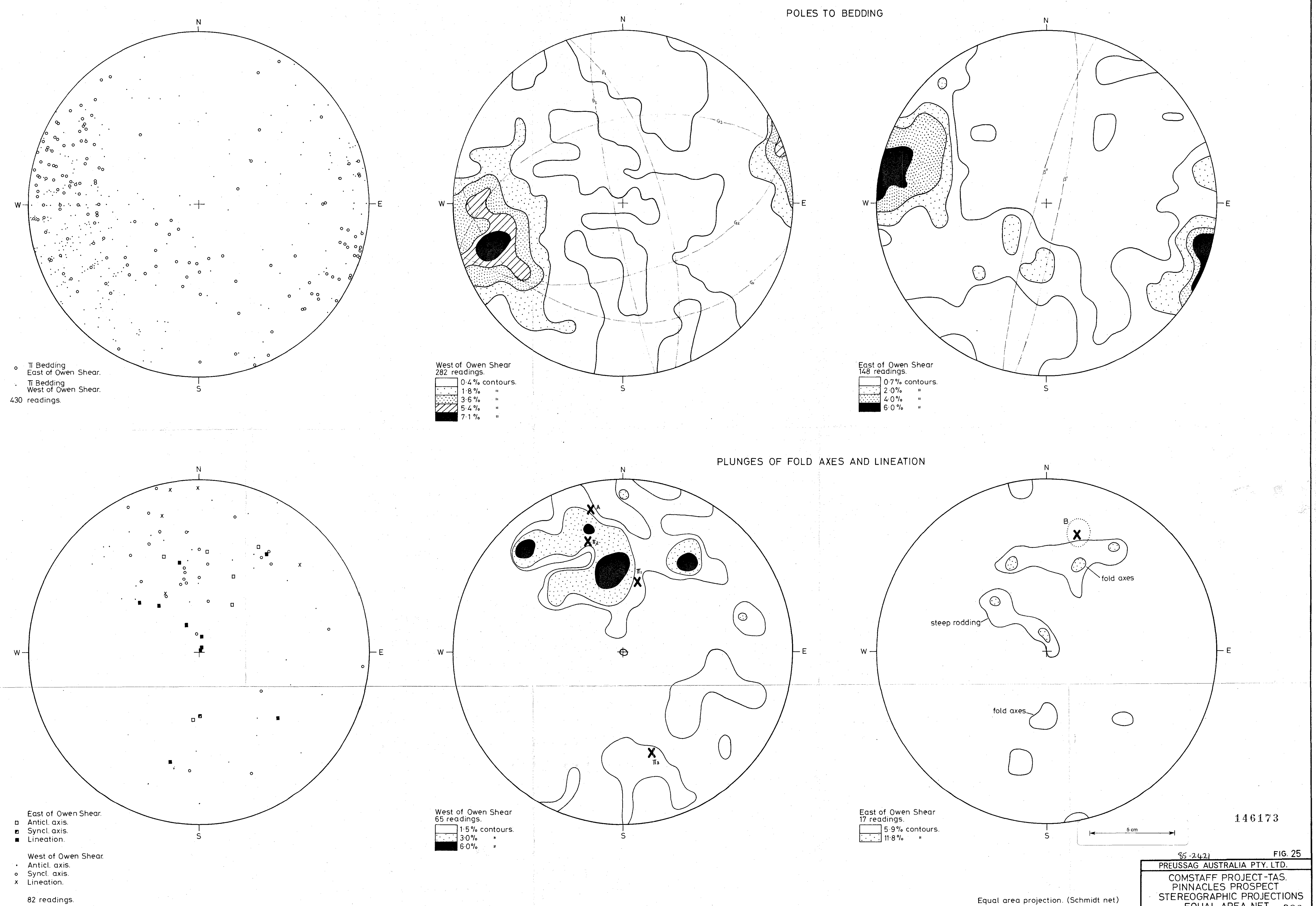
Note: topographic profile approximate only. line flagging approximate only and adjusted for slope.

FIG. 24

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT–TAS.
PINNACLES PROSPECT
GEOLOGICAL SECTION – FACT
LINE CP1–CP 2 022

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1- 292



146173

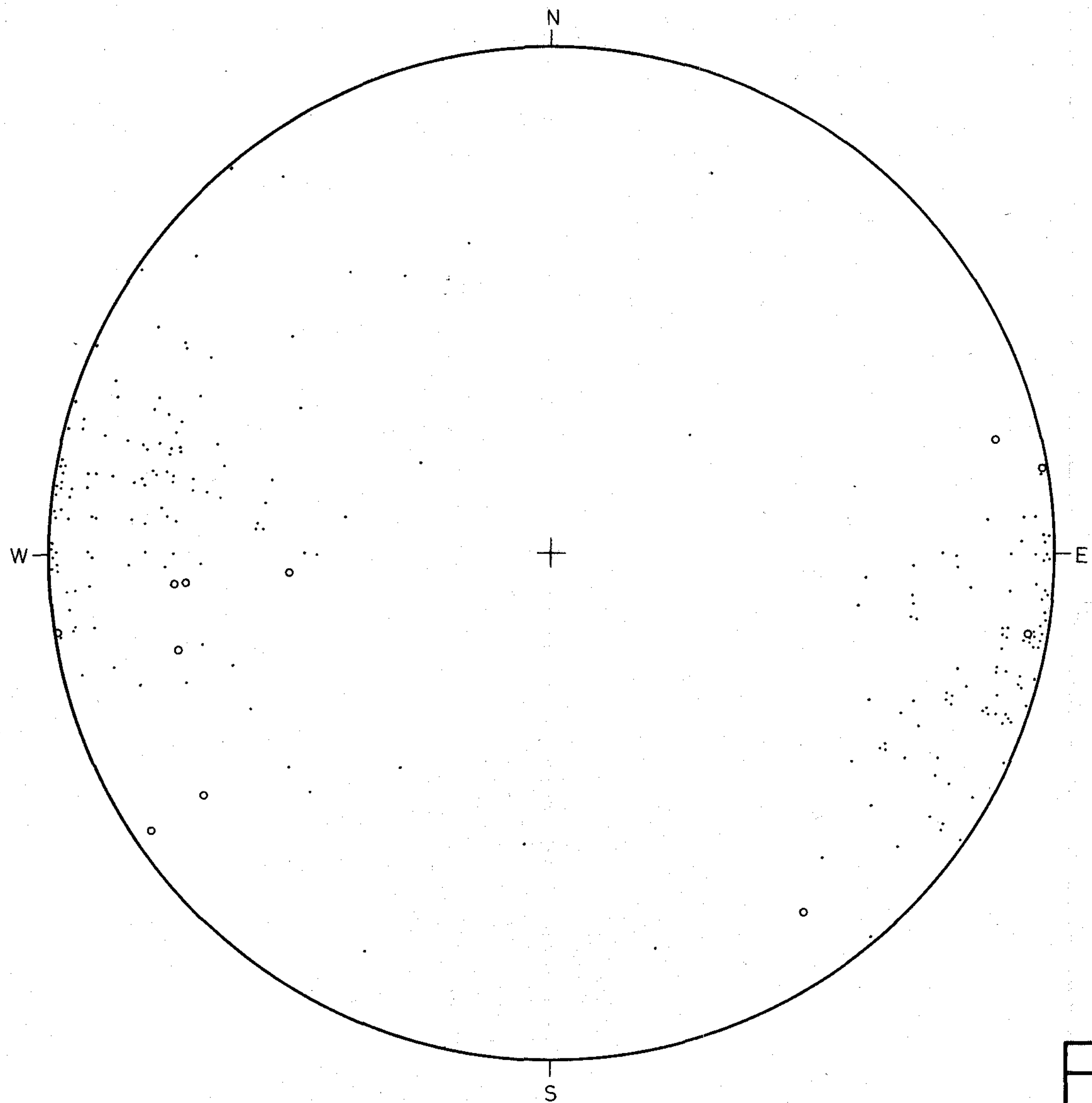
Equal area projection. (Schmidt net)

85-2421

FIG. 25

PREUSSAG AUSTRALIA PTY. LTD.				
COMSTAFF PROJECT-TAS. PINNACLES PROSPECT STEREOGRAPHIC PROJECTIONS EQUAL AREA NET 023				
Prepared G.K.K.	Date JAN. 78	Drawn A.S.C.	Date JAN. 78	A1-271

FIG. 26



. East of Owen Shear.
192 readings.

o West of Owen Shear.
10 readings.

202 readings.

146174

5 cm

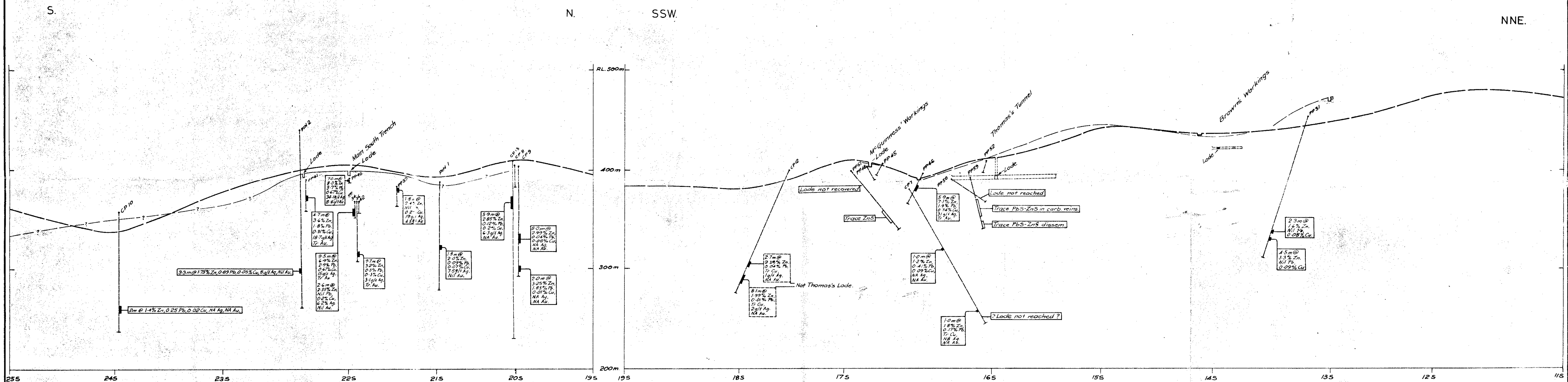
Wulff net projection.

85-2421

FIG. 26

PREUSSAG AUSTRALIA PTY. LTD.				
COMSTAFF PROJECT-TAS. PINNACLES PROSPECT STEREOGRAPHIC PROJECTION POLES TO FOLIATION 024				
Prepared G.K.K.	Date JAN. 78	Drawn A.S.C.	Date JAN. 78	A3-059

FIG. 27



PINNACLES LODE

THOMAS'S LODE

Note: reduced levels for drill hole collars and topographic profiles are approximate only.

METRES
0 40 80 120 160 200
1:2,000

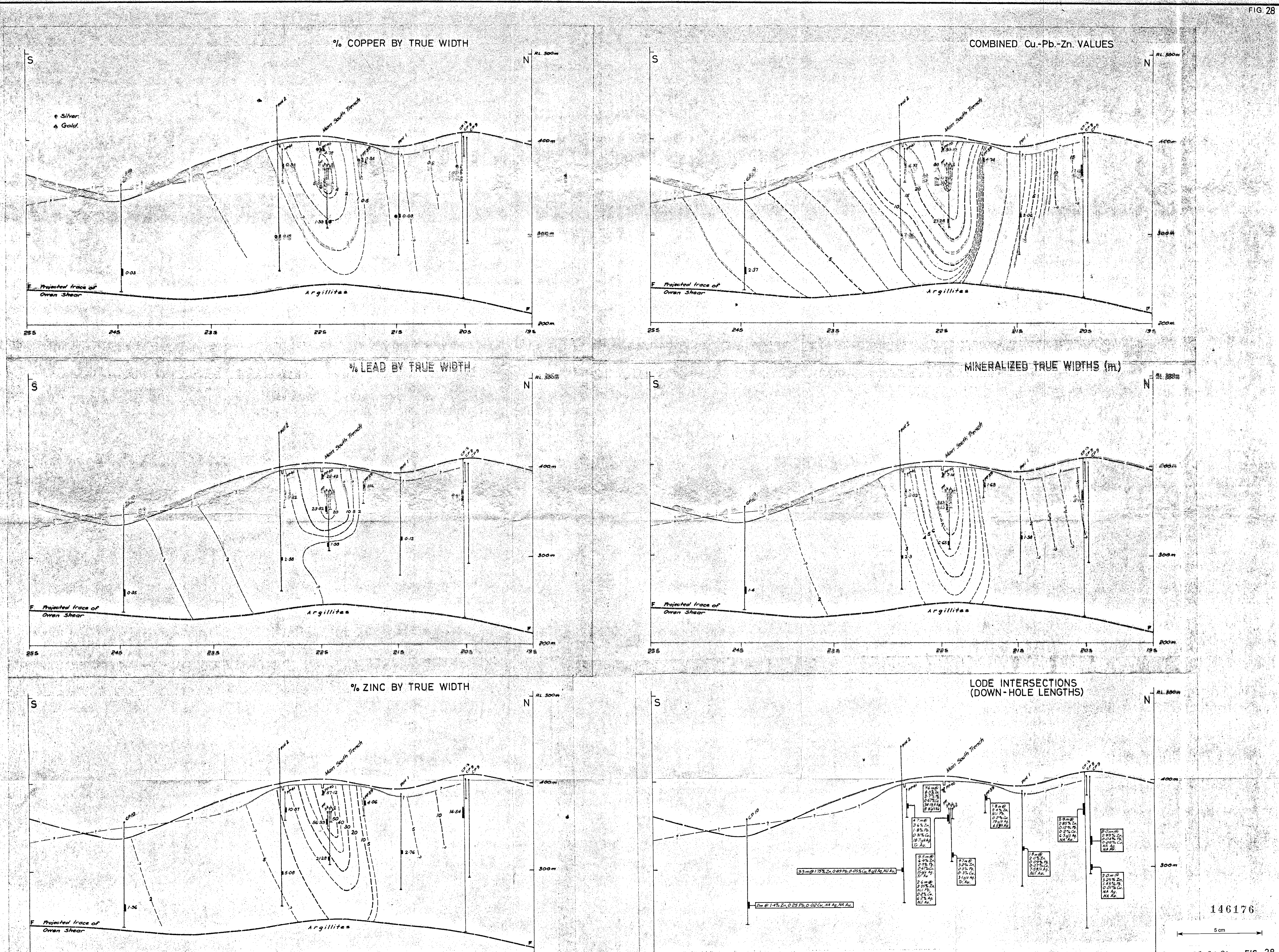
146175

5 cm

85-2421

FIG. 27

PREUSSAG AUSTRALIA PTY. LTD.		
COMSTAFF PROJECT-TAS. PINNACLES AREA 025 LONGITUDINAL PROJECTION PINNACLES & THOMAS'S LODE ASSAYS		
Prepared G.K.K. Date Nov. '77	Drawn A.S.C. Date Nov. '77	A1-294



200m. 85-2421 FIG. 28

146176

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT-TAS. 026
PINNACLES PROSPECT
PINNACLES LODE - LONGITUDINAL SECTION, GRADE, VALUE AND WIDTH ISOPLETHS

Prepared	Date	Drawn	Date	
G.K.K.	JAN. 78	A.S.C.	JAN. 78	A1-293

1000 S
1100 S
1200 S
1300 S
1400 S
1500 S
1600 S
1700 S
1800 S
1900 S
2000 S
2100 S
2200 S
2300 S
2400 S
2500 S
2600 S
2700 S
2800 S
MN
LEGEND
5
13
50
Break Points - ppm
NOTE. This early generation computer grid plot shows slight variations from corrected later plots
100 0 100 200 METRES
1:2000
5 cm
146177
85-2421
PREUSSAG AUSTRALIA PTY LTD
COMSTAFF PROJECT-TAS
PINNACLES AREA 027
GEOCHEMICAL CONTOURS-COPPER
Prepared GKK Date FEB.78 Drawn AJ Date FEB.78 A1-295
FIG. 29

FIG. 29

FIG. 30
PREUSSAG AUSTRALIA PTY LTD
COMSTAFF PROJECT - TAS.
PINNACLES AREA 028
GEOCHEMICAL CONTOURS - LEAD
Prepared GKK Date FEB. 78 Drawn AJ Date FEB. 78 A1-296

85-2421

14619

PREUSSAG AUSTRALIA PTY LTD

FIG. 31

COMSTAFF PROJECT - TAS.

PINNACLES AREA 029

GEOCHEMICAL CONTOURS - ZINC

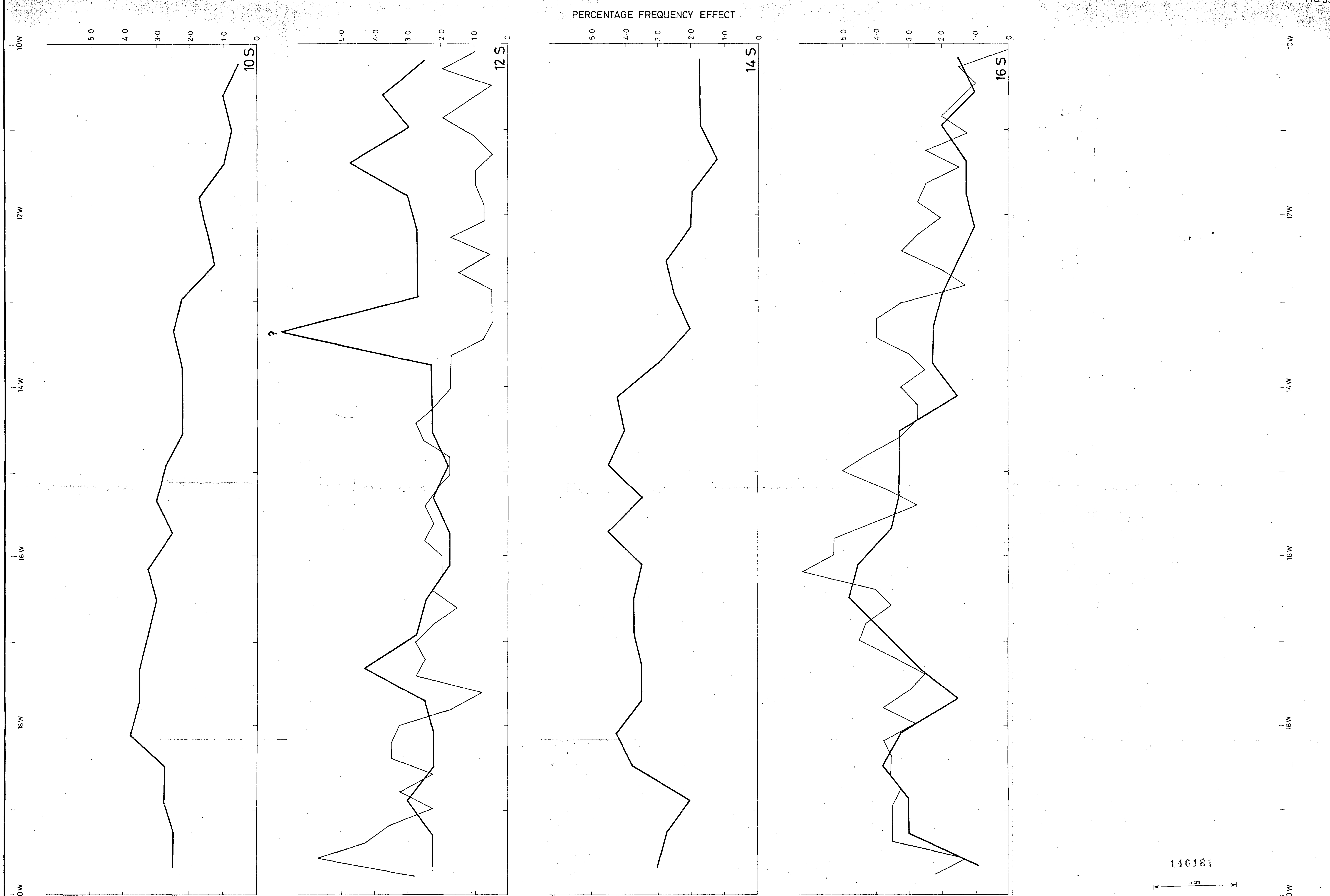
Prepared	Date	Drawn	Date	
GKK	FEB.78	AJ	FEB.78	AI-297

5 cm

FIG. 31


1000 S
1100 S
1200 S
1300 S
1400 S
1500 S
1600 S
1700 S
1800 S
1900 S
2000 S
2100 S
2200 S
2300 S
2400 S
2500 S
2600 S
2700 S
2800 S
LEGEND
225
590
Break Points - ppm
NOTE
This early generation computer grid plot shows slight variations from corrected later plots
100 0 100 200 METRES
1:2000
5 cm
85-2421
146180
PREUSSAG AUSTRALIA PTY LTD
FIG. 32
COMSTAFF PROJECT - TAS.
PINNACLES AREA 030
GEOCHEMICAL CONTOURS - BARIUM
Prepared GKK Date FEB.78 Drawn AJ Date FEB.78 A1-298
FIG. 32

FIG. 33



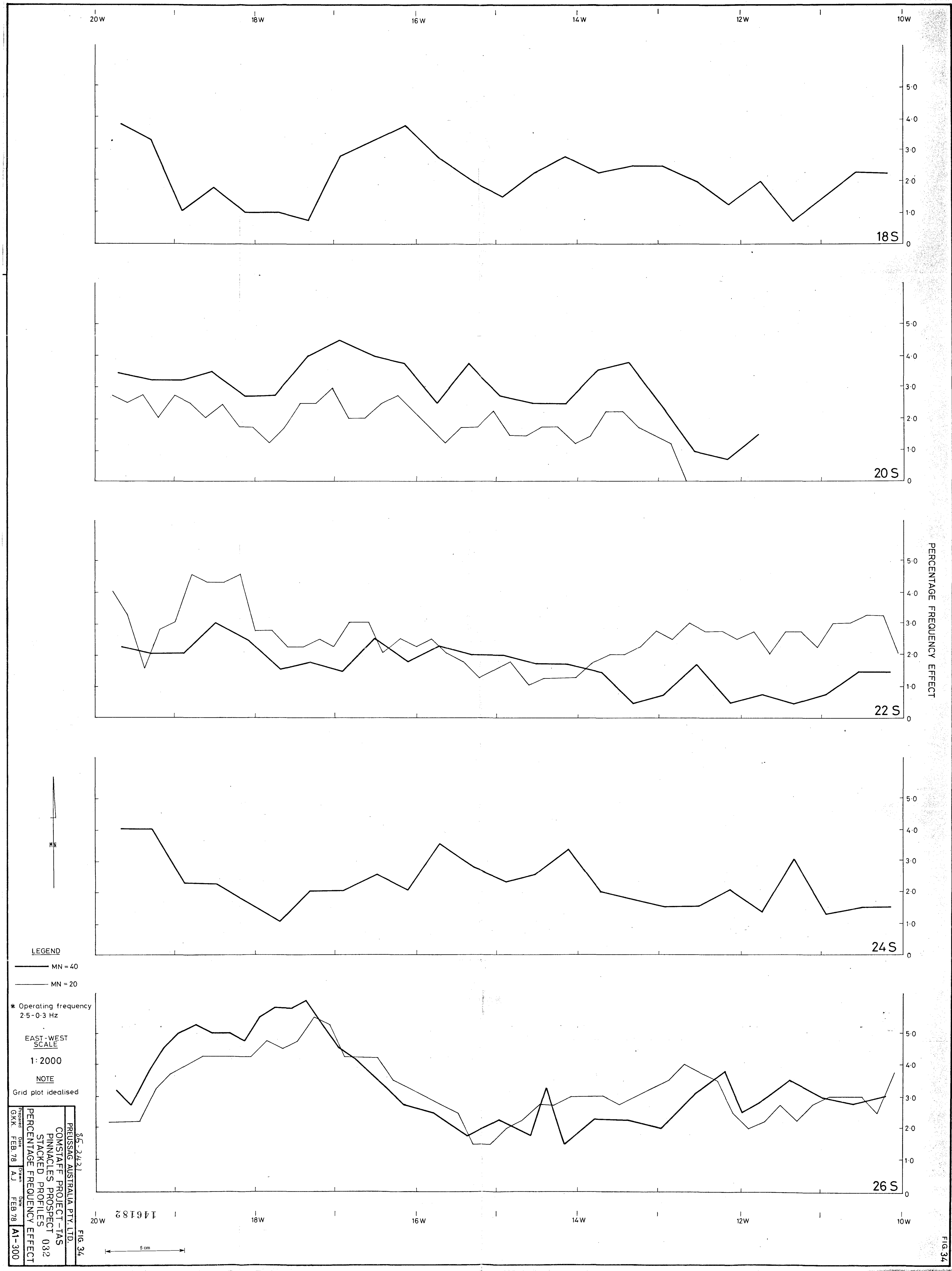
85-2421

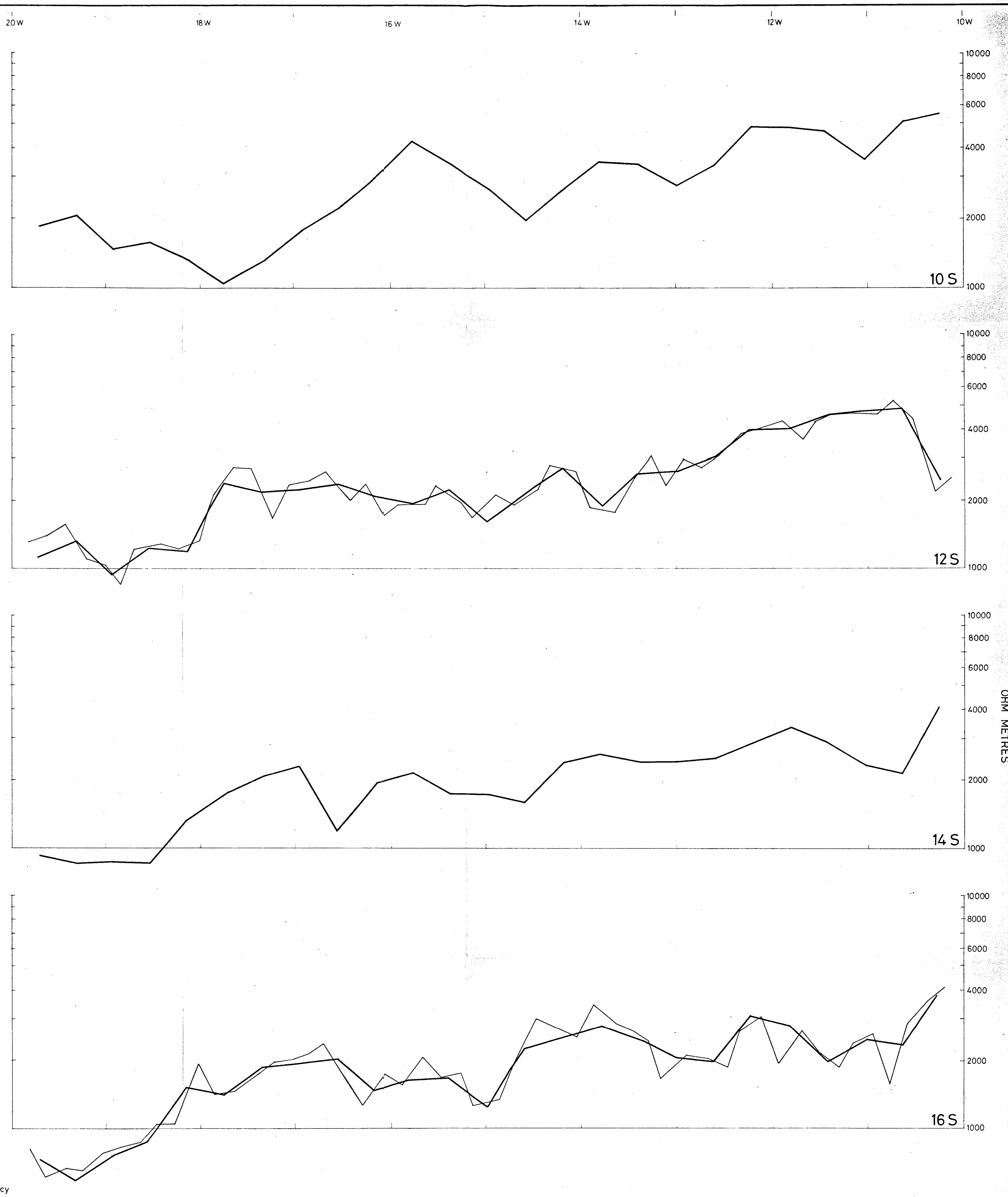
FIG. 33

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT-TAS
PINNACLES PROSPECT
STACKED PROFILES 031
PERCENTAGE FREQUENCY EFFECT

Prepared	Date	Drawn	Date	
G.K.K.	FEB. 78	A.J.	FEB 78	A1-299


20W
18W
16W
14W
12W
10W
18 S
20 S
22 S
24 S
26 S
5·0
4·0
3·0
2·0
1·0
0
PERCENTAGE FREQUENCY EFFECT
MN
LEGEND
MN = 40
MN = 20
* Operating frequency 2·5–0·3 Hz
EAST–WEST SCALE
1:2000
NOTE
Grid plot idealised
5 cm
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT–TAS
PINNACLES PROSPECT 032
STACKED PROFILES
PERCENTAGE FREQUENCY EFFECT
FIG. 34
Prepared G.K.K.
Date FEB. 78
Drawn A.J
Date FEB 78
A1-300
85-2421
146182
FIG. 34



LEGEND

—— MN = 40

—— MN = 20

* Operating frequency 2·5–0·3 Hz

EAST-WEST SCALE

1:2000

NOTE

Grid plot idealised

5 cm

85-2421

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT-TAS

PINNACLES PROSPECT 033

STACKED PROFILES

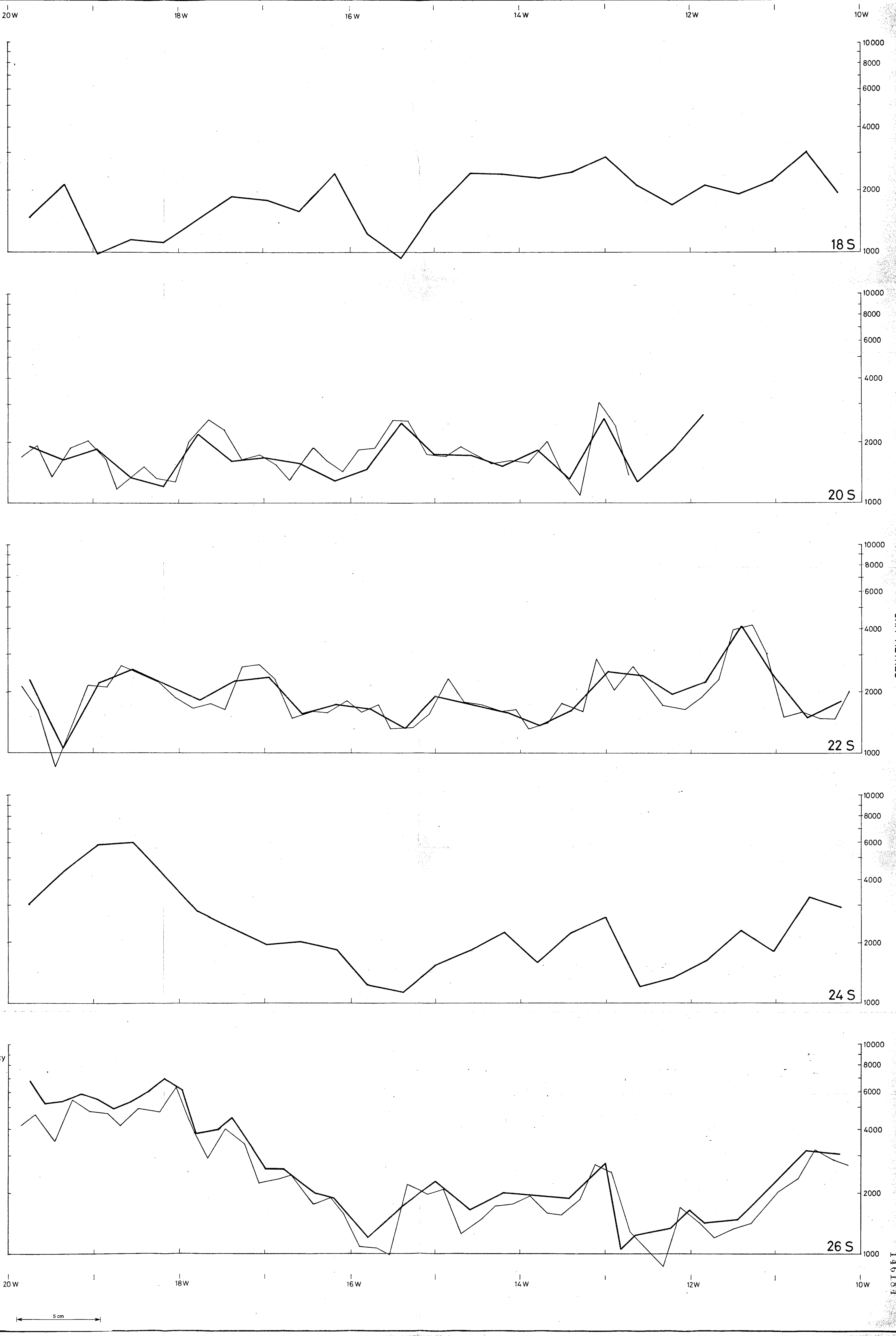
APPARENT RESISTIVITY OHM METRES

Prepared	Date	Drawn	Date	
G.K.K	FEB 78	A.J	FEB 78	A1-301

FIG 35

146183

FIG 35



LEGEND

—— MN = 40

—— MN = 20

* Operating frequency 2·5–0·3 Hz

EAST-WEST SCALE

1:2000

NOTE

Grid plot idealised

85-2421

PREUSSAG AUSTRALIA PTY. LTD.

COMSTAFF PROJECT-TAS

PINNACLES PROSPECT

STACKED PROFILES 034

APPARENT RESISTIVITY OHM METRES

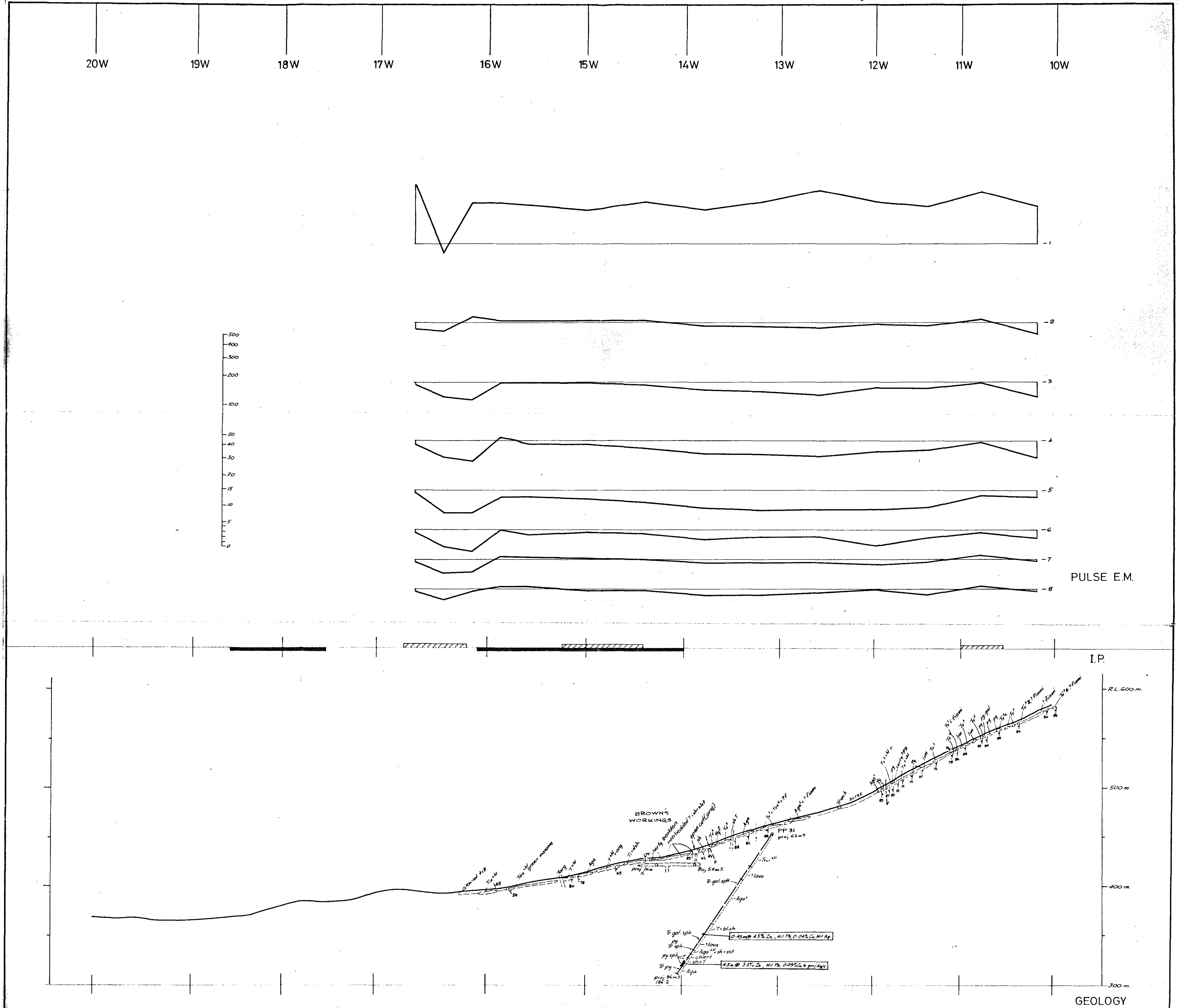
Prepared	Date	Drawn	Date
G.K.K.	FEB. 78	A.J.	FEB 78

A1-302

FIG. 36

146184

FIG. 36



METRES
0 100 200
1:2,000

5 cm

14165

85-2421

FIG. 37

Revised: Feb. '78

PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF – TAS. 035
PINNACLES PROSPECT
PULSE E.M SURVEY – LINE 14 S.

Prepared:	Drawn:	Date:	
G. K. K.	A. S. C.	March '77	A1-197

FIG. 37

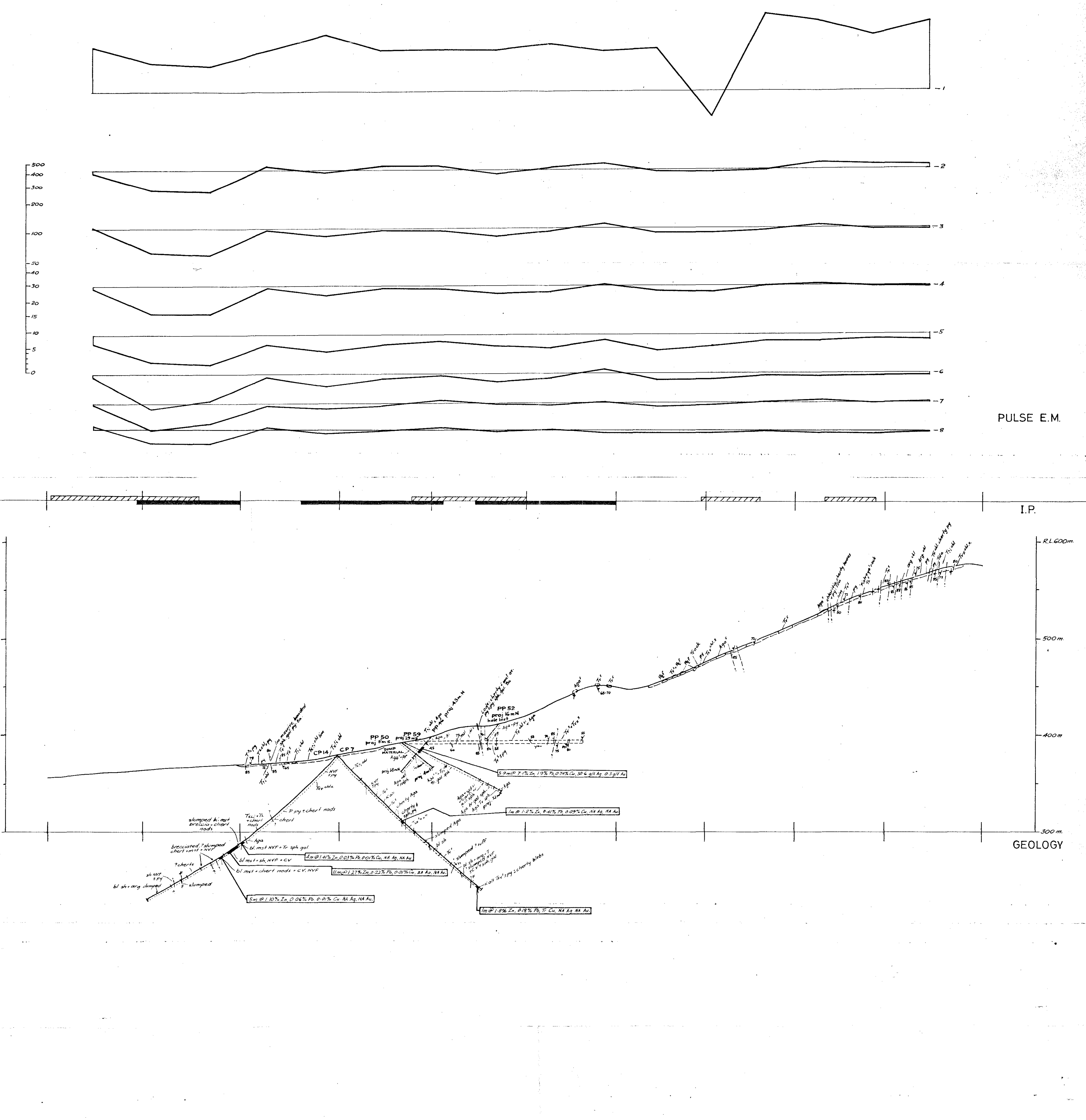


FIG. 38

Revised: Feb. '78

85-2421

PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF - TAS. 036
PINNACLES PROSPECT
PULSE E.M. SURVEY - LINE 16 S.

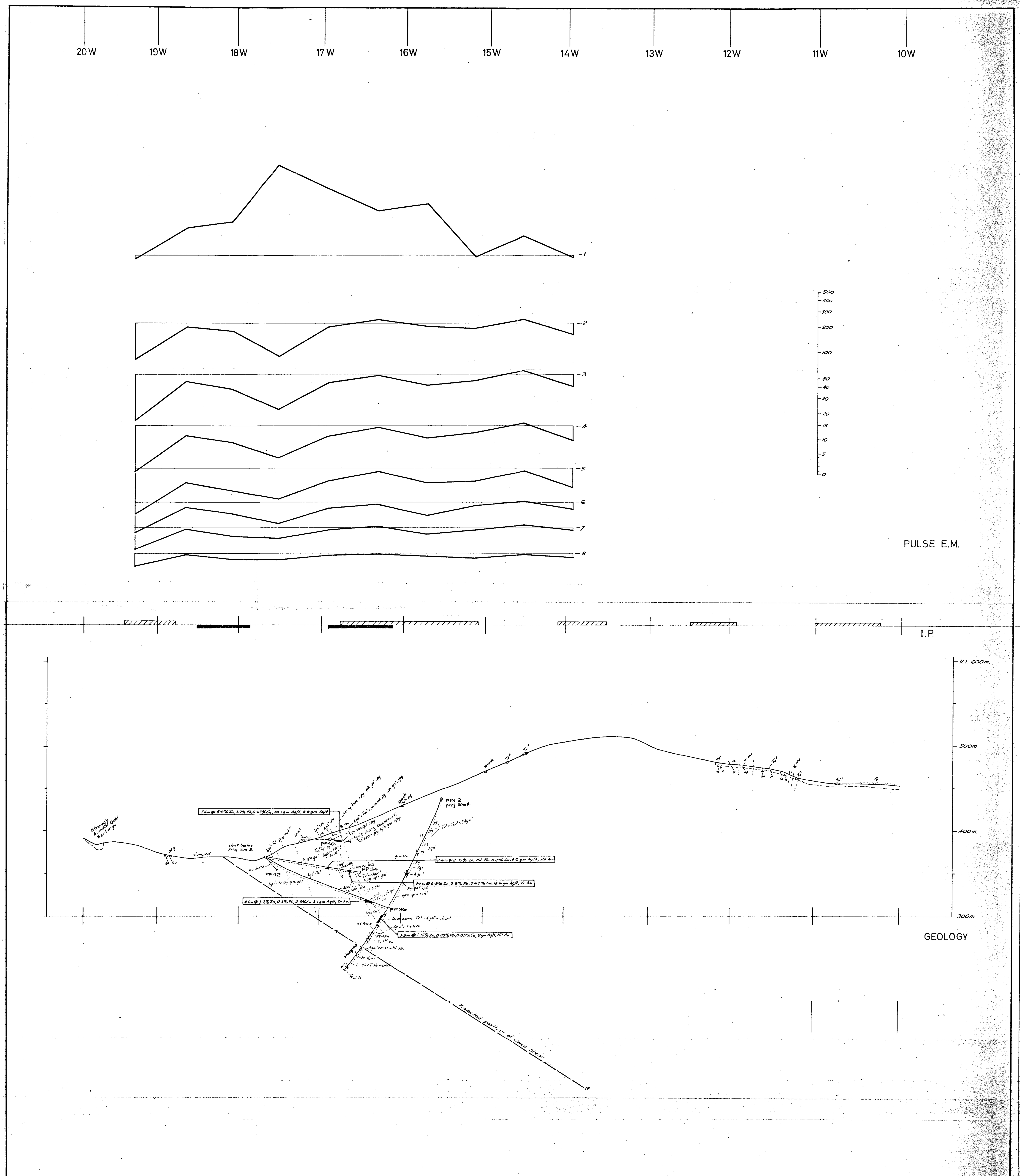
Prepared:	Drawn:	Date:	
G.K.K.	A.S.C.	March '77	A1-198

FIG. 38

5 cm

146186

FIG. 38



Revised: Feb. '78

PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF – TAS. 037
PINNACLES PROSPECT
PULSE E.M SURVEY – LINE 22S.

Prepared:	Drawn:	Date:	
G.K.K.	A.S.C.	March '77	A1-199

85-2421

146187

FIG. 39

FIG. 39

Revised: Feb. '78

PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF – TAS.
PINNACLES PROSPECT
PULSE E.M. SURVEY – LINE 26S

FIG. 40

85-2421 038

Prepared: G.K.K.	Drawn: A.S.C.	Date: March '77	A1-200

LEGEND
QUATERNARY
Qg Glacial drift
MIDDLE - UPPER CAMBRIAN (ROSEBERY GROUP)
Banded shales & siltstones; minor bands of sandstone claystone & tuff
Mainly dacitic to andesitic (mafic) crystal lithic & lapilli tuffs; weak chloritic alteration
Altered acid tuffs (T) & coarse poorly sorted pyroclastics; (Aga): sericitic alteration
UPPER PROTEROZOIC - LOWER CAMBRIAN
Highly altered, poorly sorted, coarse, acid flow pyroclastics (Aga) minor altered tuffs (Tv) & black shale; sericitic alteration
Autobrecciated rhyolites
Rhyolitic tuffs
Mafic, chloritic, altered, dacitic to andesitic crystal & lapilli tuffs & flow pyroclastics; disturbed ? minor shales & argillites, chloritic alteration
Quartz porphyry, quartz feldspar porphyry
Zone of grey chert, ?boulders with pyrite, trace of sphal & gal; silicic alteration
Zinc, lead & copper lode; chloritic & silicic alteration; sericitic alteration
Banded black & grey shales, siltstones; bedded sulphides minor altered acid tuffs, lesser patchy sericitic and/or chloritic alteration
Mainly banded, folded argillites & reworked altered tuffs; patchy chloritic & sericitic alteration
Transition zone of altered, slumped sediments, tuffs & pyroclastics; increasing chloritic, patchy sericitic alteration
Mainly mafic intermediate ?andesitic reworked tuffs (Tan) lapilli tuffs; agglomerate & lava (Van)
Bedding
Foliation/schistosity
Fault
py Pyrite
sph. Sphalerite
gal. Galena
cpy Chalcopyrite
mal Malachite
limst. Limonite stain.
Copper
Lead
Zinc
F.E. effect high.
Resistivity low.
XXXXXXX P.E.M. anomaly low.
OWEN SHEAR
1:2000
METRES
0 40 80 120 160 200
TN GN MN
1000 S
1100 S
1200 S
1300 S
1400 S
1500 S
2100 S
2800 S
5 cm
85-2421
FIG. 41
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT - TAS
PINNACLES PROSPECT
COMPOSITE 039
INTERPRETATION PLAN
Prepared G.K.K. Date FEB. 78
Drawn A.J,AC Date FEB 78
A1-304
14618
FIG. 41

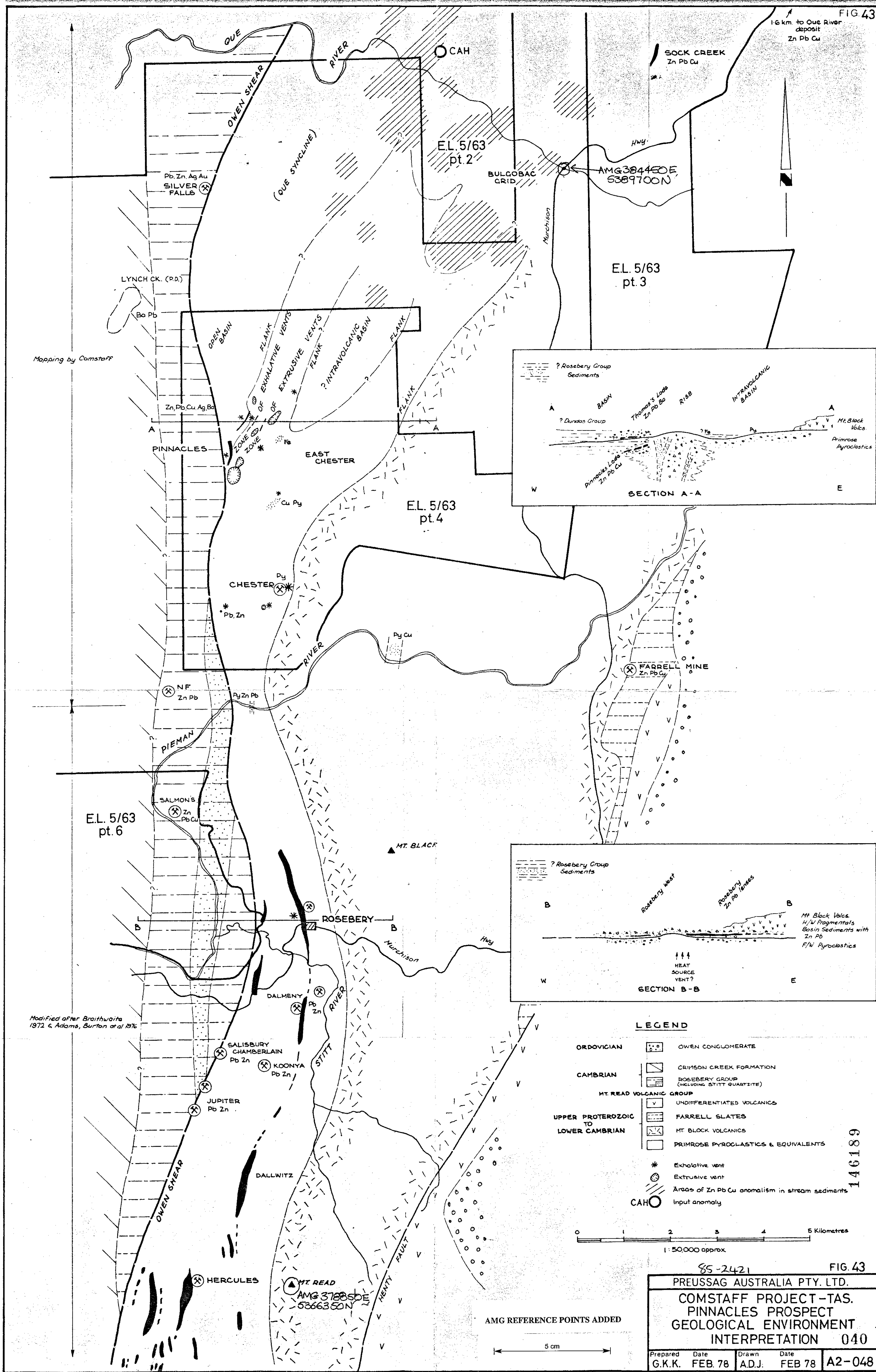


FIG. 43
1·6 km. to Que River deposit Zn Pb Cu
SOCK CREEK Zn Pb Cu
CAH
QUE RIVER
OWEN SHEAR
(QUE SYNCLINE)
E.L. 5/63 pt. 2
BULGOBAC GRID
AMG384460E 5389700N
Hwy.
Murchison
E.L. 5/63 pt. 3
Pb, Zn, Ag, Au
SILVER FALLS
LYNCH CK. (P.D.)
Ba Pb
Mapping by Comstaff
OPEN BASIN
FLANK
ZONE OF EXHALATIVE VENTS
ZONE OF EXTRUSIVE VENTS
FLANK
? INTRAVOLCANIC BASIN
FLANK
Zn, Pb, Cu, Ag, Ba
PINNACLES
EAST CHESTER
Cu Py
E.L. 5/63 pt. 4
CHESTER
Py
Pb, Zn
Py Cu
RIVER
FARRELL MINE Zn Pb Cu
N.F. Zn Pb
Py Zn Pb
PIEMAN
SALMON'S Zn Pb Cu
E.L. 5/63 pt. 6
MT. BLACK
ROSEBERY
Murchison Hwy
DALMENY Pb Zn
STITT RIVER
SALISBURY CHAMBERLAIN Pb Zn
KOONYA Pb Zn
JUPITER Pb Zn
DALLWITZ
OWEN SHEAR
HERCULES
MT. READ
AMG 378850E 5366350N
HENTY FAULT
Modified after Braithwaite 1972 & Adams, Burton et al 1976
? Rosebery Group Sediments
BASIN
Thomas's Lode Zn Pb Ba
RISE
INTRAVOLCANIC BASIN
? Dundas Group
Mt. Block Volcs.
Primrose Pyroclastics
Pinnacles Lode Zn Pb Cu
SECTION A-A
? Rosebery Group Sediments
Rosebery West
Rosebery Zn Pb lenses
Mt Block Volcs
H/W Fragmentals
Basin Sediments with Zn Pb
F/W Pyroclastics
HEAT SOURCE VENT?
SECTION B-B
LEGEND
ORDOVICIAN
OWEN CONGLOMERATE
CAMBRIAN
CRIMSON CREEK FORMATION
ROSEBERY GROUP (INCLUDING STITT QUARTZITE)
MT. READ VOLCANIC GROUP
UPPER PROTEROZOIC TO LOWER CAMBRIAN
UNDIFFERENTIATED VOLCANICS
FARRELL SLATES
MT. BLOCK VOLCANICS
PRIMROSE PYROCLASTICS & EQUIVALENTS
Exhalative vent
Extrusive vent
Areas of Zn Pb Cu anomalism in stream sediments
CAH Input anomaly
0 1 2 3 4 5 Kilometres
1:50,000 approx.
146189
85-2421
AMG REFERENCE POINTS ADDED
5 cm
PREUSSAG AUSTRALIA PTY. LTD.
COMSTAFF PROJECT-TAS.
PINNACLES PROSPECT
GEOLOGICAL ENVIRONMENT
INTERPRETATION 040
Prepared G.K.K. Date FEB. 78 Drawn A.D.J. Date FEB 78 A2-048

FIG. 43