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SML 601

YUDNAMUTANA – MOUNT PAINTER AREA

PROGRESS AND ANNUAL REPORTS FOR THE PERIOD 24/6/71 TO 23/6/72

Submitted by
Utah Development Co. Ltd
1972

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PRIMARY INDUSTRIES AND RESOURCES SA

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TENEMENT: S.M.L. 601

TENEMENT HOLDER: Utah Development Co.

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UTAH DEVELOPMENT COMPANY

QUARTERLY REPORT - SPECIAL MINING LEASE 601

PERIOD ENDING SEPTEMBER 24, 1971

SUMMARY

Activities in this SML during the quarter under review have resulted in the:-

(i) Establishment of field camp in Yerelina Valley.

(ii) Re-establishment of Mines Department grid.

(iii) Pegging of Yerelina Valley area on a 400' x 50' grid.

(iv) Geochemical soil and rock chip sampling of this grid is 60% complete.

(v) Reconnaissance traverses over Mt. Neill Porphyry outcrops.

(vi) Reconnaissance traverses over areas of outcrop of "undifferentiated Breccia".

(vii) Tenders being called for a 5,000 foot percussion drilling programme.

The programme is progressing according to the schedule proposed in the original submission forwarded to the Mines Department prior to acquiring tenancy over the area.

A progress summary map is appended to this report.

FIELD WORK

(i) Yerelina Valley Area

The first month of the quarter under review was spent establishing a field camp in the vicinity of the Mines Department grid area, (Yerelina Valley area). Also gained during this period, was an intimate knowledge of the local geography. Familiarization traverses

across the Callanna Beds were conducted to gain a sound knowledge of the lithologies and units differentiated by Mason (Mines Department geologist).

The base line and old sample sites of the pre-existing Mines Department grid were re-established, and the grid extended to cover the entire stratigraphic development, of Callanna Beds.

The present length of the baseline is 17,400 feet and line length varies from 3,600 feet to 3,400 feet. The grid is pegged and sampled at 400' x 50' centres, however the section between the Yuda Mine and the Black Queen Mine has a line spacing of 200 feet.

Soil sampling of the grid is presently about 60% complete and will be finished early in the coming quarter. Rock chip samples were taken over the Wywyana Formation, Paralana Quartzite, Opaminda Formation and Blue Mine Conglomerate out crops. Assay results for these samples are pending.

Aerial photographs at a scale of approximately 1 : 5,000 have been obtained and these will be used to provide a base map for all future work undertaken in the SML.

Geological mapping of the Yerelina Valley area has not been considered necessary at this stage as the map prepared by Mason (1970) is adequate for this initial geochemical sampling programme.

Early in September, tenders were invited for a percussion drilling programme in the Yerelina Valley area. This was for a footage of 5,000 feet with an assured minimum of 1,000 feet. This footage is to be utilized in testing several of the Mines Department induced polarization anomalies which were not evaluated. The contract will be let on October 8 and drilling commences late in that month.

(ii) Reconnaissance over Mt. Neill Porphyry

Eleven specimens were selected for petrological study from the Mt. Neill Porphyry outcropping along a ridge crest line, south of the U.D.C. field camp. These were submitted to McPhar Geophysics for preparation and description. Their descriptions are appended to this report.

In summary this report describes the thin sections as alkalic to calcic; acid to intermediate porphyry (granite-ademellite-monzonite porphyry) often showing hydrothermal alteration; pyroclastics; arenaceous to argillaceous metasediments and amphibolites (probably after sediments). All specimens were strongly stressed and sheared.

The preliminary investigation on the Mt. Neill Porphyry indicates that it is unlikely to be an intrusive body, but may be more akin to a thick pile of acid extrusives with associated pyroclastics and interbeds of detrital sediments, which have undergone later hydrothermal alteration.

The Mt. Neill Porphyry may thus prove to be a valid exploration target in SML 601 and in concept-wise may be closely related to North Flinders Mine's Parabarana Prospect.

A detailed geological mapping programme is proposed over the areas of outcrops of the porphyry within the SML.

(iii) Reconnaissance traverses over "breccia zones"

Several outcrops of "breccia" are shown on the Mt. Painter Province map - the exact field nature of this breccia was obscure so a few reconnaissance traverses were undertaken to determine its field relations. It was thought prior to this that they may represent tectonic breccias, slump breccias, diapiric breccia or possibly related to cryptovolcanic activity or even diatremes.

The breccias are composed of granite fragments set in a strong secondary silica (?) cement. They outcrop on the floors of the deep valleys and extend up the walls of the valleys almost to the top of the ridges which in this area represent the now elevated, but deeply dissected early Tertiary (?) erosion surface. At first sight these breccias appear to be Tertiary (?) valley-fill deposits related to the regolith of a prior aggradation cycle. It is not difficult to imagine that under the rigors of the Tertiary climate, the Mt. Neill Porphyry would be very rapidly decomposed by chemical weathering and quickly removed, to form a lowland south of the highland composed of Freeling Heights Quartzite. Thus, Tertiary valley fill breccia would be expected to occur marginal to Mt. Neill Porphyry and Freeling Heights Quartzite. The uraniferous type of breccia which occurs wholly within the Freeling Heights Quartzite e. g. Mt. Painter, and

East Painter, and The Smiler have probably a different genesis.

The breccias within the SML do not appear to be economically significant for base metal exploration targets. No further work is planned in these areas.

LOGISTICS OF FIELD WORK

No. of soil samples taken	2,301
No. of rock chip samples taken	848
No. of petrological specimens taken	11
Area sampled (square feet)	70 million

STAFFING

Staff involved in the exploration of SML 601 during the quarter under review consisted of one senior geologist; one junior geologist and five field assistants.

FIXED APPENDIX LIST

1. Progress Summary Map - scale 1" = 1/4 mile
2. Petrological report. Specimens 601/01P to 601/11P.

601/012 - sheared quartz-sericite schist with martite knots. (after quartz-felspar volcanic)

Components:		
	quartz	30-40%
	sericite	> 50%
	biotite	1%
	opaques (martite)	3%
	limonite	< 1%
	accessory mineral	zircon

A partially foliated schistose rock consisting of subparallel flakes of sericite distributed among allotriomorphic granular quartz. Intermittently this composition gives way to patches of elongate partly rectangular mesh of pure sericite apparently derived from phenocrysts or crystal fragments of felspar.

Shearing parallel to the foliation has produced minor fissuring along which thin hydrothermal quartz veins have been channelled. Traces of limonite staining are also spread along these fissures.

Coarse grains of quartz up to 3 mm. diameter are sparsely scattered through the rock distorting the foliation. There is also a more plentiful scattering of grains of martite up to 1 mm. diameter associated and often intergrown with a few flakes of biotite. The iron oxide grains tend to be irregular to rounded after oxidation but are considered to have formed from porphyroblasts of magnetite.

The rock has probably originated from a porphyritic siliceous extrusive volcanic rock, metamorphosed, lightly sheared and hydrothermally veined.

601/02P - stressed sericitised quartz-microcline porphyry.

Components:		
	quartz	5-10%
	felspar	~ 50%
	biotite	5-8%
	sericite	10-15%
	opaques	3%
	accessory minerals	zircon, hornblende

A porphyritic intrusive igneous rock consisting of phenocrysts up to 5 mm. diameter in a partially metamorphosed and recrystallised groundmass. Phenocrysts are principally subhedral quartz and microcline felspar crystals in an allotriomorphic granular quartz-felspar groundmass with interstitial flakes of sericite and patches of biotite and iron oxides. Corrosion and embayment of the quartz phenocrysts by reaction with the groundmass is extensive.

The felspars have predominantly been altered with total sericitisation of some phenocrysts. Microclines have been affected with clay-sericite forming along cleavages and the margins of semi-regular stress fractures which have traversed groundmass and phenocrysts, imparting a weak lineation.

Within the groundmass mafic silicates either consisted originally of biotite or have been converted almost entirely to that mineral, which occurs as a clustered random concentration of intermeshed flakes enclosing locally abundant fine lamellar iron oxide opaques (specularite?). Between these patches biotite gives way to a fine intergranular fleck of sericite from felspar alteration.

The rock is classified as a quartz-microcline porphyry slightly altered by stress and sericitisation.

601/03P - quartz-orthoclase porphyry (?) hydrothermally (?) altered.

Components:		
	quartz	40%
	sericite (argillic)	30-40%
	haematite (goethitic)	15-20%
	chlorite	10 %

This is an extensively altered rock consisting of clusters of argillic sericite-muscovite in a matrix of vari-sized anhedral quartz with intergranular chlorite and haematite. It would appear to have formed from a quartz-orthoclase porphyry by chiefly hydrothermal alteration rather than metamorphism. The main reason for this is the absence of epidote-zoisite minerals which are metamorphic indicators.

The clusters of sericite-muscovite are broadly pseudomorphous after orthoclase phenocrysts up to ½ cm. size, and they contain some fine grained quartz as well as oxidised specularite.

There are abundant large quartz grains in the quartz-chlorite-haematite matrix and these appear to be original phenocrysts. The chloritic medium contains finer quartz-, finer sericite clusters and plenty of haematite. This was hydrothermally introduced and at the same time effected chloritisation and sericitisation, so this now represents a former groundmass which consisted of major biotite, copious quartz and minor felspar.

There was little distortion of the sericitised orthoclase phenocrysts and there is not much induced cleavage in the groundmass, indicating the lack of metamorphic influence.

Although the extent of alteration by hydrothermal influences and weathering introduces considerable doubt, it is concluded to represent a quartz-orthoclase porphyry.

601/04P - sheared limonitic quartz-sericite schist (metasediment)

Components:	sericite	60-70%
	quartz	30%
	limonite	5%
	opaques (martite)	1%

A metamorphic rock consisting of alternating layers of aligned sericite and quartz-sericite, with a random spotting of coarse (2-3mm.) patches of cellular limonitic staining and fine (0.2 mm.) grains of martite partially pseudomorphous after magnetite.

The rock has been fairly intensely sheared parallel to the foliation which is coincident with the layering. The coarse patches of limonitic staining are of rounded to ovoid form and may be the product of retrogressive alteration of garnets. The layering is interpreted as a relict structure of an originally sedimentary rock which alternated from argillaceous to arenaceous composition, best described as an arenaceous siltstone.

It is concluded that the rock was fairly intensely metamorphosed and then altered retrogressively to its present state. Some random fissures stained fairly heavily with limonite are the probable product of surface weathering.

011

601/05P - sericite-biotite schist - from a porphyritic micromonzonite

Components:		
	biotite	40-50%
	muscovite	30%
	felspar and quartz (?)	15%
	limonite	2%
	opaques (iron oxide)	3-5%
	accessory mineral	zircon, tourmaline

This is the metamorphic product of a very fine grained porphyritic igneous rock of intermediate composition. It was almost quartz-free and contained phenocrysts of orthoclase and plagioclase only.

It presently consists of oriented fine grained muscovite and biotite amongst which are small amounts of fine grained albite, quartz, zircon, opaque mineral and tourmaline. Considerable numbers of larger sodic plagioclase porphyroblasts exist within this medium.

It seems probable, in view of the cleavage structure, that the rock was mildly metamorphosed resulting in the albitisation of former intermediate plagioclase, (the first stage of metamorphic modification) but not in its final conversion to epidote-zoisite (second stage of modification). Some of the muscovite may have been produced in this stage by sericitisation of potassic felspars, and some large elongate masses of very fine grained sericite are the equivalent of orthoclase phenocrysts.

The biotite is probably an original component of the groundmass of the porphyry. Because it is low in quartz and contained both types of felspars it is classified as a probable porphyritic micromonzonite.

012

601/062 lithic-crystal tuff

Components:		
	quartz	10-15%
	felspar	> 70%
	sericite	1-2%
	tourmaline	1%
	opaques (iron oxides)	2-3%
	accessory mineral	zircon

A pyroclastic volcanic rock with rare coarse quartz and felspar crystal fragments and more abundant lithic fragments comprised of felspathic microgranitoid rocks, and quartzites of varied grain size and texture. The groundmass is a fine to cryptocrystalline allotriomorphic granular mosaic of felspars and minor quartz. These felspars consist of mixed microcline and sodic plagioclase in almost equal proportions.

Alteration has involved some fine and often discontinuous quartz veins being introduced into the rock, formation of irregular clumps of tourmaline, and some recrystallising of the mass of felspars in the groundmass with traces of sericitisation and merging of the fragmental felspathic material.

Opaques are fine lamellar crystals of iron oxides often coalescing into coarser clumps.

The rock is concluded to be a felspathic tuff with minor hydrothermal to pneumatolytic alteration and recrystallisation.

013

601/07P - quartz-orthoclase porphyry with minor pegmatite veins.

Components:		
	quartz	10%
	felspars (argillic)	> 70%
	tourmaline	1%
	biotite	trace
	sericite	3-5%
	opaques	2-3%
	accessory minerals	zircon, sphene

A porphyritic igneous rock consisting of coarse subhedral phenocrysts of quartz and orthoclase set diffusely in an hydrothermally altered groundmass of microlitic quartz and felspar.

Scattered fine veinlets traverse the rock containing anhedral quartz, tourmaline and traces of biotite. Recrystallization of the porphyritic groundmass has been accompanied by introduction of tourmaline which is scattered as diffuse patches of fine prisms. Some argillic turbidity is widespread, and both phenocrysts and groundmass are flecked with fine flakes and tufts of sericite.

Fine dusty opaques are distributed within the groundmass passing into coarser subhedral crystals where the groundmass passes into hydrothermally recrystallised quartz-felspar mosaic. A few such zones also contain fine sphenes. Zircon crystals of coarser size are sparsely scattered.

The rock is concluded to be a quartz-orthoclase porphyry slightly altered by pneumatolytic-hydrothermal fluids.

601/08? - cordierite-biotite-quartz sericite schist (metasediment)

Components:		
	quartz	30%
	sericite	40-50%
	biotite	20%
	cordierite	5-8%
	opaques	1%
	accessory mineral	apatite

A fine grained foliated metamorphic rock consisting of alternating bands rich in quartz and sericite. Porphyroblastic biotite and cordierite has formed along some layers with rarer bands containing the latter mineral. Both these porphyroblastic minerals are up to 2-3 mm. diameter and poikiloblastically enclose the grains of quartz and often some coarser recrystallised muscovite.

Foliation within the sericitic layers is well developed which is also parallel to the layering which is considered to be relict sedimentary structure. Some transverse shearing has taken place obliquely to the foliation causing it to be intermittently warped and crenulated.

The rock is classified as a moderately metamorphosed arenaceous argillite or similar aluminous sediment.

601/09P - albite-hornblende gneiss

Components:	hornblende	60-70%
	felspars	30%
	sphene	1%
	sericite	1-2%
	opaques	< 1%

A coarse grained granulose mass of stumpy green hornblende and pink albite prisms closely resembling an igneous texture. The albite is often rimmed with traces of potassic felspar and minor sericite.

Voids within the rock contain euhedral terminations of hornblende and albite. A few traces of sericitised biotite flakes are also present within some of these.

Subhedral prisms of sphene, and rare granules of opaques are intermittently scattered.

The unusual composition and a vague banding in the rock leads to the conclusion that this is not an igneous rock but a considerably recrystallised metamorphic rock of amphibolite grade.

601/10P - sheared sericitised quartz-orthoclase porphyry

Components:		
	quartz	10%
	felspar	50-60%
	sericite	20-25%
	tourmaline	trace
	biotite	10-15%
	opaques	3-5%

This is a porphyritic igneous rock similar in many respects to 601/07P except that there has been marked directional shearing and intensive sericitisation of some of the potassic felspars much as in the sample 601/03P.

Plagioclase felspars are very little affected, as also the groundmass. The sericitised felspars however have been sheared out into parallel aligned lenticular masses of sericitic mesh. The groundmass consists of a microlitic intergrowth of quartz and felspars flecked with scattered biotite and sericite flakes, the former probably being indigenous to the porphyry.

Rare crystals of tourmaline are present.

Subhedral lamellar and granular aggregates of iron oxide opaques are scattered in the groundmass.

The rock is classified as a quartz-orthoclase porphyry altered by shearing and sericitisation.

017

601/11P - sheared and brecciated (?) hydrothermally altered felspathic porphyry (?)

Components:		
	quartz	25%
	sericite (argillic)	20-30%
	chlorite	10-20% (?)
	haematite	30%

This rock is mineralogically and texturally similar to sample 601/03P in that it consists of coarse sericitic masses enclosed in a matrix of quartz, haematite and probable chlorite. It differs however in that there is a distinct schistosity and quartz veins several mm. wide traverse the rock randomly.

Assuming that 601/03P does represent an altered quartz-orthoclase porphyry, then this sample is likely to be of similar origin. The sericitic masses are difficult to account for as they have unusual irregular semi-cylindrical forms which seem to enclose portions of the matrix. Possibly however shearing, folding and irregular hydrothermal alteration might account for them.

The matrix contains fine quartz and earthy to granular haematite encrustations on chlorite, replacing a former groundmass which consisted of biotite mesh with quartz and felspar.

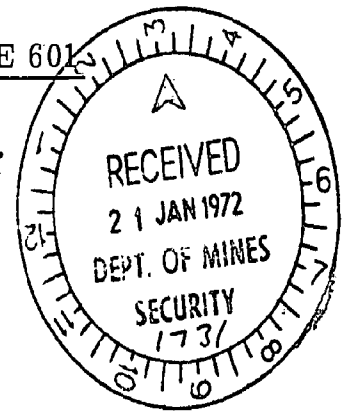
The quartz veins consist of allotriomorphic quartz which has entrained some wisps of sericite and iron oxides.

Although there is doubt because of the extent of contortion, hydrothermal influence and also weathering, this rock seems most likely to have formed from a quartz felspar porphyry.

UTAH DEVELOPMENT COMPANY

QUARTERLY REPORT - SPECIAL MINING LEASE 601

PERIOD ENDING DECEMBER 24th, 1971.



SUMMARY

Exploration activities in this SML during the quarter under review have involved the following -

1. Completion of geochemical sampling over the Yerelina Grid.

2. Establishment of a detailed grid over the Pinnacles Mine.

3. Channel chip sampling of the lower adit in the Pinnacles Mine.

4. Bulldozing of six drill sites, two costeans and the upgrading of several tracks in the SML.

5. Completion of two thousand feet of rotary percussion drilling to test the Wywyana Formation.

The work completed in the area is summarised on the Progress Summary Map appended to this Report.

FIELD WORK

(a) Yerelina Valley Grid

Geochemical rock chip and soil sampling of this grid is completed. All assays have been received, however appraisal of these is not yet completed. Initial indications are that several areas will require a considerable amount of follow-up work. Our assay results, selected at similar sample sites to the Mines Department samples, have consistently shown higher values than those reported by AMDEL. Cumulative frequency plots for all of these initial samples have been obtained, however these are pending analysis. High geochemical response for copper in soil is commonly greater than 3,000 ppm over some of the prospective horizons.

(b) Costeaning and Road Improvement

Five miles of road improvement were undertaken in the Yerelina Valley, whilst the bulldozer was operating in the area. Six drill sites were prepared for the proposed rotary percussion drilling programme.

Two costeans were also 'dozed'. A 200 ft. long trench was 'dozed beside the line connecting percussion holes YX03 and YX04 to aid correlation between these holes. A second 800 ft. costean was pushed through the upper Callanna Bed sequence near the Wheal Gleason South Mine. Sampling and mapping of these trenches is incomplete.

(c) Rotary Percussion Drilling Programme

Four angled rotary percussion holes, for a total of 2,010 ft. were drilled between the Cockscomb and Black Queen Mines. The drilling programme was designed to evaluate the economic potential of the Wywana Formation for primary and secondary copper mineralisation contained within the calc-silicate, amphibolite and argillaceous hornfels facies. Two of the geophysical anomalies (coincident I.P. and magnetic anomalies) obtained but untested, by the Mines Department, were intersected in this programme.

The drilling contract was let to :

Boring Enterprises,
Hahndorf, S.A.

Details of the four holes are tabulated below :

Designation	Coordinates	Azimuth	Depression	Depth
YX01	YO83.00/104	180° Mag.	60°	435 ft.
YX02	YO81.00/104	180° Mag.	60°	575 ft.
YX03	YO82.00/096	180° Mag.	60°	500 ft.
YX04	YO080.00/096	180° Mag.	60°	500 ft.

The sample interval for this drilling was 5 ft. Assays have not yet been received. Detailed logs for these holes are not completed, however the following preliminary comments apply :

Percussion hole YX01 was abandoned at 435 ft. in caving hornfels. The water table was intersected at 65 ft. and at 120 ft. water was inflowing at a rate of 4,000 gallons/hour. Upon termination of the drilling the hole was making 10,000 gallons/hour.

YX02 was drilled beyond its planned depth in anticipation of intersecting the top of the Paralana Quartzite. The hole however, failed to penetrate this horizon, and for most of its length, was situated in an extremely soft, fine grained amphibolite which scoured and caved badly. At the termination of drilling, water inflow was 1,000 gallons/hour. Forty feet of casing was lost in this hole.

YX03 intersecred the water table at 70 ft. and continued satisfactorily to the target depth of 500 ft. This hole tested the down dip extension of the haematite-magnetite band.

Percussion hole YX04 was drilled to test the I.P. and magnetic anomaly which the Mines Department had left untested on line 5200E.

The preliminary conclusions which can be drawn from this programme are :

1. The sections intersected by the holes did not yield very large chips, (i.e. less than 1/8th "), making logging and petrological work difficult.

2. The zone of weathering is quite deep.

3. Below the drainage channels, the water table is fairly shallow.

(d) Pinnacles Mine Area

A detailed grid, pegged at 20 ft. x 20 ft. intervals, was surveyed

and completed, over an area measuring 800 ft. x 400 ft. around the Pinnacles Mine. In the next quarter the grid will be geologically mapped in conjunction with underground mapping of the upper and lower adits.

The Cockscomb-Pinnacles type of mineralisation in the Wywyana Formation is considered to be the most significant type in the Yudnamutana area. The apparently, traverse relationship of the magnetite-haematite horizon to be subregional trends in the Yerelina Valley is thought to indicate that the Pinnacles Mine may be situated in an area of structural complexity. These factors when combined with the excellent exposures gained from access to underground workings, are sufficient to warrant some detailed geological mapping to be undertaken, despite the poor results obtained from the two diamond drill intersections of the horizon by the Mines Department in DDH-Y2 and DDH-P2.

A sample of sulphide-bearing gossan, obtained from the spoil heap of the lower adit, was submitted to the Company's consultant for detailed petrological description. This sample is designated PM005R. The description of this specimen is appended to the report.

The lower adit (creek level), was channel chip sampled at 10 ft. intervals. Assay results for these samples have not yet been received. The sequence exposed in the adit are the calc-silicate (actinolite-calcite) facies and amphibolite (?actinolite) facies of the Wywyana Formation. Disseminated pyrite with occasional disseminated blebs of chalcopyrite are present along almost the entire length of the adit. As mentioned previously, these workings will be geologically mapped in the next quarter.

LOGISTICS OF FIELD WORK

For the quarter under review the following logistics are applicable :

Number of soil samples	1,486
Number of rock chip samples	530
Number of channel chip samples	18

Number of percussion drill samples	400
Rotary percussion drill footage	2,010
Length of track improvement undertaken	± 5 miles.

STAFFING

Staff involved in the exploration of SML 601 during the quarter under review consisted of one senior geologist, one junior geologist and four field assistants.

FIXED APPENDIX LIST

1. Progress Summary Map - Scale 1" = $\frac{1}{4}$ mile

2. Petrological Report - Specimen No. PM005R.

EXPENDITURE

A detailed expenditure statement is attached for the quarter ended December 24, 1971.

Transferred to file

UTAH DEVELOPMENT COMPANY

QUARTERLY REPORT - SPECIAL MINING LEASE NO. 601

PERIOD ENDING MARCH 24th, 1972.

SUMMARY

Exploration in this SML during the quarter under review has involved:-

1. Detailed mapping in the Pinnacles Mine area, together with a vertical field magnetometer survey.

2. Mapping and sampling of the two costeans prepared during the last quarter.

3. Compilation of lithological logs for the percussion holes drilled during the previous quarter.

4. Assay and petrological investigations on various samples.

FIELD WORK

1. Pinnacles Mine Grid

Grid Work

This grid has now been mapped at a scale 1: 240 in conjunction with underground mapping of two old adits. Relevant plans compiled from this mapping are appended to this report. This detailed geological mapping has led to a new structural interpretation being proposed for the Wywyana Formation in this area. The geological mapping and subsequent interpretation of an overturned anticline and syncline with a common limb in the area has indicated one possibility for the failure of the two Mines Department holes Y1 and P2 to intersect mineralisation. Y1 and P2 were drilled almost at right angles to the strike of the jasperoid outcrop (shown to be a gossan by petrological studies).

The proposed structure would require that a hole be drilled from the S.W. of the jasperoid outcrop. It now seems possible that P2

and Y1 were drilled down a bedding plane with an appreciable pitch on it.

Magnetometer Survey

A McPhar M700 magnetometer was used to obtain magnetic cover for the Pinnacles grid. This survey was based on a 40 ft. x 40 ft. grid. The contoured plan for this work is appended.

Petrographic Studies

The results of petrographic studies on polished sections of mineralised rock from the Pinnacles grid indicate that the rocks are calcite-actinolite granulites with skarn type mineralisation. Economic minerals noted in polished section are :

magnetite; pyrite; chalcopyrite; arsenopyrite; pyrohotite; bornite; and bismuth.

Detailed petrographic reports are appended.

Future Work

A diamond drill hole is planned for the next quarter. This hole will test :-

(a) The new structural hypothesis for the Pinnacles Mine area.

(b) Downdip extensions of the surface mineralisation associated with the jasperoid and noted in the two adits mapped.

2. The Costeans

The maps of the Wheal Gleason and Cockscomb costeans are available and appended to this report. Both are at a scale of 1: 120.

The Wheal Gleason costean was cut through a sequence of metamorphosed calc-silts of the Blue Mine Conglomerate stratigraphic unit. These sediments show no primary mineralisation, and only traces of secondary

copper mineralisation. Intense weathering masks all attitudes so that little structural information was obtained from mapping this costean.

The Cockscomb costean was cut through the Wooltana Volcanics unit. Lithologies are scapolite schists, amphibolites and hornfels. No mineralisation was noted.

3. Percussion Drill Logs

The logs that are available are appended to this report.

4. Geochemistry - Yerelina Valley Grid

(a) Statistical assessment

The soil and rock chip geochemical data from this grid has been assessed using cumulative frequency diagrams. Table I lists the various interpretation parameters established for rock data from this statistical treatment. Table II summarises the interpretation of the soil data.

(b) Contour Plans

Two computer-plotted geochemical contour plans were then produced for the Yerelina Valley grid. However, final drafts of these geochemical 'relief' plans will not be available until next quarter. Geochemical follow-up work will be laid out using these contour plans as a guide.

LOGISTICS OF FIELD WORK

	This Quarter	To-date
Area mapped in detail	0.01 sq. miles	0.01 sq. miles
Area covered by magnetics	0.01 sq. miles	0.01 sq. miles
Number of petrological specimens collected	32	44

STAFFING

Staff involved in the exploration of SML 601 during the quarter being reviewed consisted of two junior geologists and one field assistant.

FIXED APPENDIX LIST

1.	Progress Summary Map	Scale 1" = $\frac{1}{4}$ mile
2.	Petrological Reports	
3.	Detailed Geology, Pinnacles Grid	Scale 1: 240
4.	Interpretative Geology, Pinnacles Grid	" 1: 240
5.	Vertical field Magnetic Intensity Pinnacles Grid	" 1: 240
6.	Lower Adit - Pinnacles Grid	" 1: 60
7.	Cockscomb Costean - Yerelina Grid	" 1: 120
8.	Wheal Gleason Costean - Yerelina Grid	" 1: 120
9.	Correlation Sections YX03 and YX04	" 1: 500
10.	Lithological Logs of Percussion Holes.	
11.	Table I - Interpretation Parameters - Rock Chip Data - Yerelina Grid.	
	Table II - Interpretation Parameters - Soil Samples - Yerelina Grid.	
13.	List of Field & Assay Sheets	

LIST OF FIELD & ASSAY SHEETS

Field Sheet No.	Assay Sheet No.	Job No.	Rack No.
(a) Pinnacles Adit Channel Sampling			
39695	5033/1	5033	2940
(b) Percussion Drilling			
43852	5047/6	5047	3038
43853	5047/7	5047	3039
39372	5047/8	5047	3041
39373	5047/9	5047	3042
39697	5047/1	5047	3033
39698	5047/2	5047	3034
39699	5047/3	5047	3035
39700	5047/4	5047	3036
43854	5047/5	5047	3037

INTERPRETATION PARAMETERS ESTABLISHED FROM STATISTICAL ASSESSMENT OF GEOCHEMICAL DATA

TABLE I

Element	B ppm	A ppm	s' no units $\frac{A}{B}$	s no units log s'	s'' % $\frac{S}{B} \times \frac{100}{1}$	$c_{s'}^{12}$ no units	$\frac{t}{b}^2 c_2$	t_1 ppm $Bx(s')^2$	t_2 ppm	N		Skew	Assay Plans Contoured at ppm	Comments on Distribution Type
COPPER	60	400	6.65	0.82	1.36	44.22 (45)	50	2650 (2500)	3000					Approx. lognormal.
ZINC	7	18	2.57	0.41	5.86	6.60 (7)	6.40 (6)	46.3 (50)	45					Approx. lognormal but slightly positively skewed. as 99% level.
LEAD	14	28	2.00	0.30	2.14	4.00	3.57 (4)	56 (55)	50					Negatively skewed at 91% level then positively skewed at 99.5% level. Below 90% level however lognormal distribution prevails.
NICKEL	18	32	1.78	0.25	1.38	3.17 (3)	6.1 (6)	57 (55)	110					Positively skewed at 85% level and negatively skewed at 98% level.
COBALT	9	23	2.56	0.41	4.55	6.55 (7)	7.8 (8)	59 (60)	70					Positively skewed at 99% level.

INTERPRETATION PARAMETERS ESTABLISHED FROM STATISTICAL ASSESSMENT OF GEOCHEMICAL DATA.

TABLE II

Element		B ppm	A ppm	s' no units	s no units	s'' %	c no units C1	c no units C2	t_1	t_2	N ppm	N %	Skew	Assay plans contoured at ppm	Comments on Distribution Type.
COPPER	I	130	390	3.00	0.48	0.37	9.00	13.87	1170	1800				100 b 400 b + s 1500 b+2s 3000 4500 1000	
	II	110	410	3.73	0.57	0.52	13.91	13.62	1530	1500					
ZINC	I	32	42	1.31	0.12	0.37	1.71	1.87	53	60					
	II	31	41	1.32	0.12	0.39	1.74	2.30	54	63					
LEAD	I	18	22	1.22	0.09	0.50	1.49	2.30 1.66	27	30					
	II	22	29	1.32	0.12	0.55	1.74	1.54	38	34					
NICKEL	I	28	48	1.71	0.23	0.82	1.92	2.71	82	76					
	II	28	51	1.82	0.26	0.93	3.28	2.93	92	82					
COBALT	I	17	28	1.65	0.22	1.29	2.72	2.53	46	43					
	II	14	23	1.64	0.21	1.50	2.69	2.93	38	41					

Samples suffixed I are for lines 00-50
Samples suffixed II are for lines 52-172.

030

UTAH DEVELOPMENT COMPANY

QUARTERLY REPORT - SPECIAL MINING LEASE NO. 717

YUDNAMUTANA AREA

PERIOD ENDING SEPTEMBER 25, 1972

SUMMARY

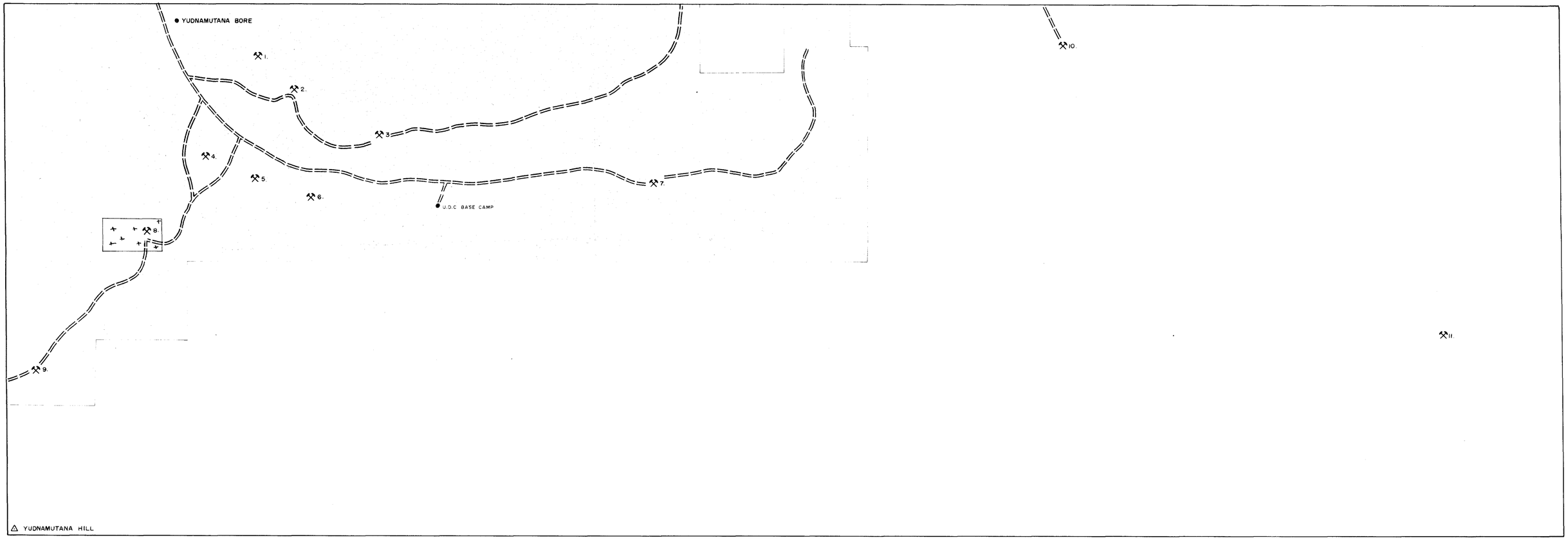
During the quarter under review, the Company has suspended field operations, pending legal assessment of the ramifications of the State Planning Authorities Flinders Ranges 'Development Plan'.

Although the Company is poised to start a $20,000 rotary percussion drilling programme in this SML, it is reluctant to commit these exploration funds, to an area, where the ultimate development of a producing mine could be blocked by a powerful conservationist lobby.

For this reason, the Company's legal advisers are trying to reach agreement on a policy on exploration areas where miners and conservationists might come into conflict. Until this issue is resolved, the proposed drilling programme cannot be started.

It is hoped to have a report on the Company's legal assessment of the situation in the near future.

A Progress Summary Map is not appended to this report as the last map appended to the Annual Report for this area is the current edition.



TENANCY S.M.L 601 _ 24/6/71 – 23/6/72.

MINIMUM EXPENDITURE – $42,000.

PLATE I

UTAH DEVELOPMENT COMPANY

(MINERAL DEVELOPMENT & GEOLOGY)

PROGRESS SUMMARY MAP

SPECIAL MINING LEASE NO. 601

YUDNAMUTANA — SOUTH AUSTRALIA

SAMLING AND FIELD WORK LOGISTICS :-

	TOTAL	
	This quarter	This year
Nº OF SOIL SAMPLES		3787
Nº OF ROCK CHIP SAMPLES		1328
Nº OF PETROLOGICAL SPECIMENS		44
GRID AREA PEGGED (sq. miles)		2·52
GRID AREA SOIL SAMPLED (sq. miles)		2·52
AREA MAPPED (sq. miles)		0·01
ROAD BUILDING (miles)		5
COSTEANING (feet)		1000
Nº OF CHANNEL CHIP SAMPLES		18
Nº OF PERCUSSION DRILL HOLES		4
PERCUSSION DRILLING FOOTAGE		2010
Nº OF PERCUSSION DRILL SAMPLES		400
AREA COVERED BY MAGNETICS (sq. miles)		0·01

GRID AREAS.

Grid area mapped.

Grid areas pegged and sampled (Yerelina Grid)

KEY TO LOCAL TIES

1. Wheal Gleeson
2. Wheal Gleeson South
3. Wealthy King Mine
4. Yuda Mine
5. Black Queen Mine
6. Black Queen East Mine
7. Cockscomb Mine
8. Pinnacles Mine
9. Wheal Austin
10. Wheal Frost
11. Commonwealth Mine

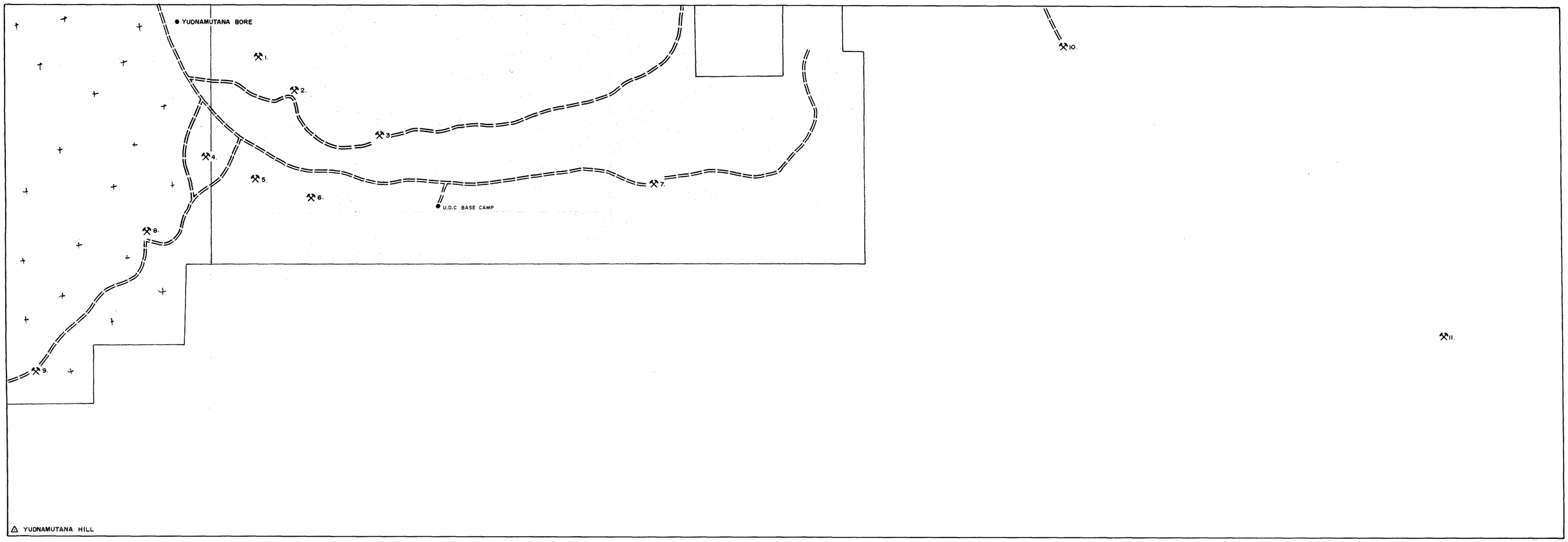
Scale 1:15,840

FEET M.S.L. 0 1000 2000 3000 4000 5000 6000 FEET

METRES 0 500 1000 1500 METRES

Report No. 199
June 1972
N. J Rowlands
Adelaide

ENV 173/(1)—1



TENANCY S.M.L 601 – 24/6/71 – 23/6/72.

MINIMUM EXPENDITURE – $42,000.

Sampling & field work logistics :-

	TOTAL	
	This quarter	To date
Nº OF SOIL SAMPLES	2301	2301
Nº OF ROCK CHIP SAMPLES	848	848
Nº OF PETROLOGICAL SPECIMENS	11	11
GRID AREA PEGGED (sq. feet)	70 mill.	70 mill.
GRID AREA SOIL SAMPLED (sq. feet)	50 mill.	50 mill.
AREA MAPPED (sq. feet)		
ROAD BUILDING (miles)		

SAMPLING

Grid area.

Grid areas sampled (and mapped)

KEY TO LOCALITIES

1. Wheal Gleeson mine.
2. Wheal Gleeson South mine.
3. Wealthy King mine.
4. Yudnamutana mine.
5. Black Queen mine.
6. Black Queen East mine.
7. Cockscomb mine
8. Pinnacles mine.
9. Wheal Austin mine.
10. Wheal Frost mine.
11. Commonwealth mine.

UTAH DEVELOPMENT COMPANY
(Mineral Development and Geology)

PROGRESS SUMMARY MAP

SPECIAL MINING LEASE NO.601.

YUDNAMUTANA – SOUTH AUSTRALIA

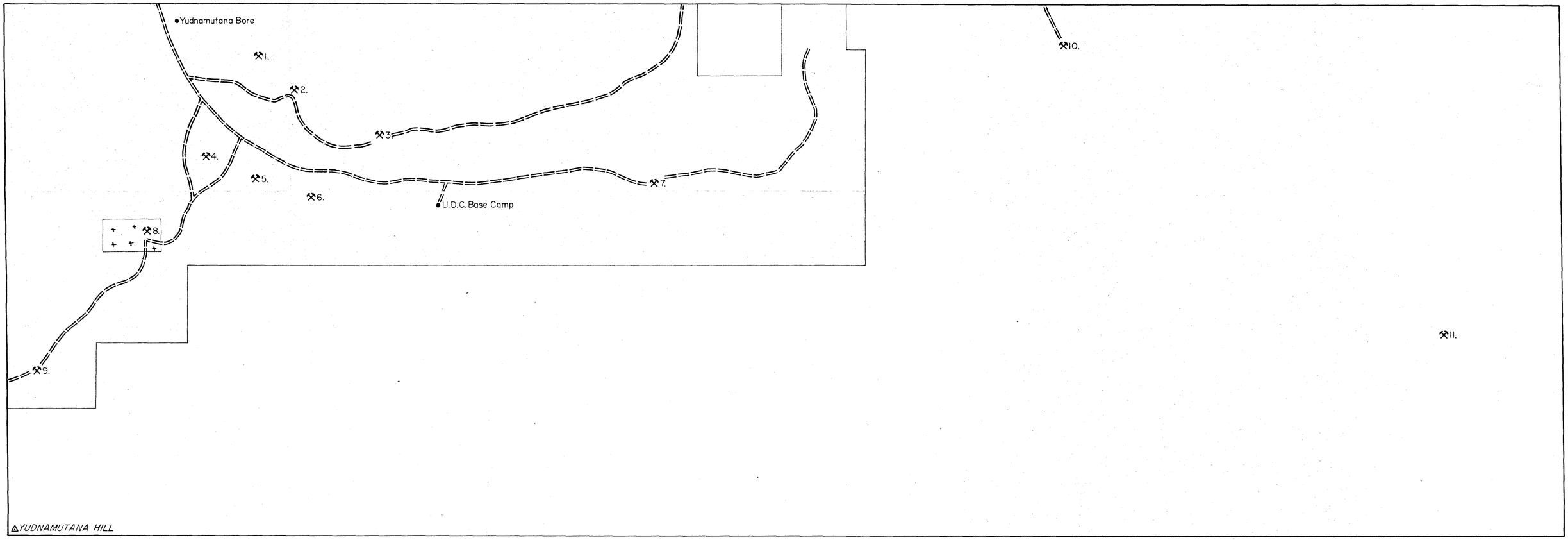
SEPTEMBER 1971

SCALE 1 : 15,840

FEET 1000 0 1000 2000 3000 4000 5000 1 MILE 6000 FEET

METRES 0 500 1000 1500 METRES

ENV 1731(1)– 2



TENANCY S.M.L. 601 _ 24/6/71 – 23/6/72.

MINIMUM EXPENDITURE – $42,000.

SAMPLING & FIELD WORK LOGISTICS

	TOTAL	
	This quarter	To date
SOIL SAMPLES	1486	3787
ROCK CHIP SAMPLES	530	1378
PETROLOGICAL SPECIMENS	1	12
CHANNEL CHIP SAMPLES	18	18
PERCUSSION HOLES	4	4
PERCUSSION DRILLING FOOTAGE	2010	2010
PERCUSSION SAMPLES	400	400
COSTEANING (feet)	1000	1000
GRID AREA PEGGED (sq. miles)	0·01	2·52
AREA MAPPED (sq. miles)	—	—
GRID AREA SOIL SAMPLED (sq. miles)	0·72	2·51
ROAD BUILDING (miles)	5	5

SAMPLING

Grid area

Grid area sampled and mapped

LOCALITIES

1. Wheal Gleeson mine
2. Wheal Gleeson South mine
3. Wealthy King mine
4. Yudnamutana mine
5. Black Queen mine
6. Black Queen East mine
7. Cockscomb mine
8. Pinnacles mine grid
9. Wheal Austin mine
10. Wheal Frost mine
11. Commonwealth mine

ENV 1731(1)-3

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

PROGRESS SUMMARY MAP
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA—SOUTH AUSTRALIA

DECEMBER, 1971

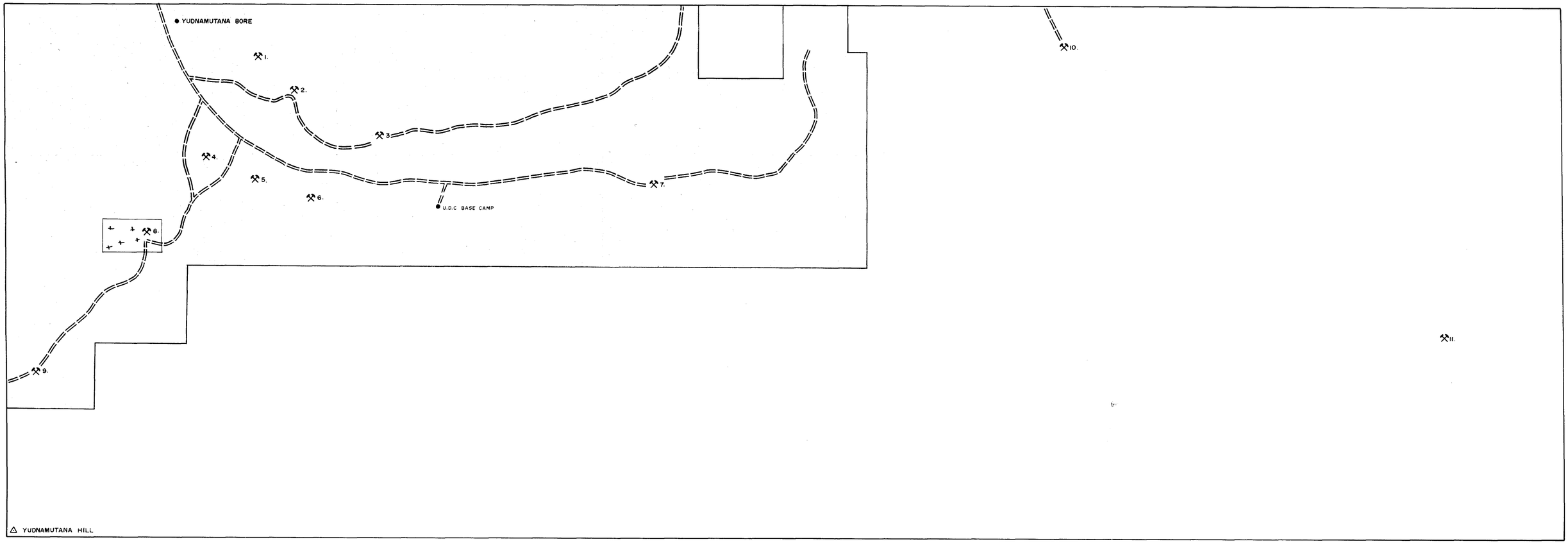
Scale 1:15,840

FEET 1000 0 1000 2000 3000 4000 5000 FEET

METRES 500 0 500 1000 METRES

To accompany report for quarter ending 23 December, 1971, to
THE DIRECTOR OF MINES,
Department of Mines, South Australia

Melbourne VFC
December, 1971



TENANCY S.M.L 601 _ 24/6/71 – 23/6/72.

MINIMUM EXPENDITURE – $42,000.

Sampling & field work logistics :-

	TOTAL	
	This quarter	To date
Nº OF SOIL SAMPLES		3787
Nº OF ROCK CHIP SAMPLES		1378
Nº OF PETROLOGICAL SPECIMENS	32	44
GRID AREA PEGGED (sq. miles)		2·52
GRID AREA SOIL SAMPLED (sq. miles)		2·51
AREA MAPPED (sq. miles)	0·01	0·01
ROAD BUILDING (miles)		5
COSTEANING (feet)		1000
Nº OF CHANNEL CHIP SAMPLES		18
Nº OF PERCUSSION DRILL HOLES		4
PERCUSSION DRILLING FOOTAGE		2010
Nº OF PERCUSSION DRILL SAMPLES		400
AREA COVERED BY MAGNETICS (sq. miles)	0·01	0·01

SAMPLING

Grid area mapped.

Grid areas pegged and sampled. (Yerelina Grid)

KEY TO LOCALITIES

1. Wheal Gleeson mine.
2. Wheal Gleeson South mine.
3. Wealthy King mine.
4. Yudnamutana mine.
5. Black Queen mine.
6. Black Queen East mine.
7. Cockscomb mine.
8. Pinnacles mine.
9. Wheal Austin mine.
10. Wheal Frost mine.
11. Commonwealth mine.

ENV 1731 (1) – 4.

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

PROGRESS SUMMARY MAP
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA
MARCH 1972

SCALE 1 : 15,840

FEET 1000 0 1000 2000 3000 4000 5000 1 MILE 6000 FEET

METRES 0 500 1000 1500 METRES

To accompany report for quarter ending 24 March 1972,
to The Director of Mines, Dept. of Mines, S. Australia by
Utah Development Company, 505 St. Kilda Rd., Melbourne.

N.J. Rowlands.
Adelaide.

Y014P - Calcite-actinolite granulite with skarn mineralisatio

The following minerals were identified in a polished section of this sample (in the following approximate order of abundance).

Magnetite	common
Pyrite	subordinate
Chalcopyrite	"
Arsenolyrite (?)	trace
Pyrrhotite	"
Bornite (?)	"
Bismuthinite	"
Bismuth	"

The rock consists of medium grained allotriomorphic calcite with masses of coarse prisms of amphibole in semi-radial groups.

Subhedral to anhedral crystals of magnetite up to 1 mm. diameter are scattered along vague metamorphic lineations. These contain very fine globular inclusions of chalcopyrite and pyrrhotite up to 10 microns diameter.

Sparsely distributed irregular masses of chalcopyrite of several mm. length are scattered between the masses of amphibole. Slightly smaller subhedral crystals of pyrite of probable primary origin are randomly scattered or associated with the chalcopyrite. A few globules of secondary melnicovite (pyrite) are scattered along minor zones of permeability.

Sparse minute blebs of a soft highly anisotropic mineral possibly bismuthinite (< 0.02 mm) are enclosed in some calcite grains and with the minute chalcopyrites in

the magnetite. There are equally small spherical blebs of native bismuth in some of the magnetites.

Y015P - Calcite-actinolite granulite with skarn mineralisati

The following ore minerals are present to the extent of approximately 5% in the polished section of this sample in the following approximate order of abundance.

Magnetite (martitic)	common
Pyrite	"
Chalcopyrite	"
Pyrrhotite	minor
Arsenopyrite (?)	trace
Covellite	"
Chalcocite	"

It consists of a rock type similar to the sample Y014P with most opaques distributed along fairly well defined random shear or fissure directions.

One such contains principally rounded subhedral masses of magnetite crystals 1-2 mm in diameter intergrown with irregular masses of pyrite and chalcopyrite, up to 0.3 mm diameter. Several of the chalcopyrite grains show fine alteration rims to chalcocite and covellite.

The other mineralised zone contains principally irregular masses of chalcopyrite 2-3 mm diameter with rare subhedral crystals of pyrite and magnetite distributed along the chalcopyrite margins. The magnetite is all partially intergrown with lamellae of secondary haematite, this being an incipient formation of martite.

Y017P - Oxidised-leached sulphide-bearing calcite-actinolite granulite (skarn mineralisation)

The calcite granulite contains some decomposed silicate minerals, as well as oxidised magnetite and sulphides. The order of abundance is:-

Magnetite and martite - common
Chalcopyrite and copper oxysalts - common
pyrite replicas in goethite - common
Pyrrhotite - minor

There is a banded structure in the granulite and copious coarse grained magnetite was intergrown with chalcopyrite, pyrite and minor phyyhotite along some of these foliae. The magnetite is variably martitised with the formation of hematite along (III) crystallographic planes. Almost all of the pyrite was oxidised to goethite pseudomorphs or leached to isometric voids. Chalcopyrite remains as corroded relics inside goethite pseudomorphous which are commonly surrounded by microcrystalline malachite and silica. There were no chalcopyrite boxwork structures formed during the oxidation. Pyrrhotite is present as protected inclusions in some of the magnetite.

Y011P - Oxidised calcite-actinolite granulite. (weak skarn mineralisation)

The granulite consists mainly of calcite. It contains subordinate amphibole, and it is weakly banded. The following minerals are present in small amounts at a maximum grain size of 1-2 mm.

Magnetite and martite	common
Pyrite and pyrite replicas	subordinate
Chalcopyrite	minor
Pyrrhotite	"

The magnetite was coarsest and most widespread. Protected minute inclusions of pyrite, pyrrhotite and chalcopyrite are contained in some magnetite grains.

Most of the pyrite was present as small euhedra which were converted to goethite replicas.

Chalcopyrite is a sparse component and its grain size did not exceed 0.02 mm.

Y013P - Oxidised-mineralised calcite-actinolite granulite (strong skarn mineralisation)

There is considerably more amphibole in this calc-silicate rock and the quantities of magnetite and pyrite are much larger than in the foregoing samples. There may be as much as 30% sulphides in the rock.

Pyrite, mainly coarse grained	-	very abundant
Magnetite, partly martitised	-	common
Chalcopyrite and secondary products	-	moderate amounts
Pyrrhotite and melnikovite pyrite	-	minor

There are extensive aggregates of variably oxidised pyrite individuals many of which exceed 3 mm in size. Most of the magnetite and chalcopyrite are associated with the groups of pyrite anhedra. The chalcopyrite is usually less than 1mm in size, and most of it displays marginal alteration to covellite.

Some finer chalcopyrite is intergrown with pyrrhotite, both of which are enclosed within the magnetite. Elsewhere, the pyrrhotite which existed alone within the granulite, displays complete conversion to melnikovite-pyrite pseudomorphs.

Y016P - Oxidised calcite-actinolite granulite (weakly mineralised)

Like the previous sample this consists principally of amphibole with subordinate finer grained calcite. It was poorly mineralised, and contains in order of abundance, the following components:-

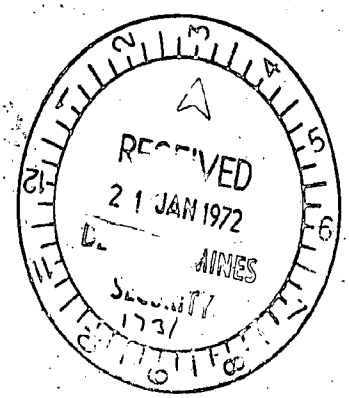
Martitised magnetite	common
Pyrite replicas and relics	sparse
Chalcopyrite	very minor
Pyrrhotite	very minor

The magnetite grains were extensively martitised and only specks of pyrite remain in the goethite pseudomorphs which developed from this mineral. Pyrrhotite and chalcopyrite are present only as minute blebs of 0.005 - 0.025 mm in some of the magnetites. There appear to have been no discrete particles of these two sulphides.

PM005R - true gossan containing relict sulphides

The following minerals were identified in a polished section of this sample (in the following approximate order of abundance) -

"limonite" (goethite, Fe-Si))	dominant
pyrite)	
digenite	subordinate
chalcopyrite)	
cuprite)	accessory
covellite)	
magnetite)	
carbonate)	
molybdenite)	trace
pyrrhotite)	
(?) pentlandite	rare trace



The section examined consists of very ragged, relict, irregular areas of strongly brecciated pyrite up to 2 cm. across enclosed within a mass of limonite.

The limonite has extensively replaced an original sulphide aggregate consisting dominantly of pyrite. It is seen in this section to pervade the margins of the remaining pyrite remnants along cubic grain boundaries and along abundant fractures and growth planes.

In areas of limonite where replacement has been complete, pseudomorphous replicas of original pyrite can be recognised. Pseudomorphous isometric subhedral outlines contain irregular, subparallel, curving and branch-like, rhythmically banded finely botryoidal goethite.

In other areas randomly wandering fine (0.01 mm.) bands of limonite occur within an Fe-Si matrix. Also irregular patches consisting of an aggregate of randomly oriented and interlocking flakes of jarosite (0.5 mm.) occur within an Fe-Si matrix.

Rarely in the pyrite fine (0.1 mm x 0.01 mm.) inclusions of chalcopyrite are found. Chalcopyrite up to 0.2 x 0.1 mm. also occurs as independent grains within limonitised fractures cutting pyrite. (In hand specimen slightly larger anhedral grains of chalcopyrite occur enclosed in limonite.)

The chalcopyrite in limonite is invariably altered and largely replaced by digenite and minor associated covellite. Isolated grains of digenite in limonite indicate complete replacement of former chalcopyrite.

Under high magnification and oil immersion digenite-chalcocite is found as fine bands interlayered with the rhythmically banded goethite which lines fractures in, and pseudomorphs original grains of, pyrite. A given limonitised void in pyrite may consist of 70% goethite, 25-30% chalcocite-digenite and up to 5% extremely fine (?) cuprite and covellite associated with the chalcocite.

Several chalcopyrite grains (0.1 mm.) have a core of pyrrhotite, the pyrrhotite carries minute spindle-like intergrowths of probable pentlandite. Chalcopyrite appears to be replacing the pyrrhotite.

Fine flakes of molybdenite (0.08 mm.) are randomly scattered in trace abundance through the limonite.

Fine euhedral crystals of oxidised magnetite are apparently localised in voids filled mainly by Fe-Si adjacent to chalcopyrite bearing areas.

Minor very small areas of carbonate boxwork indicates that the original gangue was at least in part a carbonate.

FIELD SAMPLE SHEET

SAMPEY EXPLORATION SERVICES
237 Gt. Eastern Highway, Midland
Western Australia, 6056
Phone: 74 2566
Cables: Exserv Perth.

OFFICE COPY

No. 39697

Mark "X" here if data required on Results Sheet.

- [X] No. shown above
- [ ] LINE
- [ ] Project/Charge/ Despatch Note No.
- [X] AREA EARLE

PHOTO RUN [ ] No. [ ]

BEARING OF LINE [ ]

MAP SHEET [ ]

SAMPLED BY G. DeMARY

SAMPLE TYPE Chips

DATE 15 DEC 71 (DAY / MONTH / YEAR)

REMARKS	Sample No./Location/Footage		USE ONLY
	XQ01 / 0000.0 / 05.0	1 1 2	
	XQ01 / 0005.0 / 05.0		
	XQ01 / 0010.0 / 05.0	2 3 4	
	XQ01 / 0015.0 / 05.0		
	XQ01 / 0020.0 / 05.0	3 5 6	
	XQ01 / 0025.0 / 05.0		
	XQ01 / 0030.0 / 05.0	4 7 8	
	XQ01 / 0035.0 / 05.0		
	XQ01 / 0040.0 / 05.0	5 9 10	
	XQ01 / 0045.0 / 05.0		
	XQ01 / 0050.0 / 05.0	6 11 12	
	XQ01 / 0055.0 / 05.0		
	XQ01 / 0060.0 / 05.0	7 13 14	
	XQ01 / 0065.0 / 05.0		
	XQ01 / 0070.0 / 05.0	8 15 16	
	XQ01 / 0075.0 / 05.0		
	XQ01 / 0080.0 / 05.0	9 17 18	
	XQ01 / 0085.0 / 05.0		
	XQ01 / 0090.0 / 05.0	10 19 20	
	XQ01 / 0095.0 / 05.0		
	XQ01 / 0100.0 / 05.0	11 21 22	
	XQ01 / 0105.0 / 05.0		
	XQ01 / 0110.0 / 05.0	12 23 24	
	XQ01 / 0115.0 / 05.0		
	XQ01 / 0120.0 / 05.0	13 25 26	
	XQ01 / 0125.0 / 05.0		
	XQ01 / 0130.0 / 05.0	14 27 28	
	XQ01 / 0135.0 / 05.0		
	XQ01 / 0140.0 / 05.0	15 29 30	
	XQ01 / 0145.0 / 05.0		
	XQ01 / 0150.0 / 05.0	16 31 32	
	XQ01 / 0155.0 / 05.0		
	XQ01 / 0160.0 / 05.0	17 33 34	
	XQ01 / 0165.0 / 05.0		
	XQ01 / 0170.0 / 05.0	18 35 36	
	XQ01 / 0175.0 / 05.0		
	XQ01 / 0180.0 / 05.0	19 37 38	
	XQ01 / 0185.0 / 05.0		
	XQ01 / 0190.0 / 05.0	20 39 40	
	XQ01 / 0195.0 / 05.0		
	XQ01 / 0200.0 / 05.0	21 41 42	
	XQ01 / 0205.0 / 05.0		
	XQ01 / 0210.0 / 05.0	22 43 44	
	XQ01 / 0215.0 / 05.0		
	XQ01 / 0220.0 / 05.0	23 45 46	
	XQ01 / 0225.0 / 05.0		
	XQ01 / 0230.0 / 05.0	24 47 48	
	XQ01 / 0235.0 / 05.0		
	XQ01 / 0240.0 / 05.0	25 49 50	

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S23

040 FIELD SAMPLE SHEET 10 DEC 1971

SAMPEY EXPLORATION SERVICES
237 Gt. Eastern Highway, Midland
Western Australia, 6056
Phone: 74 2566
Cables: Exserv Perth.

OFFICE COPY

No. 39695

Mark "X" here if data required on Results Sheet.

- [X] No. shown above
- [ ] LINE
- [ ] Project/Charge/ Despatch Note No.
- [ ] AREA Bark Hut

PHOTO RUN [ ] No. [ ]

BEARING OF LINE [ ]

MAP SHEET [ ]

SAMPLED BY R. P.

SAMPLE TYPE Chips

DATE 8 DEC 71 (DAY / MONTH / YEAR)

REMARKS	Sample No./Location/Footage		USE ONLY
	XQ01 X	1 1 2	
	XQ02 X		
	XQ03 X	2 3 4	
	XQ04 X		
	XQ05 X	3 5 6	
	XQ06 X		
	XQ07 X	4 7 8	
	XQ08 X		
	XQ09 X	5 9 10	
	XQ10 X		
	XQ11 X	6 11 12	
	XQ12 X		
	XQ13 X	7 13 14	
	XQ14 X		
	XQ15 X	8 15 16	
	XQ16 X		
	XQ17 X	9 17 18	
	XQ18 X		
		10 19 20	
		11 21 22	
		12 23 24	
		13 25 26	
		14 27 28	
		15 29 30	
		16 31 32	
		17 33 34	
		18 35 36	
		19 37 38	
		20 39 40	
		21 41 42	
		22 43 44	
		23 45 46	
		24 47 48	
		25 49 50	

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

041

LABTECH PTY. LTD.

ANALYSTS

(Formerly Analytical Division of Sampey Exploration Services)

237 Great Eastern Highway, Midland

G.P.O. Box U1938, Perth, Western Australia, 6001

Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 39697

Line No.:—

20 DEC 1971

Project/Charge/ Despatch Note No.:—

Date:— 16-DEC-71

Any queries please quote Lab. Sheet Number:— 5047/1

SAMPLE	CU
/0000.0/05.0	120
/0005.0/05.0	260
/0010.0/05.0	175
/0015.0/05.0	60
/0020.0/05.0	215
/0025.0/05.0	120
/0030.0/05.0	255
/0035.0/05.0	315
/0040.0/05.0	310
/0045.0/05.0	270
/0050.0/05.0	410
/0055.0/05.0	690
/0060.0/05.0	680
/0065.0/05.0	530
/0070.0/05.0	335
/0075.0/05.0	1450
/0080.0/05.0	480
/0085.0/05.0	500
/0090.0/05.0	360
/0095.0/05.0	640
/0100.0/05.0	800
/0105.0/05.0	320
/0110.0/05.0	680
/0115.0/05.0	2000
/0120.0/05.0	1200
/0125.0/05.0	300
/0130.0/05.0	630
/0135.0/05.0	550
/0140.0/05.0	1450
/0145.0/05.0	950
/0150.0/05.0	500
/0155.0/05.0	480
/0160.0/05.0	1300
/0165.0/05.0	1150
/0170.0/05.0	485
/0175.0/05.0	430
/0180.0/05.0	310
/0185.0/05.0	125
/0190.0/05.0	75
/0195.0/05.0	125
/0200.0/05.0	205
/0205.0/05.0	125
/0210.0/05.0	145
/0215.0/05.0	150
/0220.0/05.0	175
/0225.0/05.0	55
/0230.0/05.0	180
/0235.0/05.0	285
/0240.0/05.0	210
/0245.0/05.0	330
.....	ALL SAMPLE NUMBERS PREFIXED YX01 .....
METHOD	101R

WARNING NOTICE — THIS IS NCR PAPER — WHEN ANNOTATING, KEEP IT CLEAR OF OTHER NCR COATED ON BACK & FRONT

FORM S34

FOR METHOD DETAILS SEE PRICE LIST

FIELD SAMPLE SHEET

SAMPEY EXPLORATION SERVICES
237 Gt. Eastern Highway, Midland
Western Australia, 6056
Phone: 74 2566
Cables: Exserv Perth.

No. 39698

Mark "X" here if data required on Results Sheet.

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- [ ] No. shown above
- [ ] LINE
- [ ] Project/Charge/ Despatch Note No.
- [X] AREA BMLGM

PHOTO RUN [ ] No. [ ]

BEARING OF LINE [ ]

MAP SHEET [ ]

SAMPLED BY RK, LG, JAP

SAMPLE TYPE Reconnaissance

DATE [ ] DAY [ ] MONTH [ ] YEAR

REMARKS	Sample No./Location/Footage		
	YX01/0250.0/05.0	1	1 2
	YX01/0255.0/05.0		3 4
	YX01/0260.0/05.0	2	5 6
	YX01/0265.0/05.0		7 8
	YX01/0270.0/05.0	3	9 10
	YX01/0275.0/05.0		11 12
	YX01/0280.0/05.0	4	13 14
	YX01/0285.0/05.0		15 16
	YX01/0290.0/05.0	5	17 18
	YX01/0295.0/05.0		19 20
	YX01/0300.0/05.0	6	21 22
	YX01/0305.0/05.0		23 24
	YX01/0310.0/05.0	7	25 26
	YX01/0315.0/05.0		27 28
	YX01/0320.0/05.0	8	29 30
	YX01/0325.0/05.0		31 32
	YX01/0330.0/05.0	9	33 34
	YX01/0335.0/05.0		35 36
	YX01/0340.0/05.0	10	37 38
	YX01/0345.0/05.0		39 40
	YX01/0350.0/05.0	11	41 42
	YX01/0355.0/05.0		43 44
	YX01/0360.0/05.0	12	45 46
	YX01/0365.0/05.0		47 48
	YX01/0370.0/05.0	13	49 50
	YX01/0375.0/05.0		1 2
	YX01/0380.0/05.0	14	3 4
	YX01/0385.0/05.0		5 6
	YX01/0390.0/05.0	15	7 8
	YX01/0395.0/05.0		9 10
	YX01/0400.0/05.0	16	11 12
	YX01/0405.0/05.0		13 14
	YX01/0410.0/05.0	17	15 16
	YX01/0415.0/05.0		17 18
	YX01/0420.0/05.0	18	19 20
		19	21 22
		20	23 24
		21	25 26
		22	27 28
		23	29 30
		24	31 32
		25	33 34

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S35

042

LABTECH PTY. LTD.

ANALYSTS

(Formerly Analytical Division of Sampey Exploration Services)
237 Great Eastern Highway, Midland
G.P.O. Box U1938, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 39698

Line No.:—

Project/Charge/ Despatch Note No.:—

Date:— 16-DEC-71

Any queries please quote Lab. Sheet Number:— 5047/2

SAMPLE	CU
/0250.0/05.0	180
/0255.0/05.0	220
/0260.0/05.0	275
/0265.0/05.0	610
/0270.0/05.0	265
/0275.0/05.0	85
/0280.0/05.0	75
/0285.0/05.0	75
/0290.0/05.0	150
/0295.0/05.0	95
/0300.0/05.0	105
/0305.0/05.0	45
/0310.0/05.0	50
/0315.0/05.0	185
/0320.0/05.0	240
/0325.0/05.0	245
/0330.0/05.0	155
/0335.0/05.0	260
/0340.0/05.0	440
/0345.0/05.0	175
/0350.0/05.0	260
/0355.0/05.0	230
/0360.0/05.0	180
/0365.0/05.0	200
/0370.0/05.0	175
/0375.0/05.0	265
/0380.0/05.0	255
/0385.0/05.0	280
/0390.0/05.0	465
/0395.0/05.0	530
/0400.0/05.0	1100
/0405.0/05.0	700
/0410.0/05.0	520
/0415.0/05.0	1100
/0420.0/05.0	590

METHOD ..... ALL SAMPLE NUMBERS PREFIXED YX01 1010

FORM S34

FOR METHOD DET. ILS SEE PRICE

COATED ON BACK & FRONT WARNING, NOTICE — THIS IS NCR PAPER — WHEN ANNOTATING, KEEP IT CLEAR OF OTHER NCR

FIELD SAMPLE SHEET

SAMPEY EXPLORATION SERVICES
237 Gt. Eastern Highway, Midland
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Phone: 74 2566
Cables: Exserv Perth.

No 39699

Mark "X" here if data required on Results Sheet.

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- [X] No. shown above
- [ ] LINE
- [ ] Project/Charge/ Despatch Note No.
- [X] AREA BML 658

PHOTO RUN [ ] No. [ ]

BEARING OF LINE [ ]

MAP SHEET [ ]

SAMPLED BY PC LV RVGT

SAMPLE TYPE Nos

DATE 17 DEC 71 (DAY / MONTH / YEAR)

REMARKS	Sample No./Location/Footage	
	YX02/0000-0/050	1
	YX02/0005-0/050	
	YX02/0010-0/050	2
	YX02/0015-0/050	
	YX02/0020-0/050	3
	YX02/0025-0/050	
	YX02/0030-0/050	4
	YX02/0035-0/050	
	YX02/0040-0/050	5
	YX02/0045-0/050	
	YX02/0050-0/050	6
	YX02/0055-0/050	
	YX02/0060-0/050	7
	YX02/0065-0/050	
	YX02/0070-0/050	8
	YX02/0075-0/050	
	YX02/0080-0/050	9
	YX02/0085-0/050	
	YX02/0090-0/050	10
	YX02/0095-0/050	
	YX02/0100-0/050	11
	YX02/0105-0/050	
	YX02/0110-0/050	12
	YX02/0115-0/050	
	YX02/0120-0/050	13
	YX02/0125-0/050	
	YX02/0130-0/050	14
	YX02/0135-0/050	
	YX02/0140-0/050	15
	YX02/0145-0/050	
	YX02/0150-0/050	16
	YX02/0155-0/050	
	YX02/0160-0/050	17
	YX02/0165-0/050	
	YX02/0170-0/050	18
	YX02/0175-0/050	
	YX02/0180-0/050	19
	YX02/0185-0/050	
	YX02/0190-0/050	20
	YX02/0195-0/050	
	YX02/0200-0/050	21
	YX02/0205-0/050	
	YX02/0210-0/050	22
	YX02/0215-0/050	
	YX02/0220-0/050	23
	YX02/0225-0/050	
	YX02/0230-0/050	24
	YX02/0235-0/050	
	YX02/0240-0/050	25
	YX02/0245-0/050	

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

FORM S35

043

LABTECH PTY. LTD.

ANALYSTS
(Formerly Analytical Division of Sampey Exploration Services)
237 Great Eastern Highway, Midland
G.P.O. Box U1938, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 39699

Line No.:—

Project/Charge/ Despatch Note No.:—

Date:— 16-DEC-71

Any queries please quote Lab. Sheet Number:— 5047/3

SAMPLE	Sn
/0000.0/05.0	510
/0005.0/05.0	1100
/0010.0/05.0	230
/0015.0/05.0	220
/0020.0/05.0	180
/0025.0/05.0	300
/0030.0/05.0	360
/0035.0/05.0	70
/0040.0/05.0	60
/0045.0/05.0	90
/0050.0/05.0	65
/0055.0/05.0	30
/0060.0/05.0	75
/0065.0/05.0	360
/0070.0/05.0	300
/0075.0/05.0	90
/0080.0/05.0	20
/0085.0/05.0	75
/0090.0/05.0	90
/0095.0/05.0	150
/0100.0/05.0	220
/0105.0/05.0	110
/0110.0/05.0	360
/0115.0/05.0	7500
/0120.0/05.0	5850
/0125.0/05.0	4650
/0130.0/05.0	1350
/0135.0/05.0	3540
/0140.0/05.0	27000
/0145.0/05.0	1350
/0150.0/05.0	720
/0155.0/05.0	1350
/0160.0/05.0	150
/0165.0/05.0	225
/0170.0/05.0	375
/0175.0/05.0	225
/0180.0/05.0	6100
/0185.0/05.0	9100
/0190.0/05.0	7500
/0195.0/05.0	300
/0200.0/05.0	450
/0205.0/05.0	510
/0210.0/05.0	2400
/0215.0/05.0	600
/0220.0/05.0	2100
/0225.0/05.0	2250
/0230.0/05.0	3000
/0235.0/05.0	1350
/0240.0/05.0	360
/0245.0/05.0	630
METHOD	1013

ALL SAMPLE NUMBERS PREFIXED YX02

FORM S34

FOR METHOD DETAILS SEE PRICE LIST

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FIELD SAMPLE SHEET

SAMPEY EXPLORATION SERVICES
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Phone: 74 2566
Cables: Exserv Perth.

No. 39700

Mark "X" here if data required on Results Sheet.

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[X] No. shown above ◄
[ ] LINE
[ ] Project/Charge/ Despatch Note No.
[X] AREA SMI65

PHOTO RUN [ ] No. [ ]
BEARING OF LINE [ ]
MAP SHEET [ ]

SAMPLED BY
SAMPLE TYPE
DATE [ ] DAY [ ] MONTH [ ] YEAR

REMARKS	Sample No./Location/Footage	
		1
		2
		3
		4
		5
		6
		7
		8
		9
		10
		11
		12
		13
		14
		15
		16
		17
		18
		19
		20
		21
		22
		23
		24
		25

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S35

044

LABTECH PTY. LTD.

ANALYSTS
(Formerly Analytical Division of Sampey Exploration Services)
237 Great Eastern Highway, Midland
G.P.O. Box U1938, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 39700

Line No.:—

Project/Charge/ Despatch Note No.:—

Date:— 16-[illegible]-71

Any queries please quote Lab. Sheet Number:— 5047/4

SAMPLE	Cu
/0250.0/05.0	405
/0255.0/05.0	250
/0260.0/05.0	[illegible]
/0265.0/05.0	25[illegible]
/0270.0/05.0	245
/0275.0/05.0	[illegible]
/0280.0/05.0	240
/0285.0/05.0	1700
/0290.0/05.0	3860
/0295.0/05.0	2070
/0300.0/05.0	[illegible]
/0305.0/05.0	[illegible]
/0310.0/05.0	1500
/0315.0/05.0	1400
/0320.0/05.0	[illegible]
/0325.0/05.0	1060
/0330.0/05.0	700
/0335.0/05.0	[illegible]
/0340.0/05.0	330
/0345.0/05.0	270
/0350.0/05.0	170
/0355.0/05.0	145
/0360.0/05.0	140
/0365.0/05.0	63
/0370.0/05.0	225
/0375.0/05.0	[illegible]
/0380.0/05.0	255
/0385.0/05.0	130
/0390.0/05.0	[illegible]
/0395.0/05.0	175
/0400.0/05.0	365
/0405.0/05.0	75
/0410.0/05.0	330
/0415.0/05.0	[illegible]
/0420.0/05.0	[illegible]
/0425.0/05.0	[illegible]
/0430.0/05.0	250
/0435.0/05.0	460
/0440.0/05.0	215
/0445.0/05.0	[illegible]
/0450.0/05.0	1[illegible]
/0455.0/05.0	7[illegible]
/0460.0/05.0	[illegible]
/0465.0/05.0	6[illegible]
/0470.0/05.0	460
/0475.0/05.0	2360
/0480.0/05.0	1300
/0485.0/05.0	410
/0490.0/05.0	540
/0495.0/05.0	510

METHOD 1018

ALL SAMPLE NUMBERS PREFIXED YX62

FORM S34

FOR METHOD DETAILS SEE PRICE LIST

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FIELD SAMPLE SHEET

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Phone: 74 2566
Cables: Exserv Perth

№ 43854

Mark "X" here if data required on Results Sheet.

- [X] No. shown above ◄
- [ ] LINE
- [ ] Project/Charge/ Despatch Note/No.
- [X] AREA EMLEIGH

PHOTO RUN [ ] No. [ ]

BEARING OF LINE [ ]

MAP SHEET [ ]

SAMPLED BY [illegible]

SAMPLE TYPE [illegible]

DATE [17] DAY [DEC] MONTH [71] YEAR

REMARKS	Sample No./Location/Footage
	[illegible]

USE ONLY

FOR LAB.

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S35

LABTECH PTY. LTD.

ANALYSTS

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G.P.O. Box U1938, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:—

Line No.:—

Project/Charge/ Despatch Note No.:—

Date:— 16-DEC-71

Any queries please quote Lab. Sheet Number:— 5047/5

SAMPLE	Cu
/3500.0/05.0	565
/3505.0/05.0	415
/3510.0/05.0	460
/3515.0/05.0	210
/3520.0/05.0	265
/3525.0/05.0	215
/3530.0/05.0	295
/3535.0/05.0	455
/3540.0/05.0	340
/3545.0/05.0	355
/3550.0/05.0	270
/3555.0/05.0	245
/3560.0/05.0	305
/3565.0/05.0	540
/3570.0/05.0	680
METHOD	1010

..... ALL SAMPLE NUMBERS PREFIXED YX02 .....

FORM S34

FOR METHOD DETAILS SEE PRICE LIST

WARNING NOTICE — THIS IS NCR PAPER — WHEN ANNOTATING, KEEP IT CLEAR OF OTHER NCR COATED ON BACK & FRONT

FIELD SAMPLE SHEET

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Phone: 74 2566
Cables: Exserv Perth

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No. 43852
Mark "X" here if data required on Results Sheet.

[X] No. shown above ←
[ ] LINE
[ ] Project/Charge/ Despatch Note/No.
[X] AREA ML 10

PHOTO RUN [ ] No. [ ]
BEARING OF LINE [ ]
MAP SHEET [ ]

SAMPLED BY
SAMPLE TYPE C
DATE [17] [11] [71]
DAY MONTH YEAR

REMARKS	Sample No./Location/Footage			USE ONLY
		1	1	
		2	2	
		3	3	
		4	4	
		5	5	
		6	6	
		7	7	
		8	8	
		9	9	
		10	10	
		11	11	
		12	12	
		13	13	
		14	14	
		15	15	
		16	16	
		17	17	
		18	18	
		19	19	
		20	20	
		21	21	
		22	22	
		23	23	
		24	24	
		25	25	
		26	26	
		27	27	
		28	28	
		29	29	
		30	30	
		31	31	
		32	32	
		33	33	
		34	34	
		35	35	
		36	36	
		37	37	
		38	38	
		39	39	
		40	40	
		41	41	
		42	42	
		43	43	
		44	44	
		45	45	
		46	46	
		47	47	
		48	48	
		49	49	
		50	50	
		51	51	
		52	52	
		53	53	
		54	54	

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S35

046

LABTECH PTY. LTD.

ANALYSTS
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237 Great Eastern Highway, Midland
G.P.O. Box U1936, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 43852
Line No.:—
Project/Charge/ Despatch Note No.:—
Date:— 14-DEC-71
Any queries please quote Lab. Sheet Number:— 5047/6

SAMPLE	CU
/0005.0/05.0	75
/0010.0/05.0	40
/0015.0/05.0	60
/0020.0/05.0	100
/0025.0/05.0	80
/0030.0/05.0	215
/0035.0/05.0	60
/0040.0/05.0	55
/0045.0/05.0	80
/0050.0/05.0	45
/0055.0/05.0	55
/0060.0/05.0	25
/0065.0/05.0	65
/0070.0/05.0	65
/0075.0/05.0	240
/0080.0/05.0	150
/0085.0/05.0	245
/0090.0/05.0	100
/0095.0/05.0	140
/0100.0/05.0	70
/0105.0/05.0	125
/0110.0/05.0	230
/0115.0/05.0	90
/0120.0/05.0	110
/0125.0/05.0	95
/0130.0/05.0	105
/0135.0/05.0	155
/0140.0/05.0	75
/0145.0/05.0	50
/0150.0/05.0	210
/0155.0/05.0	530
/0160.0/05.0	175
/0165.0/05.0	115
/0170.0/05.0	65
/0175.0/05.0	15
/0180.0/05.0	50
/0185.0/05.0	55
/0190.0/05.0	30
/0195.0/05.0	350
/0200.0/05.0	265
/0205.0/05.0	105
/0210.0/05.0	60
/0215.0/05.0	470
/0220.0/05.0	530
/0225.0/05.0	190
/0230.0/05.0	95
/0235.0/05.0	115
/0240.0/05.0	190
/0245.0/05.0	55

ALL SAMPLE NUMBERS PREFIXED YX03

METHOD 1013

FORM S34

FOR METHOD DETAILS SEE PRICE LIST

COATED ON BACK & FRONT **WARNING NOTICE — THIS IS NCR PAPER — WHEN ANNOTATING, KEEP IT CLEAR OF OTHER NCR**

FIELD SAMPLE SHEET

OFFICE COPY

No 43853

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SAMPEY EXPLORATION SERVICES
237 Gt. Eastern Highway, Midland
Western Australia, 6056
Phone: 74 2566
Cables: Exserv Perth

[X] No. shown above ◄

[ ] LINE

[ ] Project/Charge/Despatch Note/No.

[ ] AREA

PHOTO RUN ____ No. ____

BEARING OF LINE ____

MAP SHEET ____

SAMPLED BY [illegible]

SAMPLE TYPE [illegible]

DATE ____ DAY ____ MONTH ____ YEAR 71

REMARKS							Sample No./Location/Footage
							[illegible]

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S35

5047

LABTECH PTY. LTD.

ANALYSTS

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237 Great Eastern Highway, Midland
G.P.O. Box U1938, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 43853

Line No.:—

Project/Charge/Despatch Note No.:—

Date:— 16-DEC-71

Any queries please quote Lab. Sheet Number:— 5047/7

SAMPLE	CU
/0250.0/05.0	410
/0255.0/05.0	135
/0260.0/05.0	[illegible]
/0265.0/05.0	300
/0270.0/05.0	220
/0275.0/05.0	260
/0280.0/05.0	[illegible]
/0285.0/05.0	200
/0290.0/05.0	315
/0295.0/05.0	[illegible]
/0300.0/05.0	240
/0305.0/05.0	70
/0310.0/05.0	[illegible]
/0315.0/05.0	1000
/0320.0/05.0	[illegible]
/0325.0/05.0	350
/0330.0/05.0	190
/0335.0/05.0	210
/0340.0/05.0	[illegible]
/0345.0/05.0	2400
/0350.0/05.0	20
/0355.0/05.0	10
/0360.0/05.0	5
/0365.0/05.0	RLD
/0370.0/05.0	5
/0375.0/05.0	5
/0380.0/05.0	[illegible]
/0385.0/05.0	75
/0390.0/05.0	135
/0395.0/05.0	20
/0400.0/05.0	15
/0405.0/05.0	15
/0410.0/05.0	10
/0415.0/05.0	5
/0420.0/05.0	20
/0425.0/05.0	25
/0430.0/05.0	130
/0435.0/05.0	[illegible]
/0440.0/05.0	475
/0445.0/05.0	[illegible]
/0450.0/05.0	220
/0455.0/05.0	50
/0460.0/05.0	[illegible]
/0465.0/05.0	470
/0470.0/05.0	[illegible]
/0475.0/05.0	2900
/0480.0/05.0	[illegible]
/0485.0/05.0	95
/0490.0/05.0	[illegible]
/0495.0/05.0	500
METHOD	101

.... ALL SAMPLE NUMBERS PREFIXED YX03 ....

FORM S34 FOR METHOD DETAILS SEE ...

COATED ON BACK & FRONT WARNING NOTICE — THIS IS NCR PAPER — WHEN ANNOTATING, KEEP IT CLEAR OF OTHER NCR

FIELD SAMPLE SHEET

SAMPEY EXPLORATION SERVICES
237 Gt. Eastern Highway, Midland
Western Australia, 6056
Phone: 74 2566
Cables: Exserv Perth.

No 39372

Mark "X" here if data required on Results Sheet.

OFFICE COPY

☐ No. shown above ←
☐ LINE
☐ Project/Charge/ Despatch Note No.
☐ AREA

PHOTO RUN ☐☐☐ No. ☐☐☐☐☐☐
BEARING OF LINE ☐☐☐
MAP SHEET ☐☐☐☐☐☐

SAMPLED BY
SAMPLE TYPE
DATE ☐☐ DAY ☐☐☐ MONTH ☐☐ YEAR

REMARKS	Sample No./Location/Footage	
		1
		2
		3
		4
		5
		6
		7
		8
		9
		10
		11
		12
		13
		14
		15
		16
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		21
		22
		23
		24
		25

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S35

048

LABTECH PTY. LTD.
ANALYSTS
(Formerly Analytical Division of Sampey Exploration Services)
237 Great Eastern Highway, Midland
G.P.O. Box U1938, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 39372
Line No.:—
Project/Charge/ Despatch Note No.:—
Date:— 16-DEC-71

Any queries please quote Lab. Sheet Number:— 5047/8

SAMPLE	Cu
/0005.0/05.0	105
/0010.0/05.0	255
/0015.0/05.0	150
/0020.0/05.0	90
/0025.0/05.0	135
/0030.0/05.0	150
/0035.0/05.0	85
/0040.0/05.0	410
/0045.0/05.0	105
/0050.0/05.0	75
/0055.0/05.0	90
/0060.0/05.0	95
/0065.0/05.0	85
/0070.0/05.0	220
/0075.0/05.0	55
/0080.0/05.0	60
/0085.0/05.0	85
/0090.0/05.0	10
/0095.0/05.0	25
/0100.0/05.0	10
/0105.0/05.0	10
/0110.0/05.0	5
/0115.0/05.0	5
/0120.0/05.0	15
/0125.0/05.0	15
/0130.0/05.0	10
/0135.0/05.0	5
/0140.0/05.0	10
/0145.0/05.0	25
/0150.0/05.0	10
/0155.0/05.0	10
/0160.0/05.0	5
/0165.0/05.0	15
/0170.0/05.0	10
/0175.0/05.0	5
/0180.0/05.0	5
/0185.0/05.0	5
/0190.0/05.0	5
/0195.0/05.0	5
/0200.0/05.0	5
/0205.0/05.0	PLD
/0210.0/05.0	PLD
/0215.0/05.0	5
/0220.0/05.0	5
/0225.0/05.0	5
/0230.0/05.0	15
/0235.0/05.0	10
/0240.0/05.0	5
/0245.0/05.0	105
METHOD	101B

ALL SAMPLES PREFIXED YX04

FORM S34

FOR METHOD DETAILS SEE PRICE LIST

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FIELD SAMPLE SHEET

SAMPEY EXPLORATION SERVICES
237 Gt. Eastern Highway, Midland
Western Australia, 6056
Phone: 74 2566
Cables: Exserv Perth.

No 39373

Mark "X" here if data required on Results Sheet.

OFFICE COPY

- [ ] No. shown above
- [ ] LINE
- [ ] Project/Charge/ Despatch Note No.
- [ ] AREA

PHOTO RUN [ ] No. [ ]

BEARING OF LINE [ ]

MAP SHEET [ ]

SAMPLED BY

SAMPLE TYPE

DATE [ ] DAY [ ] MONTH [ ] YEAR

REMARKS	Sample No./Location/Footage	
		1 1 2
		2 3 4
		3 5 6
		4 7 8
		5 9 10
		11 12
		7 13 14
		8 15 16
		9 17 18
		10 19 20
		11 21 22
		12 23 24
		13 25 26
		14 27 28
		15 29 30
		16 31 32
		17 33 34
		18 35 36
		19 37 38
		20 39 40
		21 41 42
		22 43 44
		23 45 46
		24 47 48
		25 49 50

FOR LAB. USE ONLY

COMPLETE SAMPLE DESPATCH FORM (S24) FOR ANALYTICAL INSTRUCTIONS

USE ONE LINE CONSECUTIVELY FOR EACH SAMPLE

FORM S35

049

LABTECH PTY. LTD.
ANALYSTS
(Formerly Analytical Division of Sampey Exploration Services)
237 Great Eastern Highway, Midland
G.P.O. Box U1938, Perth, Western Australia, 6001
Telephone: 74 2566 ● Telegrams: "Exserv" Perth

Field Sheet No.:— 39373

Line No.:—

Project/Charge/ Despatch Note No.:—

Date:— 16-DEC-71

Any queries please quote Lab. Sheet Number:— 5047/2

SAMPLE	Cu						
/0250.0/05.0	35						
/0255.0/05.0	5						
/0260.0/05.0	5						
/0265.0/05.0	5						
/0270.0/05.0	5						
/0275.0/05.0	5						
/0280.0/05.0	65						
/0285.0/05.0	145						
/0290.0/05.0	60						
/0295.0/05.0	25						
/0300.0/05.0	15						
/0305.0/05.0	150						
/0310.0/05.0	190						
/0315.0/05.0	225						
/0320.0/05.0	135						
/0325.0/05.0	110						
/0330.0/05.0	130						
/0335.0/05.0	75						
/0340.0/05.0	45						
/0345.0/05.0	25						
/0350.0/05.0	15						
/0355.0/05.0	10						
/0360.0/05.0	130						
/0365.0/05.0	75						
/0370.0/05.0	60						
/0375.0/05.0	145						
/0380.0/05.0	135						
/0385.0/05.0	150						
/0390.0/05.0	105			345m			
/0395.0/05.0 ←	275						
/0400.0/05.0	295						
/0405.0/05.0	365						
/0410.0/05.0	325						
/0415.0/05.0	365						
/0420.0/05.0	285						
/0425.0/05.0	250						
/0430.0/05.0	490						
/0435.0/05.0 ←	490						
/0440.0/05.0	335						
/0445.0/05.0	320						
/0450.0/05.0	165						
/0455.0/05.0	95						
/0460.0/05.0	320						
/0465.0/05.0	720						
/0470.0/05.0	250						
/0475.0/05.0	250						
/0480.0/05.0	175						
/0485.0/05.0 ←	250						
/0490.0/05.0	210						
/0495.0/05.0	320						
ALL SAMPLES PREFIXED YX04							
METHOD	101P						

FORM S34

FOR METHOD DETAILS SEE PRICE LIST

WARNING: NOTICE — THIS IS NCR PAPER — WHEN ANNOTATING, KEEP IT CLEAR OF OTHER NCR COATED ON BACK & FRONT

DESCRIPTIVE LOG — PERCUSSION DRILLING

050

(Mineral Development & Geology)
505 St Kildo Rd., Melbourne

HOLE NO. YX01
Sheet No. 1

PROJECT:- SML 601
LOCATION:- Yerelina Valley
LOGGED BY:- R. B. Kitch

CO-ORDINATES:- 10,400' East 8,325' North
COLLAR ELEVATION:-
BEARING:- 182°M
INCLINATION:- -60°

DRILLED BY:- Drilling Enterpris Hahndorf
COMMENCED:- 22/11/71
COMPLETED:- 23/11/71

FOOTAGE From	FOOTAGE To	FOOTAGE Diff.	CORE DESCRIPTION	SAMPLE NO.	ASSAYS Cu	ASSAYS ppm		
0	70	70	Hornfels - weathered dark green, fine grained	YX01/0000.0/05.0	315			
			to	YX01/0065.0/05.0				
70	100	30	Felspathic amphobolite with minor dark green	YX01/0070.0/05.0	630			
			fine grained hornfels to	YX01/0095.0/05.0				
100	120	20	Hornfels - fine grained, dark green,	YX01/0100.0/05.0	950			
			Pyrite from 110 - 120' to	YX01/0115.0/05.0				
120	160	40	Biotite schist, amphibolite schist & slightly	YX01/0120.0/05.0	820			
			foliated hornfels. Pyrite toward bottom to	YX01/0115.0/05.0				
			of section. Calcite & gold mica.					
160	205	45	Scapolite schist, actinolite fibres	YX01/0160.0/05.0	465			
			to	YX01/0200.0/05.0				
205	215	10	Felspathic amphibolite	YX01/0205.0/05.0	135			
			to	YX01/0210.0/05.0				
215	240	25	Scapolite - amphibole schist - massive	YX01/0215.0/05.0	170			
			to	YX01/0235.0/05.0				
240	270	30	Felspathic actinolite granulite	YX01/0240.0/05.0	325			
			to	YX01/0265.0/05.0				
270	315	45	Weathered hornfels & ? argillites	YX01/0270.0/05.0	105			
			to	YX01/0310/0.05.0				
315	420	105	Oxidized hornfels, actinolite schist?, argilla-	YX01/0315.0/05.0	400			
			ceous sediments with occasional fresher to	YX01/0415.0/05.0				
			sections of hornfels. Quartz veins present.					
420	425	5	Dark Grey siliceous hornfels	YX01/0420.0/05.0	550			

DESCRIPTIVE LOG — PERCUSSION DRILL

UTAH DEVELOPMENT COMPANY
051 (Mineral Development & Geology)
505 St Kilda Rd., Melbourne

HOLE NO. YX02
Sheet No. 1

PROJECT: SML 601
LOCATION:- Yerelina Valley
LOGGED BY:- R. B. Kitch

CO-ORDINATES:- 10,400' East 8,100' North
COLLAR ELEVATION:-
BEARING:- 182° M
INCLINATION:- -60°

DRILLED BY:- Drilling Enterpr Hahndorf
COMMENCED:- 24/11/71
COMPLETED:- 30/11/71

FOOTAGE From	To	Diff.	CORE DESCRIPTION		SAMPLE NO.	ASSAYS Cu
0	10	10	Soil. Buff coloured; slight carbonate content		YX02/0000.0/05.0	800
			black heavy minerals, hydro-micas, amphibole	to	YX02/0005.0/05.0	
10	30	20	Hornfels. Quartz vein 10-15; purplish hornfels		YX02/0010.0/05.0	215
			and medium-green amphibolite schist	to	YX02/0025.0/05.0	
30	55	25	Amphibole schist. Weathered, minor grey		YX02/0030.0/05.0	115
			hornfels	to	YX02/0050.0/05.0	
55	65	10	as above but more intensely weathered to an		YX02/0055.0/05.0	50
			orange-brown friable rock. Semi-translucent	to	YX02/0060.0/05.0	
			quartz vein.			
65	110	45	Weathered schist. Brown and green fine grained		YX02/0065.0/05.0	150
			schist; white quartz, white micas, amphibole	to	YX02/0105.0/05.0	
			(often weathered to ?chlorite ?hematite).			
110	150	40	As above but possibly even more weathered/more		YX02/0110.0/05.0	3840
			argillaceous. ?Limonite psuedomorph after	to	YX02/0145.0/05.0	
			pyrite 140-145'. Carbonate present.			
150	185	35	Weathered schist? - buff v.fine material		YX02/0150.0/05.0	1710
				to	YX02/0180.0/05.0	
185	215	30	Calc.-silicate - fibrous actinolite, calcite		YX02/0185.0/05.0	2500
			and amphibolite hornfels	to	YX02/0210.0/05.0	
215	220	5	Orange-red limonitic ochre		YX02/0215.0/05.0	6800
220	235	15	Limonite-koalin, jasperoid?		YX02/0220.0/05.0	2450
				to	YX02/0230.0/05.0	

DESCRIPTIVE LOG — PERCUSSION DRILL — 052

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)
505 St Kilda Rd., Melbourne

HOLE NO. YX02
Sheet No. 2

FOOTAGE From	FOOTAGE To	FOOTAGE Diff.	CORE DESCRIPTION	SAMPLE NO.	ASSAYS
235	250	15	Hematite-magnetite, slightly weathered	YX02/0235.0/05.0	555
			to	YX02/0245.0/05.0	
250	290	40	Green-grey hornfels becoming actinolitic	YX02/0250.0/05.0	435
			towards base to	YX02/0285.0/05.0	
290	390	100	V.fine material, possibly actinolite schist	YX02/0290.0/05.0	730
			in places weathered. Some argillaceous inter- to	YX02/0385.0/05.0	
			beds possible.		
390	455	65	Fibrous dark green actinolite with calcite and	YX02/0390.0/05.0	265
			?biotite, also remnants of ?interbedded to	YX02/0450.0/05.0	
			argillites.		
455	470	15	Actinolite ?schist	YX02/0455.0/05.0	570
			to	YX02/0465.0/05.0	
470	490	20	Felspathic actinolite schist	YX02/0470.0/05.0	1130
			to	YX02/0485.0/05.0	
490	575	85	Actinolite-calcite-biotite schist, occasional	YX02/0490.0/05.0	395
			interbeds of black siliceous hornfels to	YX02/0570.0/05.0	

DESCRIPTIVE LOG — PERCUSSION DRILL

UTAH DEVELOPMENT COMPANY
053 (Mineral Development & Geology)
505 St Kilda Rd., Melbourne

HOLE NO. YX03
Sheet No. 1

PROJECT:- SHL 601
LOCATION:- Yerelina Valley
LOGGED BY:- R. B. Kitch

CO-ORDINATES:- 9,600' East 8,000' North
COLLAR ELEVATION:-
BEARING:- 182°M
INCLINATION:- -60°

DRILLED BY:- Drilling Enterpris Hahndorf.
COMMENCED:- 1/12/71
COMPLETED:- 3/12/71

FOOTAGE From	FOOTAGE To	FOOTAGE Diff.	CORE DESCRIPTION	SAMPLE NO.	ASSAYS Cu	ASSAYS ppm		
0	20	20	Schist - weathered amphibolite in radiating	YX03/0000.0/05.0	45			
			aggregates. Minor carbonate material - to	YX03/0015.0/05.0				
			?calcrete along joints					
20	90	70	Schist - green-grey amphibole in bladed & acicular	YX03/0020.0/05.0	90			
			habit; calcite. Weak, disseminated, fine to	YX03/0085.0/05.0				
			grained pyrite mineralization over entire section.					
90	140	50	?amphibolite - calcite-mica assemblage, -	YX03/0090.0/05.0	155			
			very soft, fine powder. Pyrite grain 95-100' to	YX03/0135.0/05.0				
140	175	35	Dark grey hornfels with minor dark gran fibrous	YX03/0140.0/05.0	170			
			amphibole and biotite. Finely disseminated to	YX03/0170.0/05.0				
			pyrite from 150-165'.					
175	230	55	Hornfels - medium grained with pale green	YX03/0175.0	185			
			fibrous actinolite, dark green amphibole to	YX03/0225.0/05.0				
			(cummingtonite-grunerite/hornblend?) & biotite.					
			Slight carbonate content. Shiny gold-brown ?mica.					
230	265	35	Calcite-amphibolite assemblage, vein quarts	YX03/0230.0/05.0	200			
			250-255. Pyrite grains (0.5) mm in calcite to	YX03/0260.0/05.0				
			at 230-235.					
265	270	5	(No sample)	YX03/0265.0/05.0 (missing)	300			
270	295	25	Hornfels - dark green-grey. Very fine	YX03/0270.0/05.0	360			
			pyrite - rare to	YX03/0290.0/05.0				

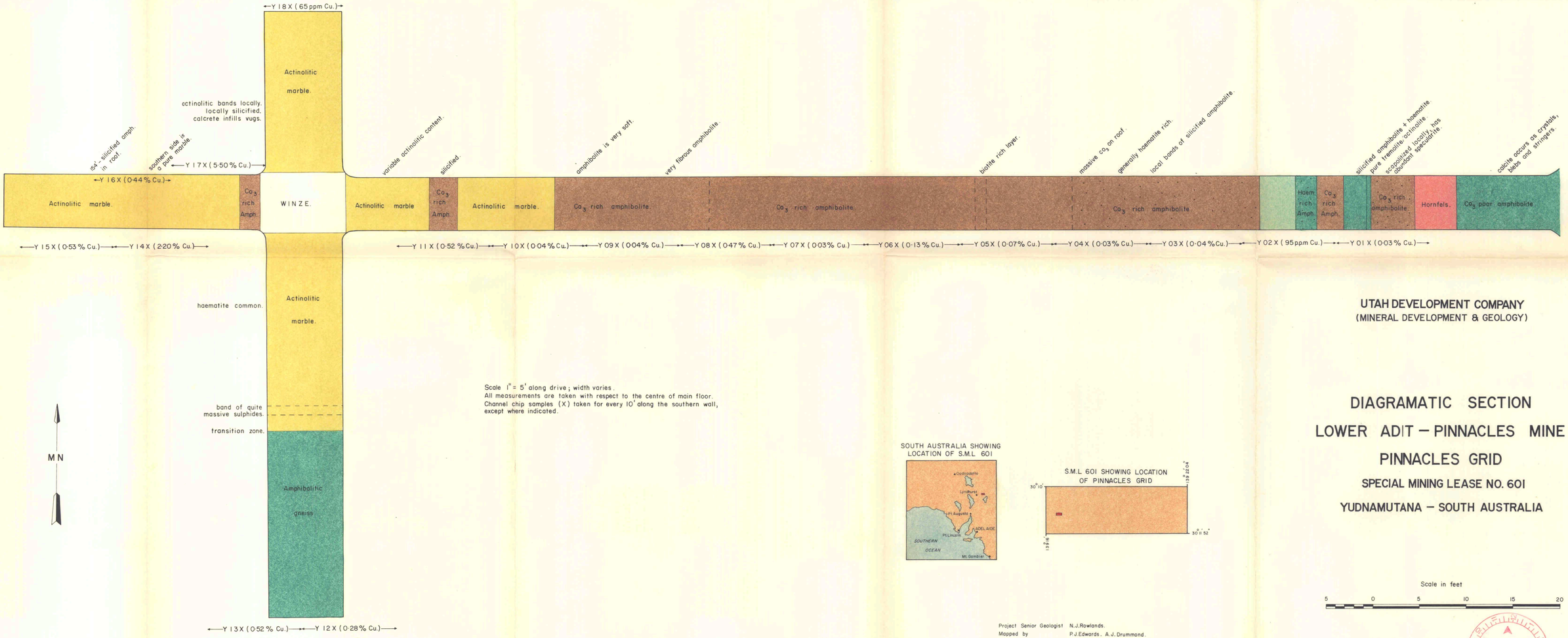
DESCRIPTIVE LOG — PERCUSSION DRILL

054

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)
505 St Kilda Rd., Melbourne

HOLE NO. YX03
Sheet No. 2

FOOTAGE			CORE DESCRIPTION	SAMPLE NO.	ASSAYS			
From	To	Diff.			Cu			
295	320	25	Schist - amphibole, biotite with calcite grains	YX03/0295.0/05.0	475			
			becoming increasing towards the base of to	YX03/0315.0/05.0				
			the section. Pyrite also increasing similarly.					
320	350	30	Biotite - amphibole schist - dark grey,	YX03/0320.0/05.0	710			
			soft friable to	YX03/0345.0/05.0				
350	440	90	Calcite-amphibolite - mid green granular	YX03/0350.0/05.0	55			
			amphibole, biotite and calcite - slight to	YX03/0435.0/05.0				
			schistose texture. Rare pyrite grains.					
440	500	60	Felspathic hornfels - dark grey with orange-pink	YX03/0440.0/05.0	560			
			felspars rare calcite and amphibole. Oxidized to	YX03/0495.0/05.0				
			465 - 500.					



Scale 1" = 5' along drive; width varies.
All measurements are taken with respect to the centre of main floor.
Channel chip samples (X) taken for every 10' along the southern wall, except where indicated.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L 601

S.M.L 601 SHOWING LOCATION OF PINNACLES GRID

Project Senior Geologist N.J.Rowlands.
Mapped by P.J.Edwards. A.J.Drummond.
Drawn by A.J.Hitchcox.
Date February 1972.
Office Adelaide S.A.

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

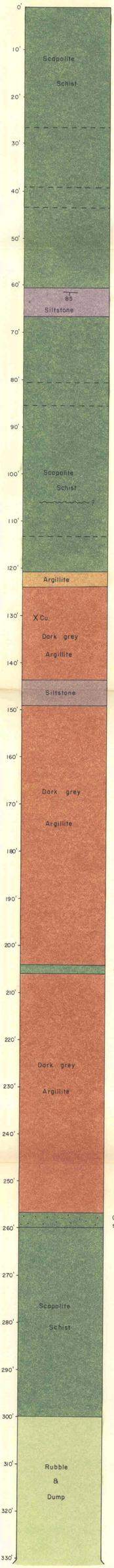
DIAGRAMATIC SECTION
LOWER ADIT — PINNACLES MINE
PINNACLES GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA — SOUTH AUSTRALIA

Scale in feet
5 0 5 10 15 20

To accompany report for quarter ending 24 March 1972, to The Director of Mines, Dept. of Mines, S.Australia by Utah Development Company, 505 St. Kilda Rd., Melbourne.

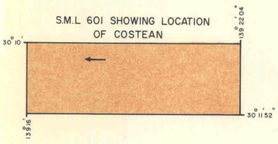
N.J.Rowlands.
Adelaide.

ENV 1731 (II) — 1



SOUTH AUSTRALIA SHOWING
LOCATION OF S.M.L. 601

S.M.L 601 SHOWING LOCATION
OF COSTEAN



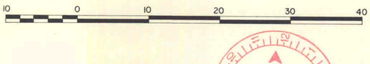
Project Senior Geologist	N.J.Rowlands.
Mapped by	P.J.Edwards. A.J.Drummond.
Drawn by	A.J.Hitchcox.
Date	February 1972.
Office	Adelaide S.A.

Actual width of costean is 6–8 feet.
All measurements are taken with respect to the centre of the costean.

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

DIAGRAMATIC SECTION
WHEAL GLEESON COSTEAN
YERELINA GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA

Scale in feet



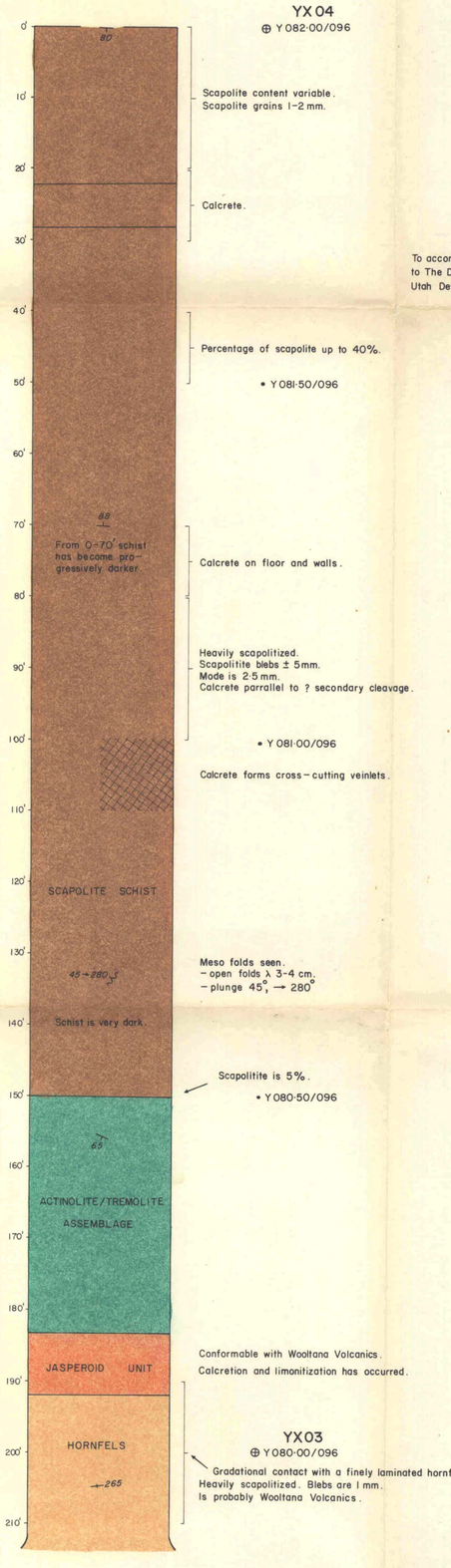
To accompany report for quarter ending 24 March 1972,
to The Director of Mines, Dept. of Mines, S.Australia by
Utah Development Company, 505 St. Kilda Rd., Melbourne.

N.J.Rowlands.
Adelaide.

ENV 1731 (II) – 2

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

DIAGRAMATIC SECTION
COCKSCOMB COSTEAN
YERELINA GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA



Scale in feet

10 0 10 20 30 40

To accompany report for quarter ending 24 March 1972, to The Director of Mines, Dept. of Mines, S.Australia by Utah Development Company, 505 St. Kilda Rd., Melbourne.

N.J.Rowlands.
Adelaide.

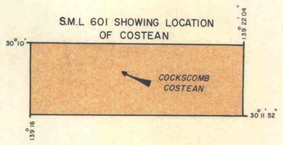
⊕ Percussion drill hole.
• Grid point.

Actual width of costean is 6-8 feet.
All measurements are taken with respect to the centre of the costean.
Strike of costean is 178°M.

MN

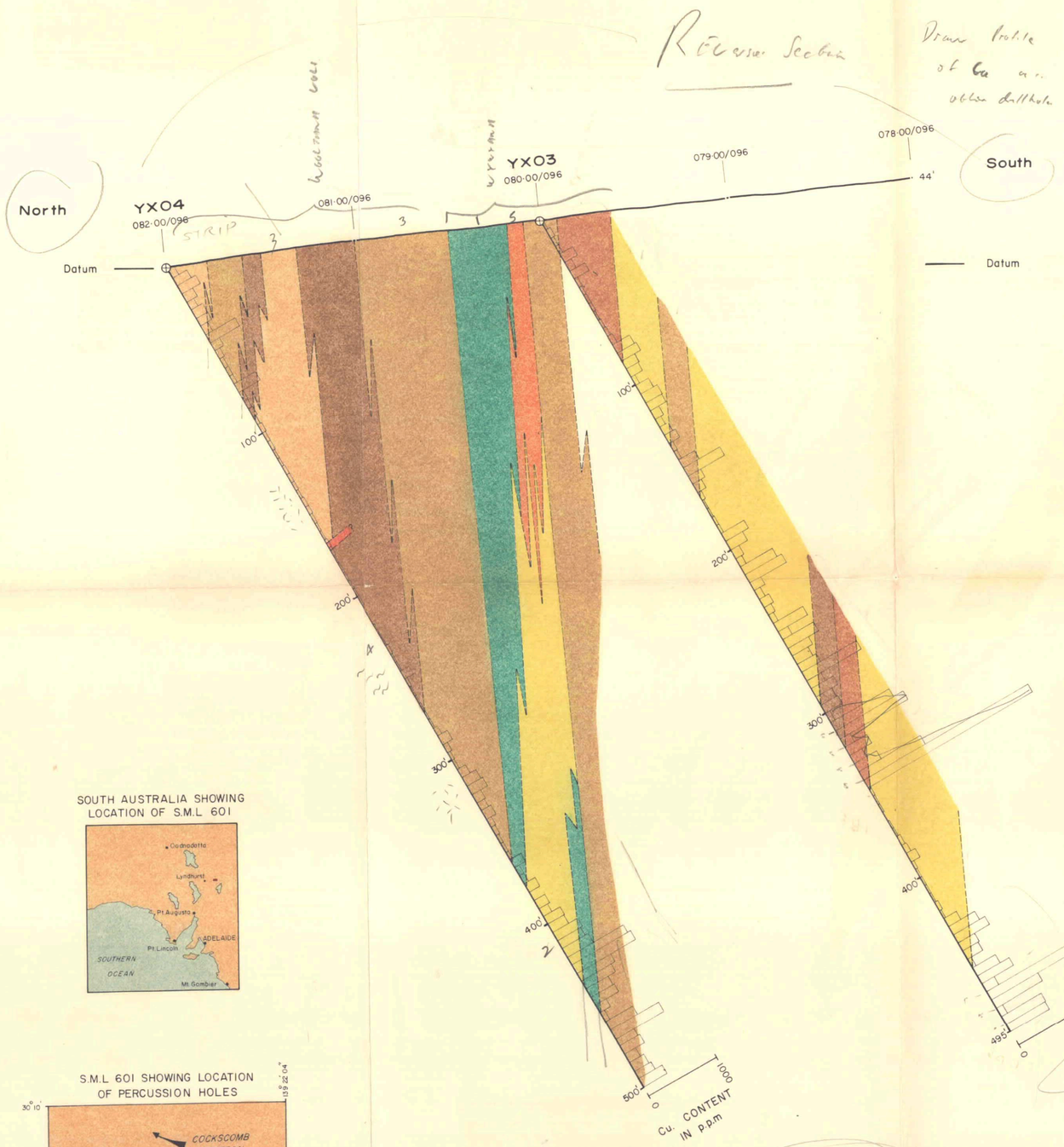
SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L 601

S.M.L 601 SHOWING LOCATION OF COSTEAN



Project Senior Geologist	N.J.Rowlands.
Mapped by	P.J.Edwards. A.J. Drummond.
Drawn by	A.J.Hitchcox.
Date	February 1972.
Office	Adelaide S.A.

ENV 1731 II-3



Reference

WYWYANA FORMATION (~~Lower Callana beds~~ Callanna Group)	3	SCHIST. Vague shistosity, green-grey amphibole grains, fine grained biotite. Often grades into hornfels. Pink felspar sometimes present (after argillaceous sediment?).
	4	SCAPOLITE SCHIST. As above but containing blebs of scapolite up to 5mm. in diameter. Often constitutes up to 30% of total volume of rock. ? Scapolitization due to Paleozoic contact thermal metamorphism.
	3	PYRITIFEROUS SCHIST. As for SCHIST but containing weak disseminated pyrite mineralization.
	3	HORNFELS. Medium grained grey siliceous hornfels (after arenaceous siltstone?) sometimes scapolitized. Quartz, amphibole, mica, garnet in fine grains.
	1	CALCITE – ACTINOLITE ASSEMBLAGE. Fibrous, bladed actinolite/tremolite and calcite, minor hematite, magnetite segregations. Calcite content
	2	PYRITIFEROUS CALC-SILICATE ASSEMBLAGE. As above but containing 3-4mm. grains of disseminated pyrite.
	5	JASPEROID. Craggy outcrops of limonite, hematite, chert, quartz and jasper. Replacement of iron-rich carbonate sediment by silica — ? hydrothermal or pedogenic (supergene).
Lower Paleozoic? (Younger granite suite)		QUARTZ VEIN, APLITE/PEGMATITE VEIN. Hydrothermally introduced.

23 Staple

Percussion holes drilled by Boring Enterprises, Hahndorf, S.A.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L 601

S.M.L 601 SHOWING LOCATION OF PERCUSSION HOLES

suggest For Cu

F.G 11

Project Senior Geologist	N.J.Rowlands.
Holes logged by	R.B.Kitch.
Correlation by	R.B.Kitch.
Drawn by	A.J.Hitchcox.
Date	March 1972.
Office	Adelaide S.A.

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

PERCUSSION DRILL HOLES YX03 & YX04
CORRELATION DIAGRAM
COCKSCOMB COSTEAN
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA

Scale 1:500

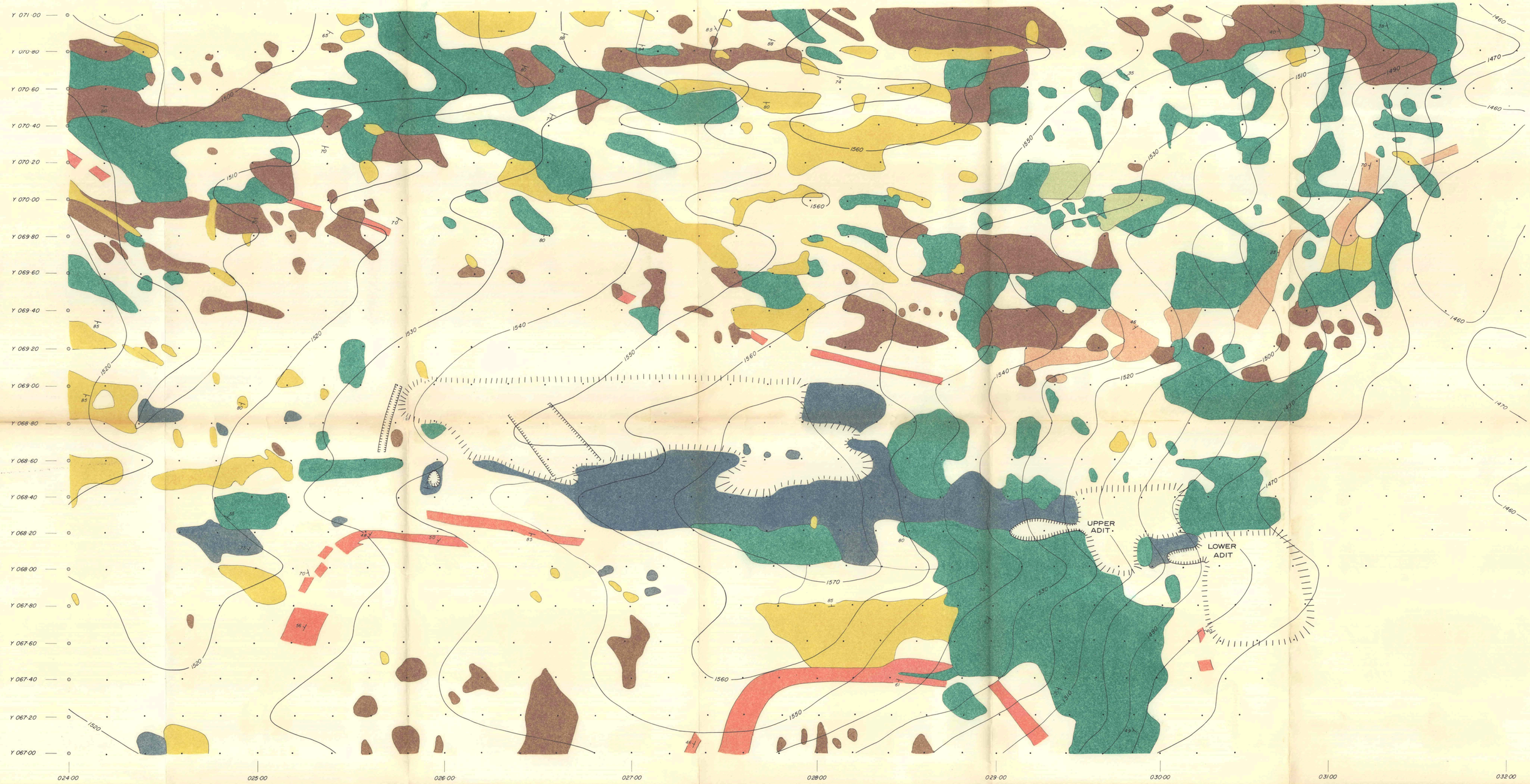
FEET 50 0 50 100 150 FEET
METRES 20 0 20 40 60 80 METRES

To accompany report for quarter ending 24 March 1972, to The Director of Mines, Dept. of Mines, S.Australia by Utah Development Company, 505 St. Kilda Rd., Melbourne.

N.J.Rowlands.
Adelaide.

ENC 1731 (II) – 4

Fig. 11



MN

QUAT- ? TERTIARY ERNARY

Scree deposits and calcretion.

Jasperoid.
Cryptocrystalline silica replacement of a carbonate – rich lithology. Malachite staining evident.

LOWER PROTEROZOIC (WILLOURAN)

LOWER CALLANA BEDS – WYWYANA FORMATION

Carbonate – poor amphibolite.
Massive, often silicified, sheaves of actinolite and tremolite.

Carbonate – rich amphibolite.
Actinolite and tremolite assemblage with both milky and pink calcite.

Actinolite marble.
Impure marble containing varying amounts of actinolite and tremolite.

Hornfels.
Scapolite developed in minor patches. In places porcelanitic or spilositic.
Megascopically different. Considered to reflect a facies change in the original unit.

Quartz – haematite – (magnetite).
Usually occurs in veins.

Excavation or adit.

Spoil heap.

Established baseline peg.

Established grid point.

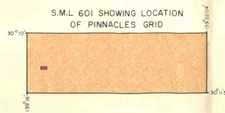
Dip and strike of bedding.

Strike of vertical bedding.

—1510— Topographic contour.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601

S.M.L 601 SHOWING LOCATION OF PINNACLES GRID



Project Senior Geologist	N.J. Rowlands.
Mapped by	P.J. Edwards., A.J. Drummond.
Drawn by	A.J. Hitchcox.
Date	February 1972.
Office	Adelaide S.A.

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

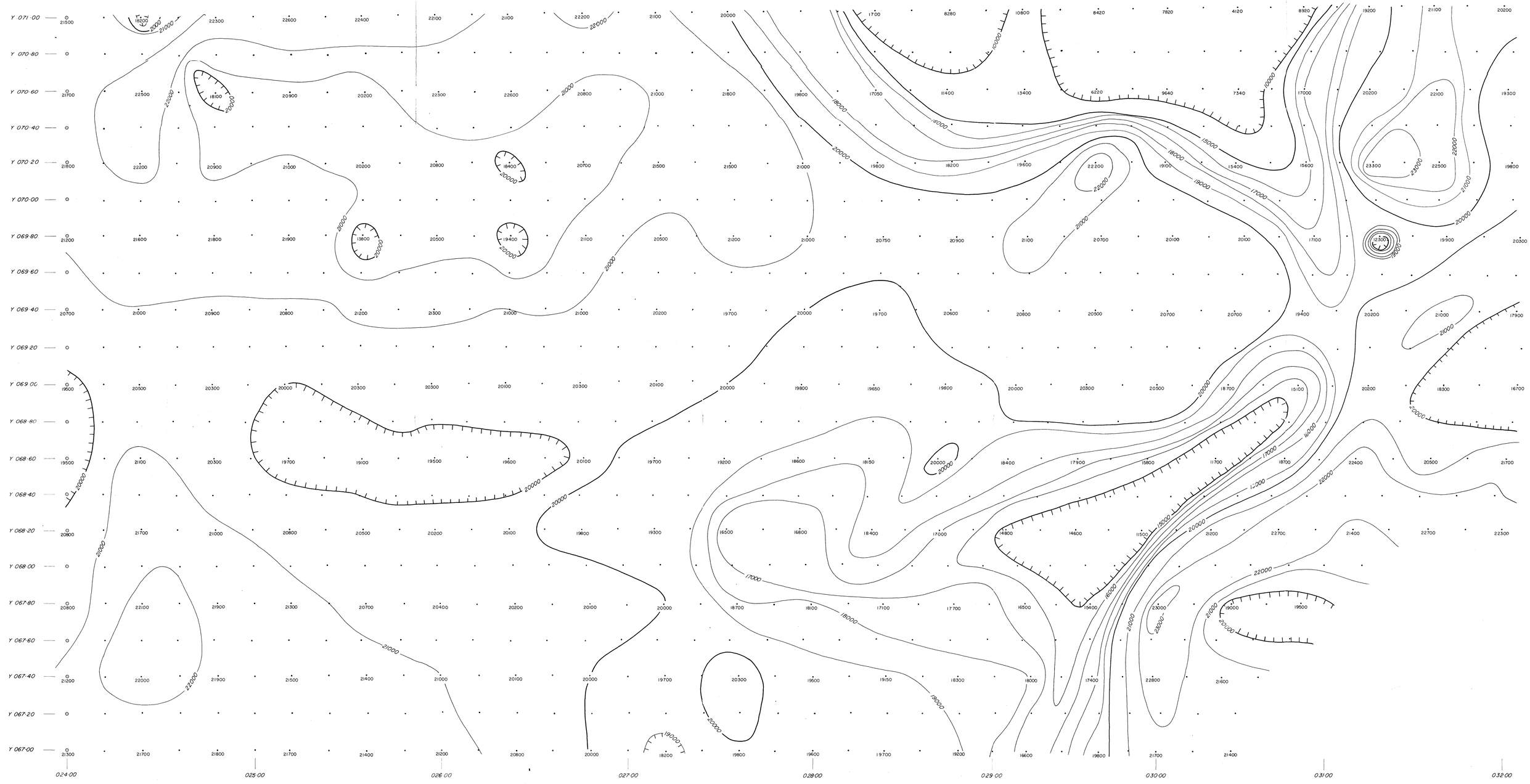
DETAILED GEOLOGY
PINNACLES GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA

Scale in feet
20 0 20 40 60 80 100

To accompany report for quarter ending 24 March 1972,
to The Director of Mines, Dept. of Mines, S.Australia by
Utah Development Company, 505 St. Kilda Rd., Melbourne.

N.J.Rowlands.
Adelaide.

ENV. 1731(II) – 5



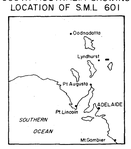
MN

Base Station
Instrument
— 15000 —

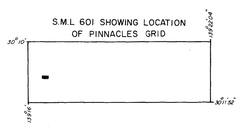
Y071·00 / 028·40
MacPhar M 700.
Contour in gammas.

Show Pinnacles Mine
From Fig 19
Figs 19 & 20 at
same scale

SOUTH AUSTRALIA SHOWING
LOCATION OF S.M.L. 601



S.M.L. 601 SHOWING LOCATION
OF PINNACLES GRID



Project Senior Geologist	N.J.Rowlands.
Surveyed by	P.J.Edwards. P.M.Gruythuysen.
Drawn by	A.J.Hitchcox.
Date	February 1972.
Office	Adelaide S.A.

60 mm

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

VERTICAL FIELD MAGNETIC INTENSITY

PINNACLES GRID

SPECIAL MINING LEASE NO. 601

YUDNAMUTANA — SOUTH AUSTRALIA

1:2400 Fig 17

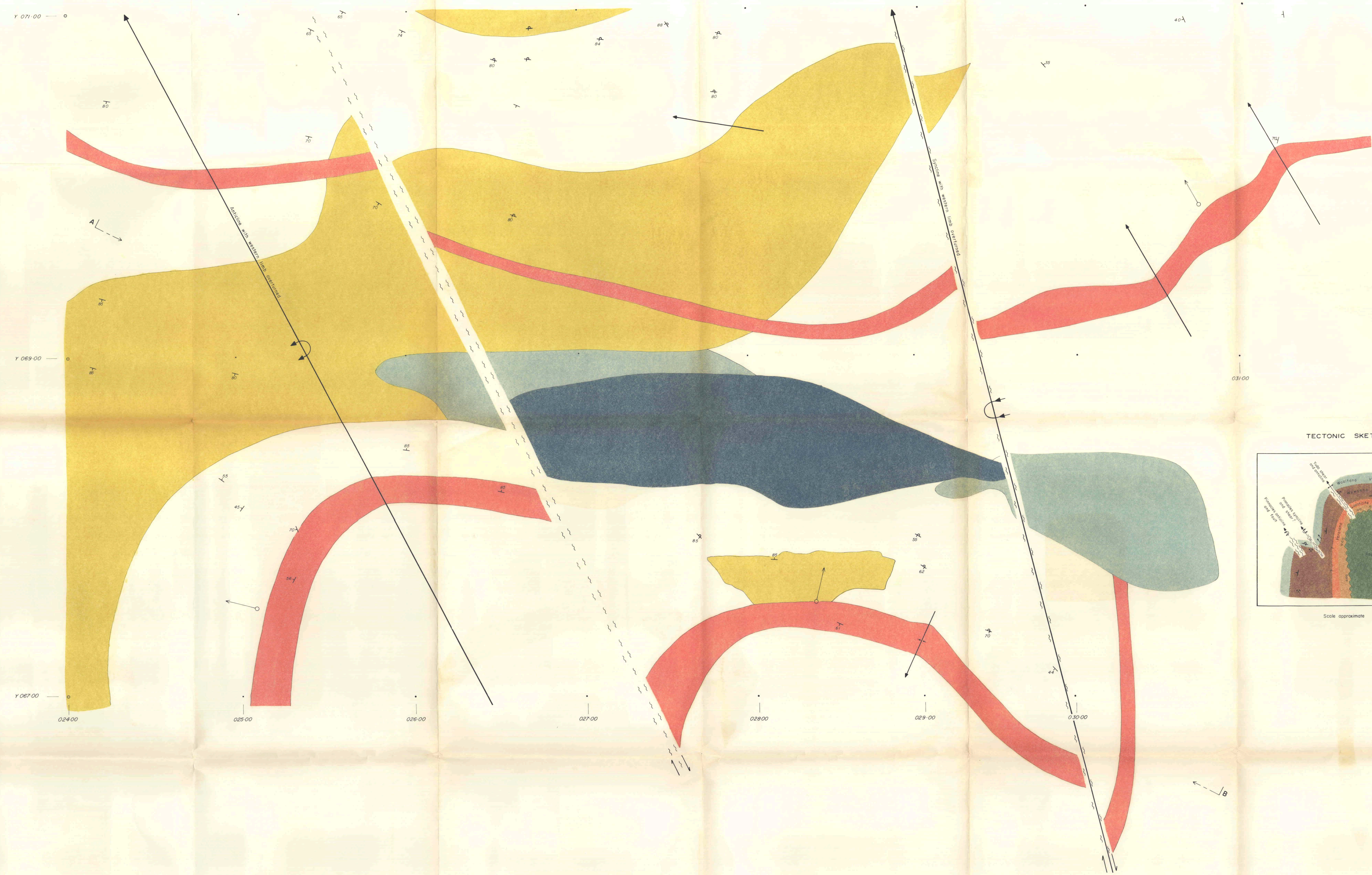
Scale in feet

20 0 20 40 60 80 100

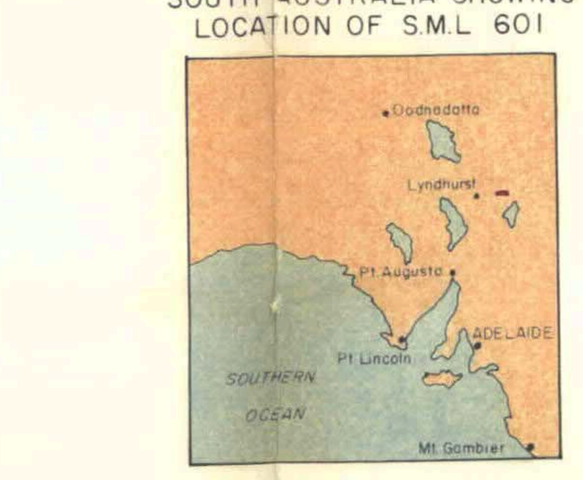
To accompany report for quarter ending 24 March 1972,
to The Director of Mines, Dept. of Mines, S.Australia by
Utah Development Company, 505 St. Kilda Rd., Melbourne.

N.J.Rowlands.
Adelaide.

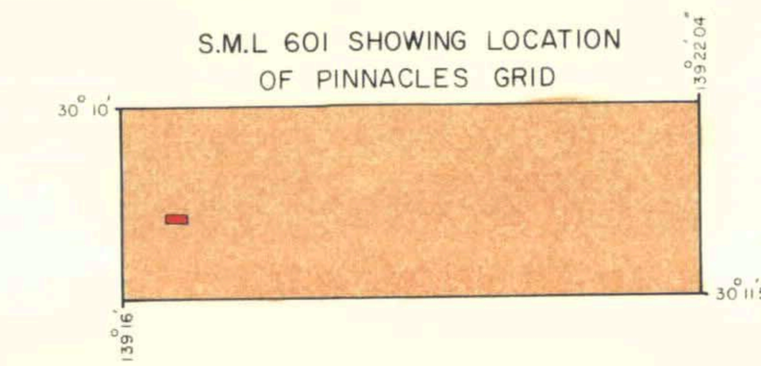
ENV 1731 (II) — 6



SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601



S.M.L. 601 SHOWING LOCATION OF PINNACLES GRID



Project Senior Geologist	N.J.Rowlands.
Mapped by	P.J.Edwards. A.J.Drummond.
Interpretation by	P.J.Edwards.
Drawn by	A.J.Hitchcox.
Date	February 1972.
Office	Adelaide S.A.

RECENT
- Mine dump, rubble and scree.

? TERTIARY
- Jasperoid.

LOWER CALLANA BEDS
- Amphibolite. Both carbonate rich and carbonate poor.
- Amphibolitic marble.
- Marble. Actinolitic marble.
- Hornfels.

- Anticline with overturned limb _ direction of plunge shown.
- Syncline with overturned limb _ direction of plunge shown.
- Dip and strike of bedding.
- Dip and strike of overturned bedding.
- Fault with shearing _ direction of faulting shown.
- Direction of plunge of mesoscopic fold.
- Facing (arrow indicates top of bed.)
- Geological boundary.
- Grid baseline orientation points.
- Grid orientation points.

TECTONIC SKETCH

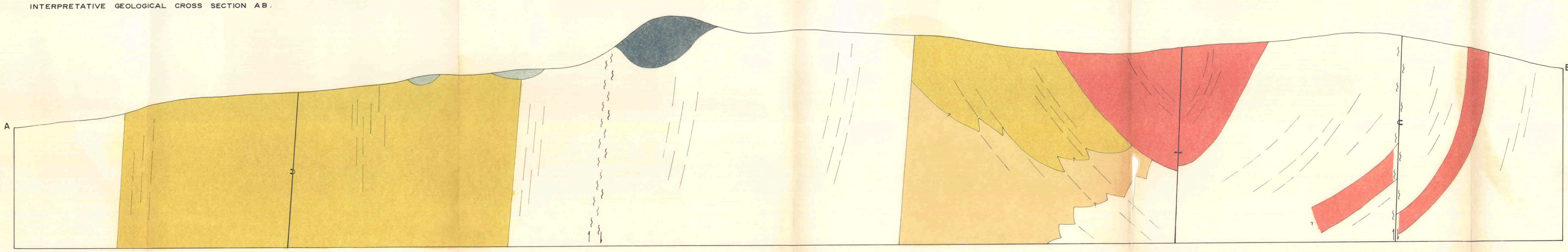
Scale approximate

MN

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

INTERPRETATIVE GEOLOGY
PINNACLES GRID
SPECIAL MINING LEASE 601
YUDNAMUTANA — SOUTH AUSTRALIA

INTERPRETATIVE GEOLOGICAL CROSS SECTION AB.



1371 (a)

Scale in feet

20 0 20 40 60 80 100

To accompany report for quarter ending 24 March 1972, to The Director of Mines, Dept. of Mines, S.Australia by Utah Development Company, 505 St. Kilda Rd., Melbourne.

N.J.Rowlands.
Adelaide.

055

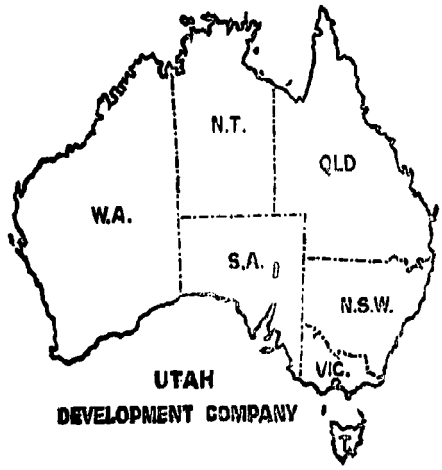
ANNUAL REPORT ON

EXPLORATION ACTIVITIES IN SML. 601,

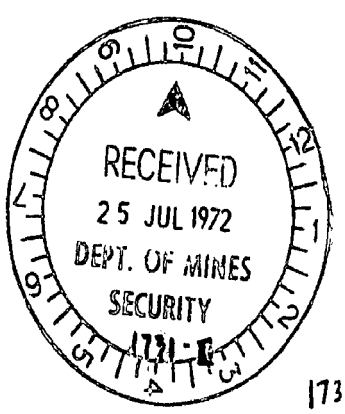
YUDNAMUTANA AREA, SOUTH AUSTRALIA.

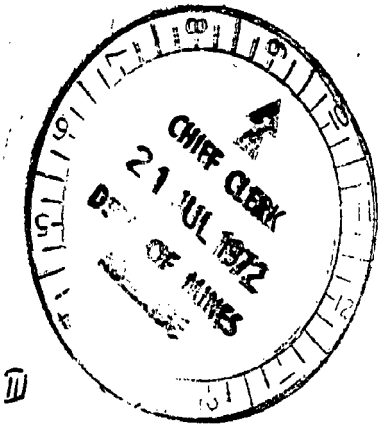
(period ending June 24, 1972)

Report No. 199. July, 1972.



by
R. B. Kitch,
Geologist.





1731 - III

ADELAIDE,
Australia.

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Report No. 199.

SUMMARY

Exploration activities in SML. 601 during the year have involved follow-up work on the anomalies indicated by the South Australian Mines Department. Almost the entire exploration effort has been spent in the Yerelina Valley.

This work has involved geochemical surveys and detailed grid and mine geological mapping with a vertical magnetic intensity survey being conducted in one area. A four hole rotary percussion programme was undertaken to evaluate an area of Wywyana formation - west of the Cockscomb Mine.

Processing of the geochemical assay data obtained from the geochemical survey has had a heavy statistically orientated computer-based bias.

Significant copper mineralisation has been detected around the Pinnacles Mine and between the Black Queen East and Cockscomb Mines within the Wywyana Formation, and possible significant copper mineralisation has been indicated in several other areas including the Upper Callana Bed sequence of sediments.

A 10, 000 ft. rotary percussion drilling programme is planned in the coming year to evaluate these indicated anomalies. This programme will only be implemented once the implications of the proposed Flinders Ranges Development Programme have been fully clarified.

A Progress Summary Map showing the status of the exploration programme is appended as Plate 1.

INTRODUCTION

This report reviews Utah Development Company's exploration programme for Special Mining Lease No. 601 for the twelve month period ending June 24, 1972. The report has been prepared in accordance with the Company's commitments to the South Australian Mines Department, and is submitted in place of the usual Quarterly Report.

SML. 601 expired on June 24, 1972, and Utah Development Company obtained renewed tenancy over the same area for a period of one year from June 24, 1972, under SML ~~709~~ 717

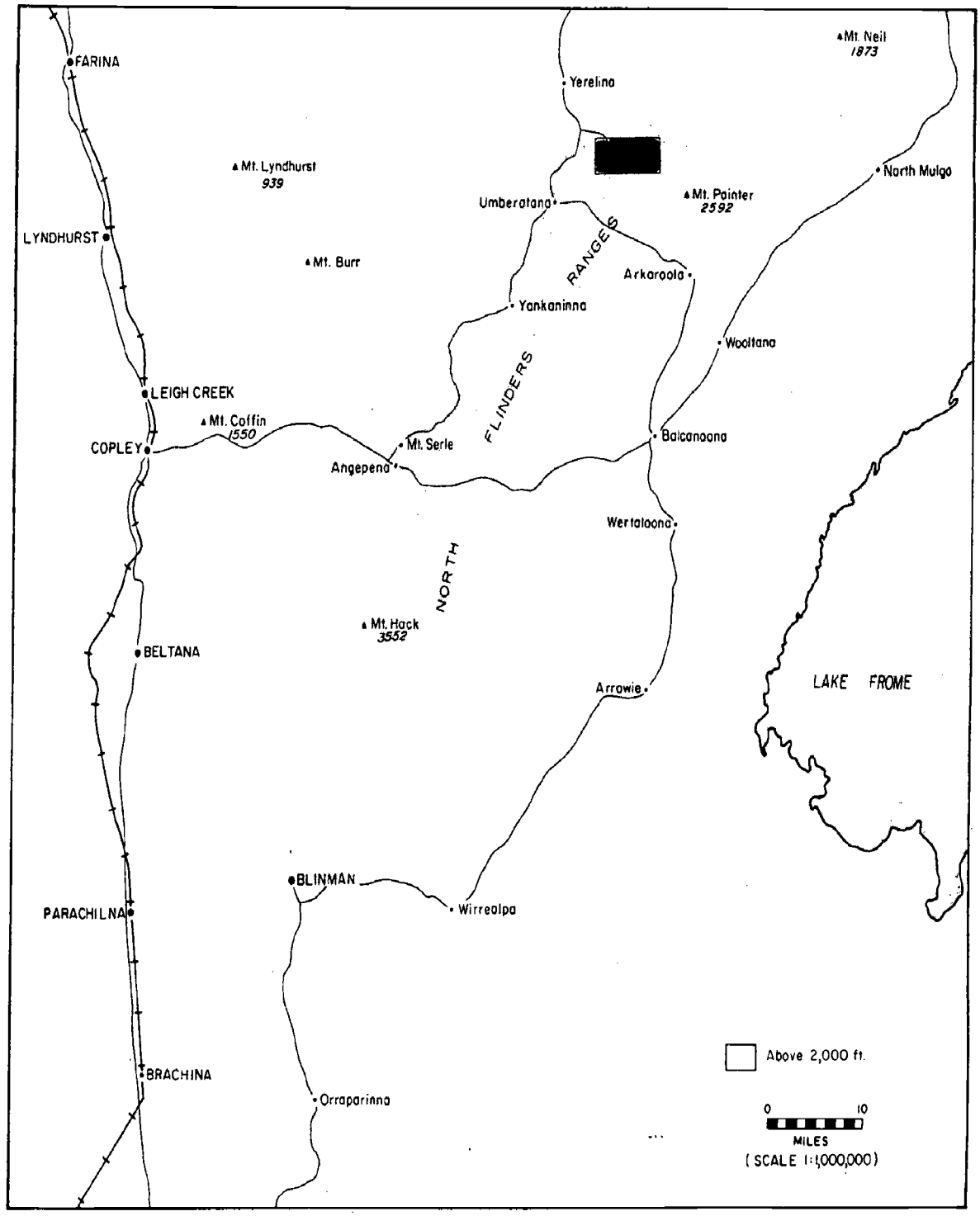
SML. 601 covers an area of 12 square miles in the Yudnamutana area of the Northern Flinders Ranges. The SML is defined as a rectangular area six miles long (north and south sides) by two miles wide (east and west sides) with Yudnamutana Hill at the south-western corner (see Figure I). The Yudnamutana district is 320 miles north of Adelaide and about 60 miles north-east of Copley (see Figure II). It forms part of the pastoral property of Mt. Freeling Station, and is situated on the north-western extremity of the Arkaroola Sanctuary. Access is by gravel road from Copley to the Mt. Serle turn-off, near Angepena, then via graded road to Mt. Serle, Yankaninna, and Umberatana, and finally by 11 miles of rough track to the Yudnamutana mine near Yerelina Creek. Access within the area is confined to a number of rough tracks (see Plate 3).

The Yudnamutana area is an old mining field from which small tonnages of secondary copper ores were won during the latter half of the last century.

Willouran sediments of the Adelaide Trough outcrop within the lease area. Utah has been evaluating the potential of some of these sediments for the occurrence of stratiform copper mineralisation.

Prior to Utah's tenancy over the area, the rectangular area was reserved from the operation of the Mining Act in September, 1966. Since that date, the Mines Department have undertaken extensive geological investigations in, particularly, the Yerelina Valley, which is situated in the northern segment of the SML.

The Mines Department exploration investigations are summarised by Mason (1970, unpublished report).



ACCESS PLAN

SPECIAL MINING LEASE NO. 601

YUDNAMUTANA – SOUTH AUSTRALIA

FIGURE II
Report No. 199
N.J. Rowlands
Adelaide
June 1972

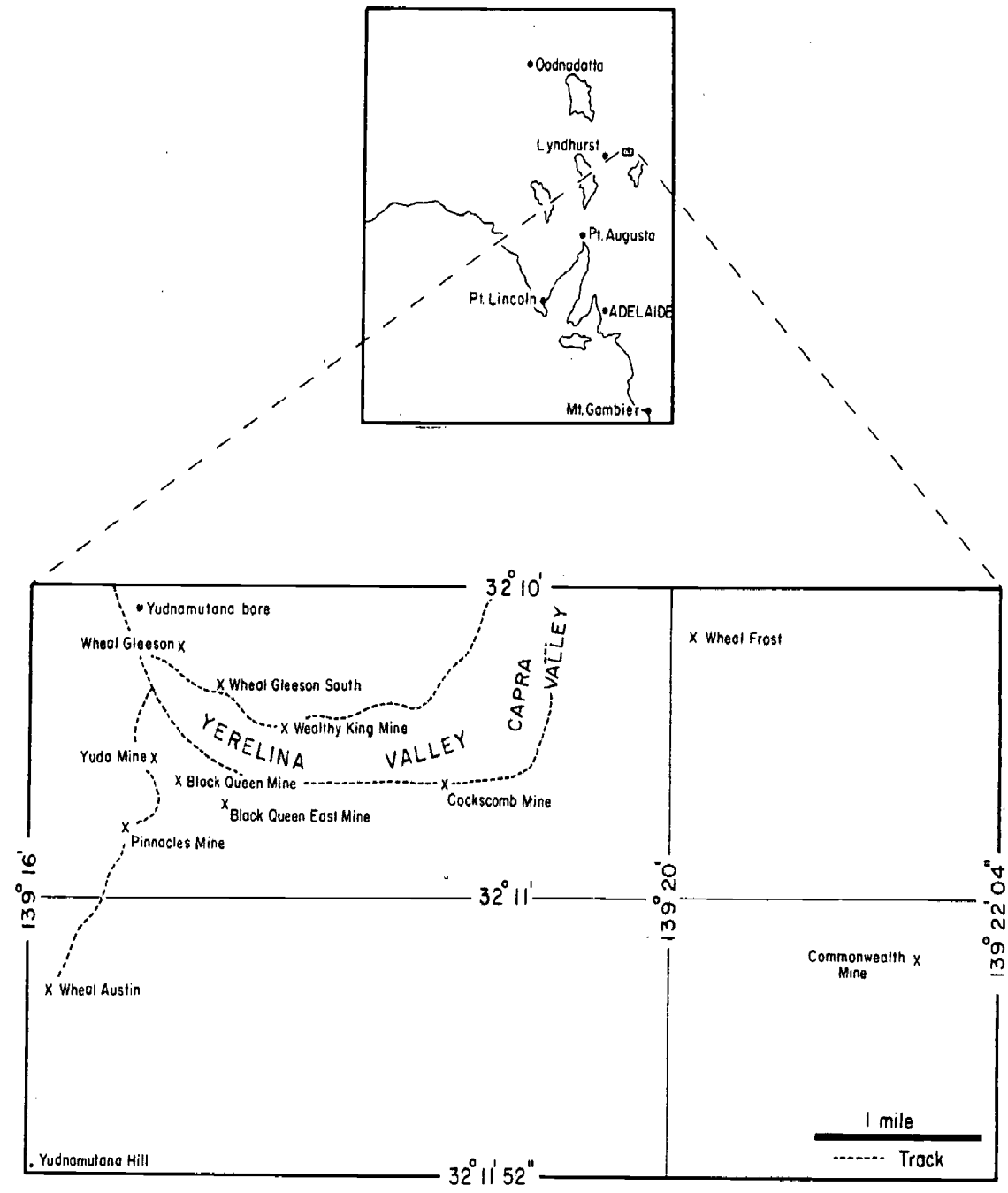
UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

064

LOCALITY PLAN

SPECIAL MINING LEASE NO. 601

YUDNAMUTANA – SOUTH AUSTRALIA



S.M.L 601 is an area of approximately 12 square miles and is situated approximately 60 miles east of Lyndhurst. Tenancy was first granted to U.D.C on 24·6·71 for a period of 1 year.

FIGURE 1
Report No. 199
N.J.Rowlands
Adelaide
June 1972

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

FIELD INVESTIGATIONS

GEOLOGICAL INVESTIGATIONS

Limited geological mapping has been conducted in certain areas within the Yerelina Valley. The geological map of the Yerelina Valley prepared by Mason (1970, Plan No. L.70-11, 1" = 400 ft.) has been regarded as a sufficient base from which to plan our current exploration activities. As such, there has been no further mapping of the entire Yerelina Valley; however, Plate 3 is a re-draft of the above map at a scale of 1 : 5000. This map also shows Utah extensions to the Mines Department geochemical sampling grid and percussion drill hole location.

The grid areas discussed below were surveyed and pegged using a theodolite, tape, and in some instances, a compass. In the field, steel or wooden pegs serve as permanent markers of important grid points.

The grid sample numbering system is a twelve digit system, which indicates the distance (in hundreds of feet) north and east of the south-western corner of the SML. The origin point for this grid is the trig. station on Yudnamutana Hill. Geological, geochemical and geophysical surveys have utilised the same grids, and the various sample suffixes denote the type of material sampled.

Yerelina Grid:

Location: This is an area extending about three miles eastwards and one mile southwards from the north-western corner of the SML. The area has a rugged topographic setting, particularly in the south-west and easternmost sectors, but is not quite as deeply dissected as the basement outcropping to the south. The basement displays ridge crest remnants of the Freeling (3,000 ft.) Surface, and the Yerelina Valley probably forms part of the Yudnamutana (2,000 ft.) surface of Blisset (Coats and Blissett, 1971, pp. 211). This latter area has been mapped geologically by Mason (1970). (See Plate 3).

Stratigraphic Setting: The stratigraphy of the Yerelina Valley is summarised in Table A. Two transgressive cycles of sedimentation may be recognised, being the Lower and Upper Callana Beds respectively.

First transgressive sedimentation cycle - Lower Callana Beds: The first cycle commences with the Shanahan Conglomerate Member which was locally deposited in depressions produced by minor dislocations of

TABLE A

CAINOZOIC	QUATERNARY	PLEISTOCENE RECENT	Alluvium of creek beds. Scree slopes. High level gravels (Telford Gravel equivalents?).
			unconformity
ADELAIDEAN	STURTIAN	UMBERATANA GROUP YUDNAMUTANA SUB-GROUP	TAPLEY HILL FORMATION. BOLLA BOLLANA FORMATION.
			unconformity
	TORRENSIAN	BURRA GROUP	WORTUPA QUARTZITE.
	WILLOURAN	UPPER CALLANA BEDS	OPAMINDA FORMATION. BLUE MINE CONGLOMERATE.
			unconformity
		LOWER CALLANA BEDS	WOOLTANA VOLCANICS. WYWYANA FORMATION. PARALANA QUARTZITE. Shanahan Conglomerate member.
			unconformity
CARPENTARIAN		MT. PAINTER COMPLEX	MT. NEILL GRANITE PORPHYRY ("Older Granite Suite") RADIUM CREEK METAMORPHICS: Freeling Heights Quartzite. Unnamed Member. Corrundum Creek Schist Member.

STRATIGRAPHY – YERELINA VALLEY
SOUTH AUSTRALIA

the basement. This was followed by the grey and pink, cross-bedded, heavy mineral banded, quartzites and siltstones with minor para-amphibolites of the Paralana Quartzite. Clastic sedimentation then passes into the actinolitic, quartzites, laminated quartzite granulites, massive dolomitic marble, actinolitic marble and the thin silicified magnetite-hematite bed, all of which constitutes the Wywyana Formation.

The Lower Callana transgressive sequence was interrupted by a phase of vulcanism; the Wooltana Volcanics. The boundary with the underlying Wywyana Formation is marked by the appearance of finer grained dark grey scapolite schist, probably produced by the dynamic and thermal metamorphism of predominantly argillaceous beds with interbedded minor trachytic lava flows. The volcanic rocks are no longer recognisable as such, except where they have retained their amygdoloidal texture, for example, near Y. 196. 00/152.

Second transgressive sedimentation cycle - Upper Callana Beds: Coats (1970) has shown that throughout the Mt. Painter Province the Lower Callana Beds are overlain unconformably by a sedimentary sequence below the Burra Group. This sequence is the second transgressive phase of sedimentation represented in the Yerelina Valley by the Blue Mine Conglomerate and the Opaminda Formation.

The Blue Mine Conglomerate is up to 100 ft. thick, lensing out eastwards at the Hugh Shear and changing in facies from conglomerate into finely laminated siltstone containing mudcracks. Ovoids of blue quartz within the conglomerate show that the Mt. Neill Porphyry was being eroded at this time.

The Opaminda Formation also extends as far as the Hugh Shear. This formation overlies the Blue Mine Conglomerate with a sharply defined contact and consists of well bedded grey siltstones with ripple marks, bands of dolomite, metamorphosed to scapolite-schists and amphibolite marbles. Deposition was also probably in small faulted basins.

Structural Setting: The rocks of the Yerelina Valley form the southern flank of the Yerelina Syncline, an east-west axially trending structure. The eastern end of the syncline has been fractured by a series of north-westerly striking, steeply dipping faults. Along the Yerelina Valley the rock units dip 70° to the north and strike easterly, but occasionally steep overturning to the south has been noted, for example, in costean and drill holes on line Y096. In the Capra Valley, the rocks pass into a northerly trend and dip westerly at 60°. West of the Yuda Fault, and on the western limb of the

Yudnamutana Anticline, the strike is north-easterly with a dip of 60° to the west. Monoformal flexures and overturning locally disrupt the regional structure around the Pinnacles Mine.

The Miller Fault, the Cockscomb, Hugh and Black Queen Shears, and the Yuda Fault form part of the same system as the Hamilton Fault. This rupture system is radial, with a focus near Mt. Saturday, five miles north of Yudnamutana Hill. The later development of the Yerelina Syncline during the lower Palaeozoic orogeny initiated a second phase of movement along these pre-existing lines of weakness.

A prominant fracture cleavage has developed parallel to the main fault system and in the more tightly folded structures. This is manifested by a predominent cleavage within the more competent beds and foliation planes within incompetent beds. A later cleavage, expressed as schistosity, is axial planar to the Yerelina Syncline, striking in an east-west direction.

There are two sets of quartz veins in the area. One set, prominent within the Wooltana Volcanics, strikes parallel to the schistosity, and is steeply dipping. These veins contain traces of iron oxide. The second type of quartz vein occurs within north striking fractures and contains silica, calcite, pyrite, chalcopyrite and specularite.

Jointing is well developed and may be divided into the following sets:

1. Striking 140°, nearly parallel to the major faults and dipping from 80°S to vertical.

2. Striking 360° and dipping 60-70°to the east.

3. Minor set striking 020-030 and vertically dipping.

4. Variable strikes and attitudes.

All types are nearly planar, spaced about 10 ft. apart. All are open and often coated with specularite and quartz. The joints appear to have formed during the late deformation stage of the Lower Ordovician orogeny.

Mineralisation: Four formations within the Willouran sequence are considered to hold potential for stratiform copper mineralisation.

These are the Wywyana Formation, Paralana Quartzite, Blue Mine Conglomerate and Opaminda Formation, in descending order of potential.

The limited areal extent and reduced stratigraphic thickness of the Upper Callana Beds detracts from their potential as being hosts to economic base metal mineralisation. However, the Wheal Gleeson group of workings and Wealthy King Mine are situated in these formations, and good geochemical response (see later) has been obtained from these theoretically favourable horizons.

The main target for Utah's current exploration programme is directed at the Wywyana Formation, and to a lesser extent the upper Paralana Quartzite.

All of the old mines were situated on small but high grade occurrences of secondary copper enrichments.

The 'fissure vein' type of Ridgeway (1948) was predominant in the mines in the Upper Callana Bed sequence, whilst 'Stockworks' type were common in the Wywyana Formation.

The most interesting type of ore occurrence, and the most probable to yield a viable mining operation, is felt to lie in the bedded occurrences of chalcopyrite with pyrite and magnetite in the dolomitic marbles and ferruginous jasperoid beds of the Wywyana Formation.

Further Work: The Yerelina Valley is regarded as being a highly prospective area. Detailed mapping, petrographics, percussion and diamond drilling with costeaning are scheduled for the coming year.

Pinnacles Grid:

This area was chosen for detailed follow-up work because of the presence of sulphides in outcrop and exposed in the underground workings the presence of a gossan with relict sulphide textures, a 'tight' structural position and being situated stratigraphically within the magnetite marbles of the Wywyana Formation.

Location: The Pinnacles Grid is centred over the jasperoid outcrop at the Pinnacles Mine, which is about 700 yards south of the Yuda Mine. The grid is pegged at 20 ft. centres, and is a rectangular area extending 800 ft. east-west and 400 ft. north-south, with the prominent jasperoid outcrop being centrally located in the grid. The eastern section of the grid extends over the large creek which drains from the basement to the south. The remainder of the grid area is situated on mildly dissected topography strewn with calcreted scree and rubble, probably correlatable as a remnant of the Yudnamutana Surface of Coats-Blissett (1971). The grid was mapped at a scale of 1 : 2400 (see Plates 7 and 8).

Stratigraphic Setting: The grid occurs within the dolomitic marbles and actinolitic marbles of the Wywyana Formation. The jasperoid outcrop may be correlated with the silicified magnetite-hematite horizon which prominently outcrops at the Cockscomb Mine and elsewhere in the Yerelina Valley. It forms a thin persistant marker throughout the Wywyana Formation in the Yerelina Valley. The jasperoid outcropping at the Pinnacles Mine differs, however, in that relict sulphides may be seen, and is hence better termed a 'gossan'. The implication is that the gossan may have a different genesis in the Pinnacles Grid than that in the remainder of the sequence.

Lithology: Seven lithologically distinct rock units were discerned in the grid mapping. These units are not to be regarded as having any stratigraphic connotations.

Magnetite-Amphibole-Marble - outcropping sporadically over the whole grid, but largely confined to the northern and western edges is an impure marble which contains varying amounts of actinolite and/or tremolite. The amphibole occurs in sheaves up to about 5 cm. Often this marble has been stained by limonite or has been silicified.

Amphibolite - confined largely to the northern and eastern edges of the grid, an amphibolite without obvious free carbonate outcrops. The bulk of the rock is composed of tightly packed, often silicified, assemblages of amphibole. These consist chiefly of actinolite and tremolite and maybe hornblende.

Calc-silicate rock - outcropping in close association with the carbonate-poor amphibolite, and particularly along the northern edge of the grid is a carbonate-rich amphibolite. It consists of an actinolite/tremolite assemblage throughout which is dispersed both milky and pink calcite. This calcite occurs in veins, veinlets, and as patchy blebs up to 8cm.

Scapolite hornfels and siliceous hornfels - outcropping in three well defined bands on the grid is a fine grained hornfelsic unit which in small areas can become procelanitic or spilositic. This unit was mapped in fine detail in the hope that it would provide a marker unit for delineation of structure. Two megascopically different hornfels units were noted. It is considered the differences reflect only a different chemical composition, which in turn reflects a local facies change of the original unit. Some of the hornfels has suffered scapolitisation and some display a maculose texture. However, these features are not common when the unit is considered in toto.

Jasperoid - a prominent craggy outcrop of jasperoid occurs on the top of the Pinnacles Hill. This same lithology is represented elsewhere on the grid by minor outcrops to the west of the main body. As a term, jasperoid has been applied in the classic sense to mean replacement of a host by cryptocrystalline silica. Around the Pinnacles Mine area the host has been a carbonate-rich lithology - perhaps a dolomite or marble.

Magnetite and Specularite Quartz veins - minor outcrop of a thin (up to 30 cm) quartz-hematite-magnetite assemblage which occurs in veins was found in the north-east of the grid area.

Calcrete, scree and mine rubble - large areas of the grid, particularly in the north, have been patchily calcreted. The calcrete is associated most closely with the amphibolite units and, therefore, is an obvious mapping unit.

Structure: The Pinnacles Grid is situated on the western flank of the Yudanumatana Anticline. Dips in the north and south of the grid are steeply westwards and accord with the regional view. The jasperoid/gossan and outcrop trends east-west and either dips steeply southward or occupies the axial region of an extremely tightly folded (isoclinal?) syncline.

Structural mapping tends to suggest a fairly simple explanation and that the deformation occurred in only one period.

Broadly, the grid is dominated by a steeply plunging monoformal structure with the east-west limb being steeply overturned to the south, but with both extremities being quite normal and dipping off the basement to the east. Parasitic cross folds occur perpendicular to the major axis, but both fold forms were probably generated almost concommitantly under the same stress field. Shearing, flowage and disharmonic folding ('diapiric habit' of Mason), characterise the Wywyana Formation in the grid area, as during the essentially parallel folding style of the underlying competent basement and Paralana Quartzite, and overlying volcanics, rudites and arenites, the Wywyama Formation acted as a decollement surface, which was initiated by a change in the rheology of the sediments.

An analysis of stress orientation in the grid area agrees with the regional stress distribution.

The folding episode was probably the Delamarian Orogeny which was responsible for the formation of the Yerelina Syncline and the Yudnamutana Anticline.

Mineralisation: The most spectacular and obvious mineralisation on the grid is the development of malachite staining along the northern face of the jasperoid crag. Cuprite and malachite also fill cavities and are present on some fracture planes. Close examination of the dump around the jasperoid and the upper and lower adits reveals a pyrite and chalcopyrite in irregular bands or patchy concentrations. Specularite (Hm) was particularly abundant in quartz veins and within silicified amphibolites. Quartz and calcite bands were noted as infrequent associates of every lithology over the whole grid. Pyrite and chalcopyrite were/are frequent associates of the actinolite marbles.

Extremely minor bornite disseminations were infrequently noted throughout the workings, around the portal and within the main drive of the mine.

Appendix IV compares the mineralogy of the Pinnacles Gossan with the jasperoid at the Cockscomb Mine.

Petrographics: Four slides of the hornfels have been examined but will be discussed under 'Petrographics - Pinnacles Mine Lower Adit'.

Future Work: Several percussion holes, and perhaps a diamond drill hole, are planned for this grid area. A similar grid will possibly be surveyed over the Wheal Austin Mine, some 700 yards further south. Hopefully, this work should add clarity to the detailed stratigraphy on the hanging- and foot-walls of the jasperoid bed, as in this latter location the structure is not as complex as in the Pinnacles Grid.

Pinnacles Mine Lower Adit:

The lower adit, at creek level, of the Pinnacles Mine, was mapped at a scale of 1 : 60, in conjunction with the mapping of the Pinnacles Grid. The plan is presented as Plate 10, accompanying this report.

Location: The portal of the adit is at Y068.00/030.20 and has been driven westward under the hill for a distance of 165 ft. At 130 ft. west from the portal a cross-cut extends 20 ft. north and about 40 ft. south. Also, at this depth from the portal a winze has been sunk to 17 ft. Immediately east of the winze an inclined rise connects the upper adit about 40 ft. higher. The surface projection at the working in relationship to the Pinnacles Grid is plotted on Plate 3.

Stratigraphic Setting: This is within the Wywyana Formation and the drive is probably in the bed whose surface expression is the jasperoid/gossan outcrop boldly outcropping some 50 ft. above it.

Lithology: The units recognised were the same as those described from the mapping of the Pinnacles Grid.

The jasperoid rock appears to change at a depth of a few tens of feet to pyritic actinolitic marble carrying quartz, magnetite, hematite and chalcopyrite. If the section of actinolitic marble present in the western end of the drive and cross-cuts has a surface correlative, then it must be correlated with the area of marble centred around Y067.60/028.20. This implies a steep northerly dip, which has indeed been recorded in the field. Paradoxically the surface projection of the lower adit is south of the jasperoid outcrop, suggesting a steep southerly dip of the bed, if the previous assumption concerning correlation is correct.

Petrographics: Several sections of magnetite and actinolitic marbles and hornfels have been examined under the polarising microscope, and six slides of calc-silicates have been examined using reflected light techniques, to determine the economic mineral species and their mode of occurrence.

The descriptions of this study are presented as Appendices IV and V.

The thin section studies indicate that the regional metamorphic grade is greenschist facies, but may extend into the amphibolite-hornfels field. Contact metamorphic minerals have not been observed in any of the sections which probably negates Mason's (1970) suggestion that the emplacement of a cupola below the Pinnacles Mine contributed to the mineralisation. It is unlikely that the mineralisation is of a skarn type.

The introduction metasomatically of several elements is, however, indicated.

Cockscomb Costean:

This costean was cut to aid correlation between percussion holes YX03 and YX04 discussed under 'Drilling'. The costean was mapped at a scale of 1 : 120 (Plate 12). Subsurface correlations are shown in Plate 6 at a scale of 1 : 500.

Location: The Cockscomb Costean is situated south of Yerelina Creek approximately midway between the Black Queen East and Cockscomb Mine. The trench extends 200 ft. south from Y082.00/096, and is situated about 300 ft. west of the Hugh Shear.

Stratigraphic Setting: The costean exposed the silicified, magnetite rich bed, which in this particular section of the Wywyana Formation indicates its

stratigraphically higher levels. The scapolitised schist exposed in the northern end of the trench may be representative of the lower Wooltana Volcanics.

Lithology:

Scapolite schist - the degree of scapolitisation varies from a couple of percent up to about 40% of the total rock volume.

Amphibolite - aggregates of actinolite/tremolite with 5% scapolite.

Jasperoid - on the surface this is characterised by silicified magnetite and hematite. In the bottom of the trench this unit contains mainly specular hematite which is limonitised in the trench walls.

Hornfels - heavily scapolitised, very fine grained, finely laminated and fractured hornfels.

Structure: The northernmost 150 ft. of costean shows normal steep dips to the north; however, at 160 ft. a dip of 65°S was recorded indicating overturning of bedding. This is also suggested by the drill hole correlation evidence (see Plate 6). The southern end of the trench shows vertical bedding at 205 ft. Four mesoscopic folds with a wavelength of 3-4cm were recorded at 135 ft. with their axes plunging 45° to 280°.

Wheal Gleeson Costean:

Location: The southern end of the costean commences up the hill overlooking the junction of Gleeson Creek with Yerelina Creek. The trench terminates 330 ft. north over the hill crest near the Wheal Gleeson Mine. The approximate grid co-ordinates of the extremities of the trench are Y098.00/050 to Y101.00/050. Plate 11 is a plan at a scale of 1 : 120 of the costean.

Stratigraphic Setting: The costean commences in Wooltana Volcanics, then intersects the entire Upper Callana Bed sequence, the thin Wortupa Quartzite horizon, and terminates in the Sturtian Tillites of the Bolla Bollana Formation.

Wooltana Volcanics - these extend from 255 ft. to 300 ft. and are grey, fine grained scapolite schist. A 3 ft. thick bed of dolomitic schist was noted at 260 ft.

Blue Mine Conglomerate - this was the thickest formation intersected

and extended from 125 ft. to 255 ft. The predominant lithology was a dark grey argillite with thin interbeds of scapolite schist and laminated grey siltstone.

Opaminda Formation - Scapolite schist, with possible ripple marks represents this formation from 65 ft. to 125 ft. A thin bed of talcose magnesian dolomite is taken as the arbitrary base of this formation in the costean.

Wortupa Quartzite - a thin bed of laminated, light grey siltstone from 60 ft. to 65 ft. is taken as representing the Wortupa Quartzite. This indicates a facies change in the quartzite or the bed may be part of the Opaminda Formation, indicating lensing or non deposition of Burra Group sediments in this section of the Yerelina Valley.

Bolla Bollana Formation - the remainder of the northern end of the trench is in the Sturtian tillite. This is represented from 0 ft. to 60 ft. by varvoid scapolite schist, often silicified and with scapolite content variable but in a general sense increasing southwards.

Structure: Due to the poor outc rop and deep weathering, only one attitude of bedding was noted. This was on the Wortupa Quartzite siltstone bed, and indicated steeply overturned bedding dipping southwards.

Mineralisation: The only mineralisation observed in the trench was at 130 ft. in the uppermost horizon of the Blue Mine Conglomerate. It was secondary mineralisation manifested in the form of cuprite and malachite stainings. No primary mineralisation or pseudomorphs after sulphides were observed.

Reconnaissance Traverse - Mt. Neill Granite Porphyry:

Location: A couple of traverses across the Mt. Neill Granite Porphyry were undertaken south of the Cockscomb Costean and the Cockscomb Mine. Approximate co-ordinations for these traverses would be along lines Y096 and 136.

Stratigraphic Setting: The porphyry is a massive granite and granodiorite of the 'Older Granite Suite' (Carpentarian). Concordant to low-angle discordant structural contact relationships exist between the Radium Creek Metamorphics and the Porphyry, showing that the hosting sedimentary sequence was essentially unfolded prior to emplacement of the Older Granites. Its shape suggests emplacement in the form of a laccolith or lense, which has been later folded

to conform with the trends of the Adelaidean sediments in the nose of the Yerelina Syncline.

Lithology: Thin section work describes the porphyry as alkalic to calcic, acid to intermediate porphyry (granite-adamellite-monzonite porphyry), often showing hydrothermal alteration; pyroclastics; arenaceous to argillaceous metasediments and probably para-amphibolites. The entire rock mass is strongly stressed and sheared.

Petrographics: The eleven rock samples examined under transmitted light are described and appended to this report in Appendix III.

This work has demonstrated that the Mt. Neill Granite Porphyry is unlikely to be an intrusive body, but may be more akin to a thick pile of acid extrusives with associated pyroclastics and interbeds of clastic sediments which have undergone later hydrothermal alteration. The stressing of the mass probably occurred during the folding of the basement and the sedimentary cover during the early Palaeozoic. The hydrothermal alteration may have occurred when the 'Younger Granite Suite' was intruded.

Future Work: No future work is planned on the Mt. Neill Granite Porphyry in SML. 601.

Reconnaissance Traverses - 'Undifferentiated Breccias':

Location: An outcrop of 'undifferentiated breccia' is shown on Plate 2 near the southern-central portion of the SML.

Stratigraphic Setting: The breccia occurs at the contact of the Mt. Neill Granite Porphyry and the Freeling Heights Quartzite.

Lithology: The breccia consists of granite debris within a silica cement. Minor chlorite and hematite occurs in the matrix material also.

Distribution and Structure: The breccia occurs as a linear elongated mass which was traced continuously for about half a mile to the approximate position where it passes beyond the SML. The breccia outcrops mainly in the floor of the deep valley, but does also extend up the walls of the valley almost to the top of the ridge. It appears to have a 'draped' relationship with the present topography, suggesting that it is a tertiary valley-fill deposit related to the regolith of a prior erosion cycle.

Future Work: No further action is warranted in this area.

GEOCHEMICAL SURVEYS

Yerelina Valley:

Grid Sampling (soil and rock): The -80 mesh fraction was assayed for soil samples collected from the Yerelina Valley Grid; rock chip samples were also reduced to a -80 mesh fraction. All the samples were assayed by routine A.A.S. techniques.

Geochemical Data Processing: Interpretation parameters for the geochemical data from the Yerelina Valley was quantified using computer plotted cumulative frequency distribution diagrams. Due to limitations in the number of data bits the input facility of the computer could accept, the soil assay data was split at line Y050. There are thus two cumulative frequency distribution diagrams for the assay data of a particular element in soil; one diagram refers to all data west of, and inclusive of, line Y050, and the second diagram to all data east of line Y050.

The distribution diagrams are presented as Diagrams I - XV in this report.

The results of this interpretative study are summarised in Tables B and C. (Table B is for rock chip samples, and Table C is for both series of soil samples).

Plates 4 and 5 are the computer contoured assay data plans for soil and rock chip assay (respectively), obtained from the Yerelina Valley Grid.

Pinnacles Mine Lower Adit:

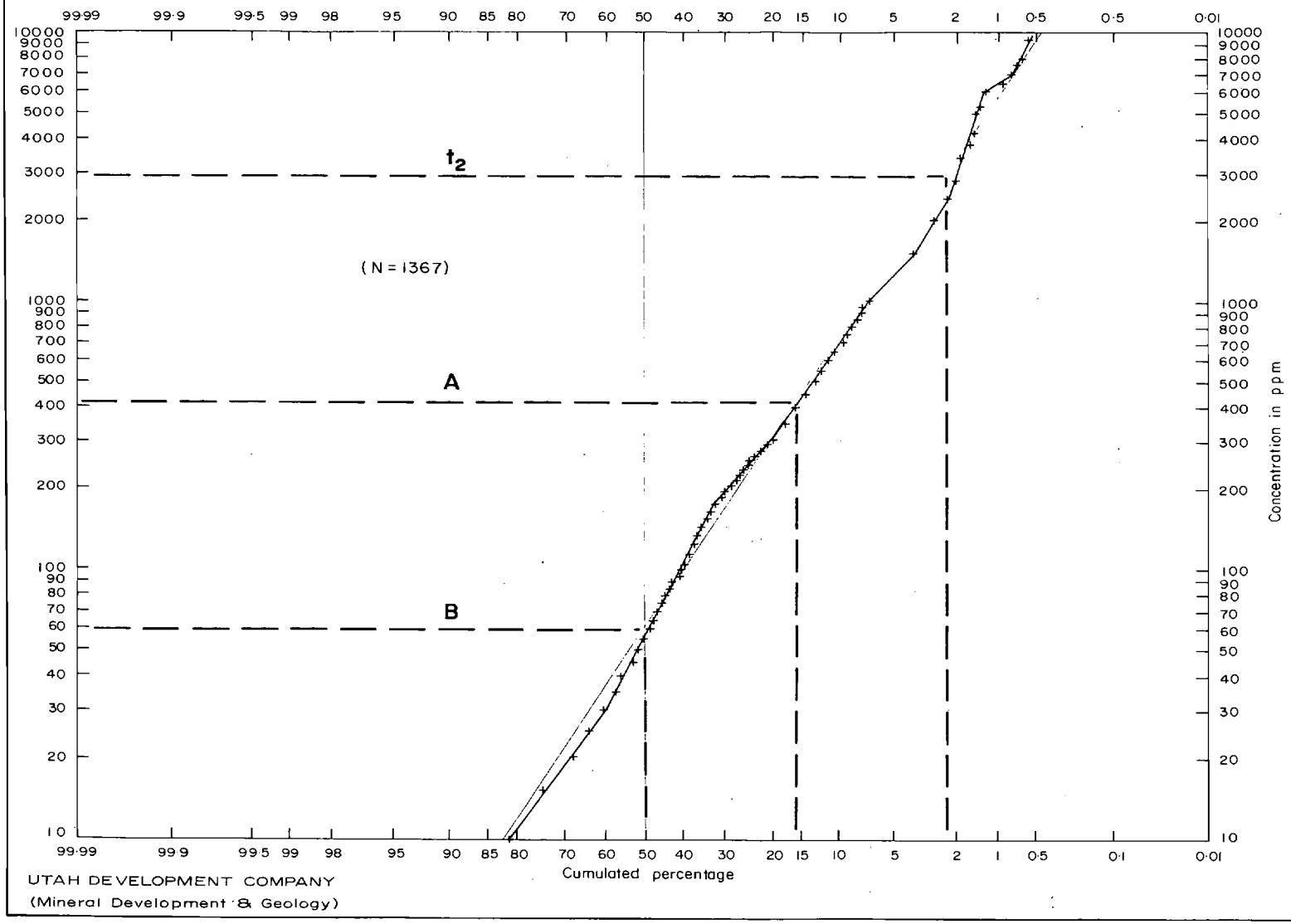
Eighteen channel chip samples were collected from the lower adit. The location and assays of these are plotted on Plate 10. Good assays appear to be confined to the actinolitic marble member of the Wywyana Formation.

GEOPHYSICAL SURVEYS

Pinnacles Grid:

A vertical field magnetic intensity survey was conducted over the Pinnacles Grid using a McPhar M700 instrument.

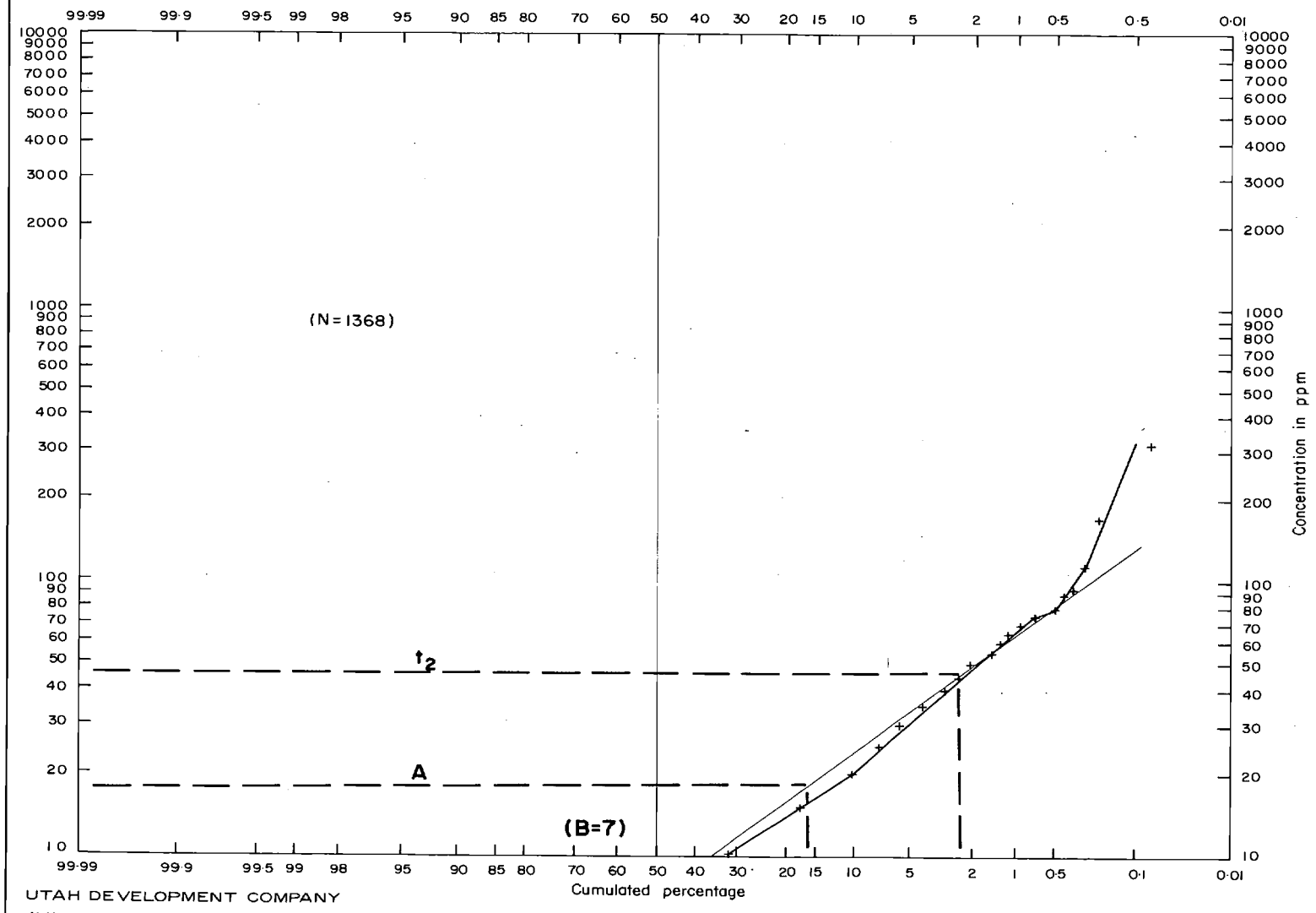
A contoured plan of the values obtained is presented as Plate 9 at a scale of 1 : 240.



UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

CUMULATIVE FREQUENCY
LOG PROBABILITY PLOT
COPPER (Rock chip data)
YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

Diagram I
Report No. 199
N. J. Rowlands
Adelaide
June 1972



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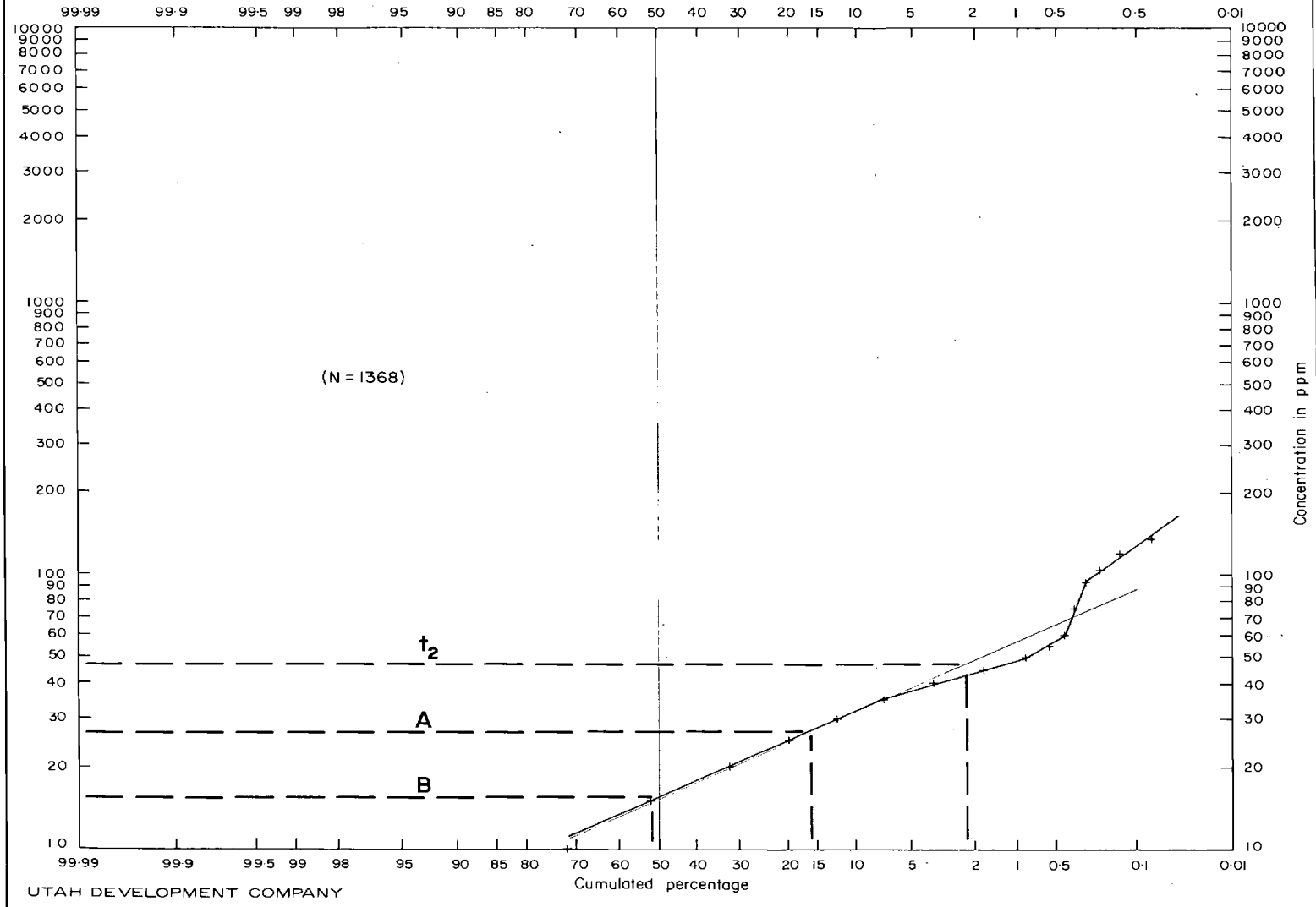
CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

ZINC (Rock chip data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

Diagram II
Report No. 199
N. J. Rowlands
Adelaide
June 1972

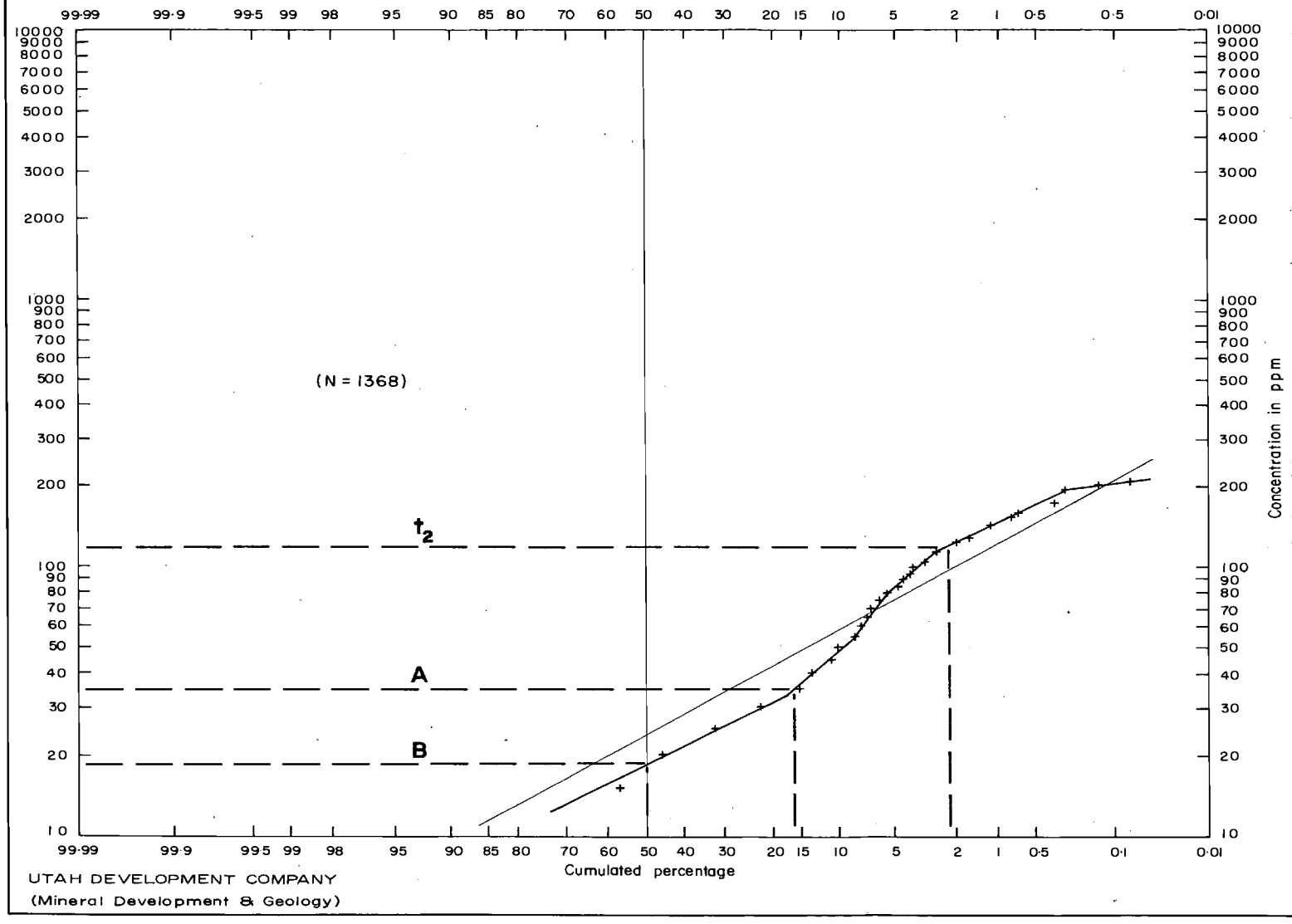
080



UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

CUMULATIVE FREQUENCY
LOG PROBABILITY PLOT
LEAD (Rock chip data)
YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

Diagram III
Report No. 199
N. J. Rowlands
Adelaide
June 1972



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(Mineral Development & Geology)

CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

NICKEL (Rock chip data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

Diagram IV
Report No. 199
N. J. Rowlands
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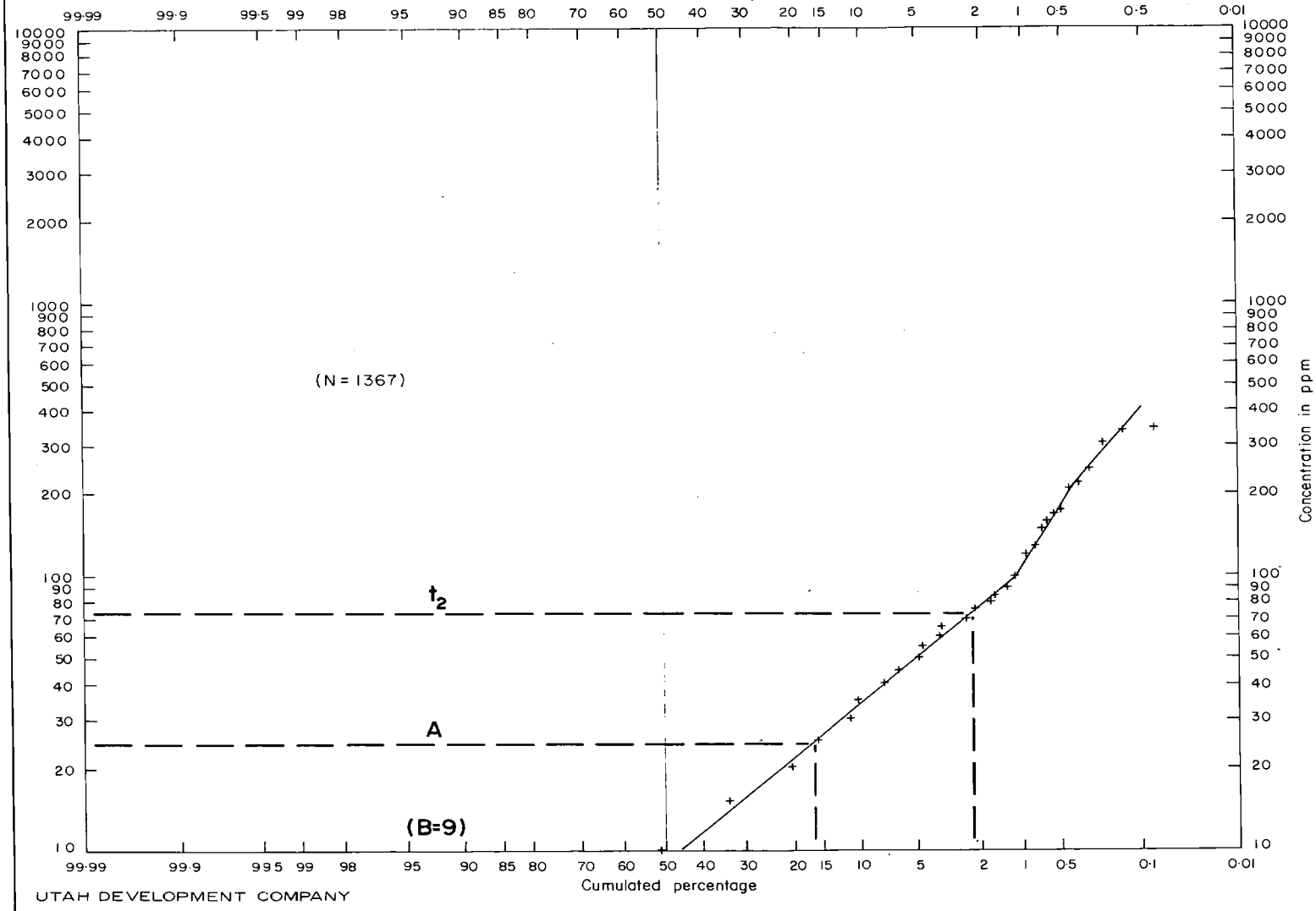

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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

COBALT (Rock chip data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

Diagram V
Report No. 199
N. J. Rawlands
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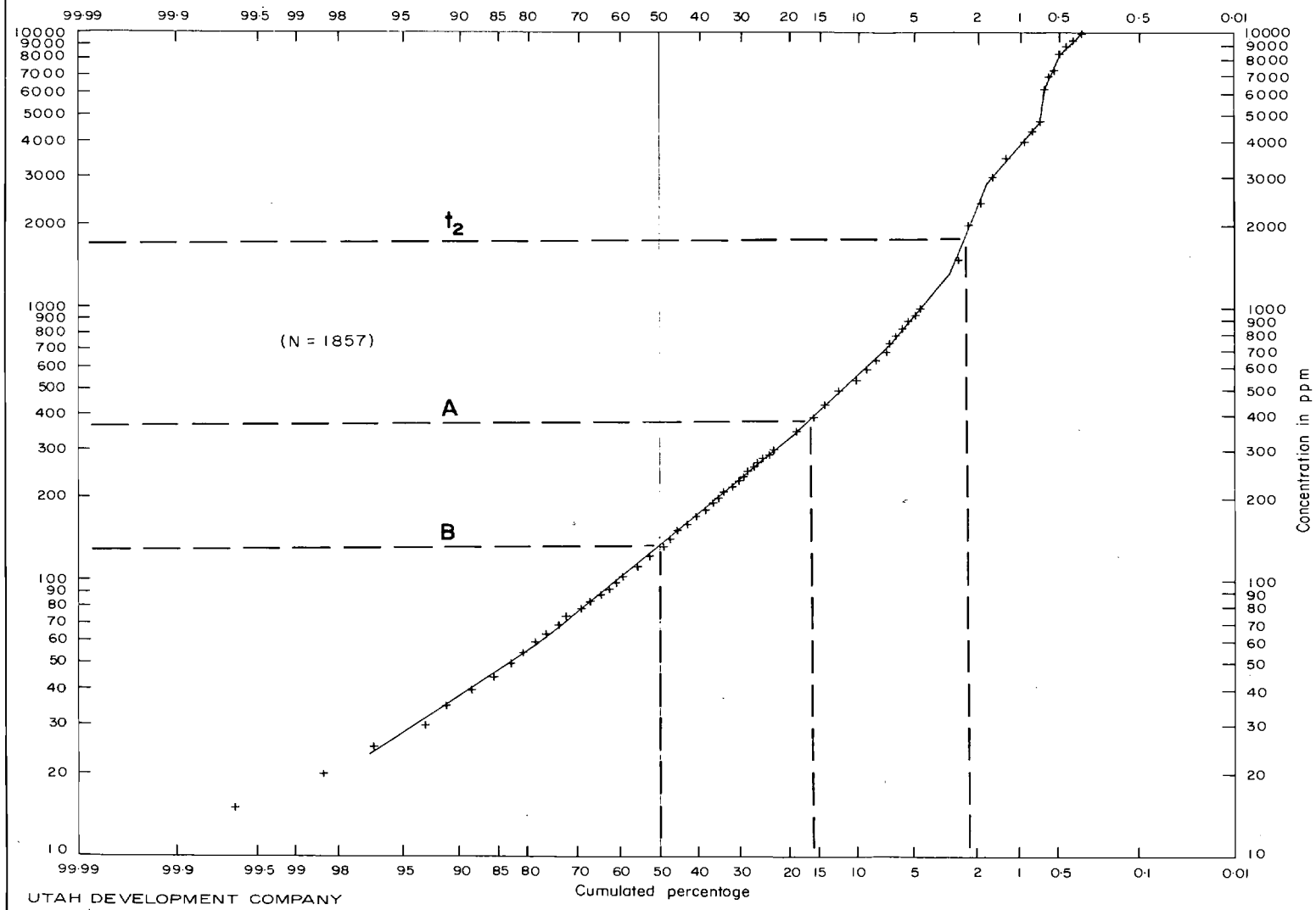


UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

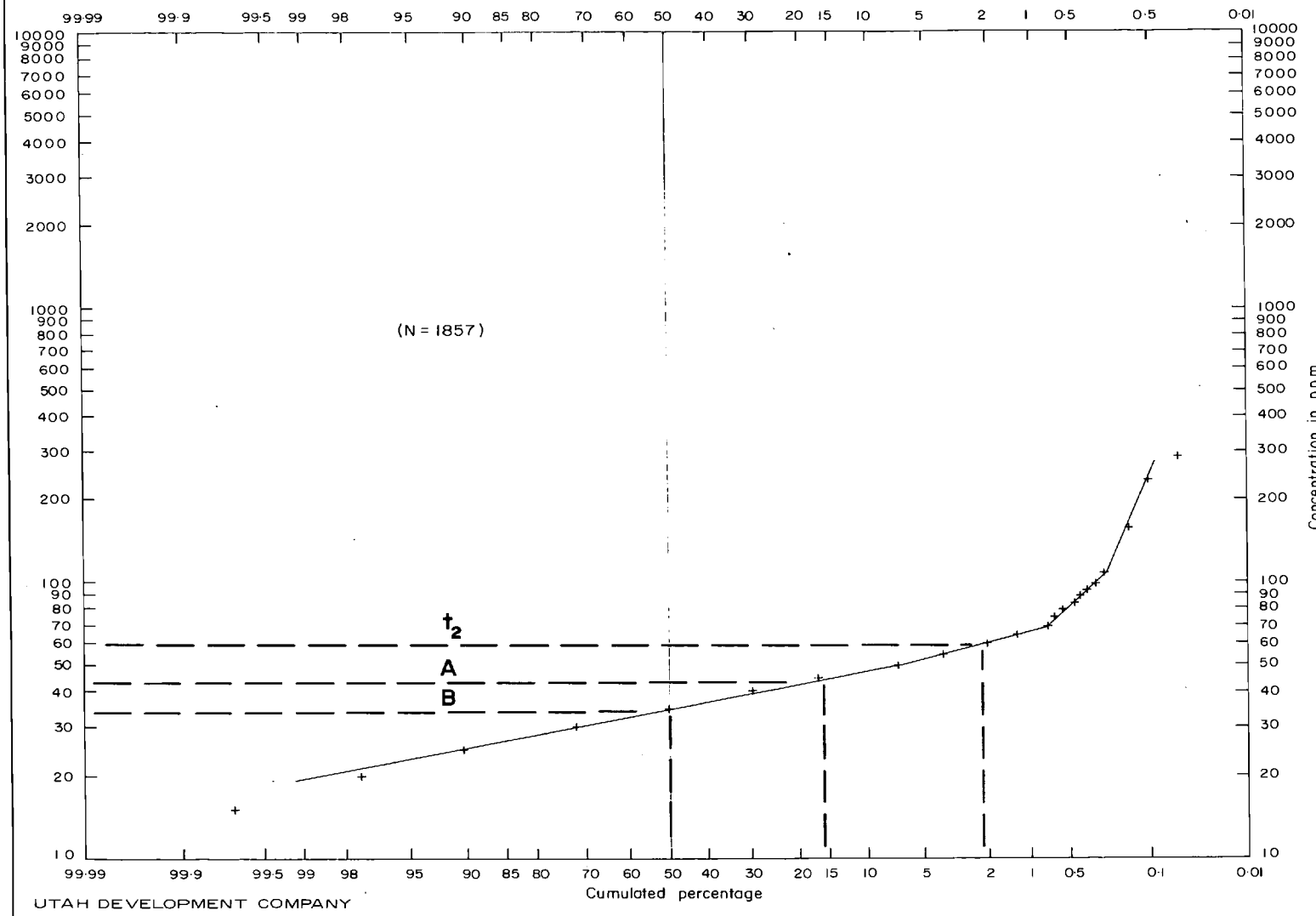
CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

COPPER (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 000 – 050)

Diagrom VI
Report No. 199
N. J. Rowlands
Adeloide
June 1972



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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

ZINC (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 000 – 050)

Diagram VII
Report No. 199
N. J. Rowlands
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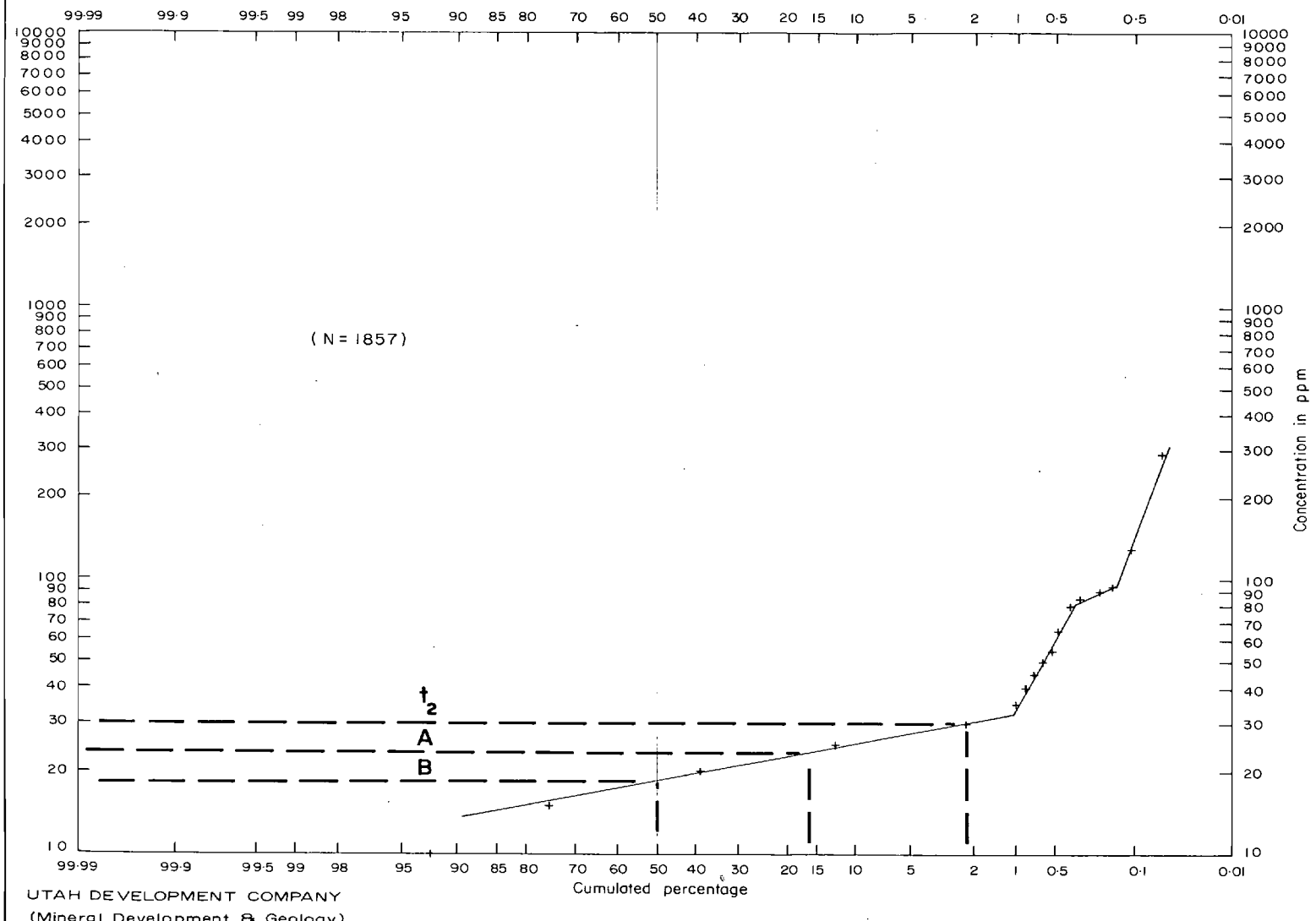
June 1972

085



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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

LEAD (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 000 – 050)

Diagram VIII
Report No. 199
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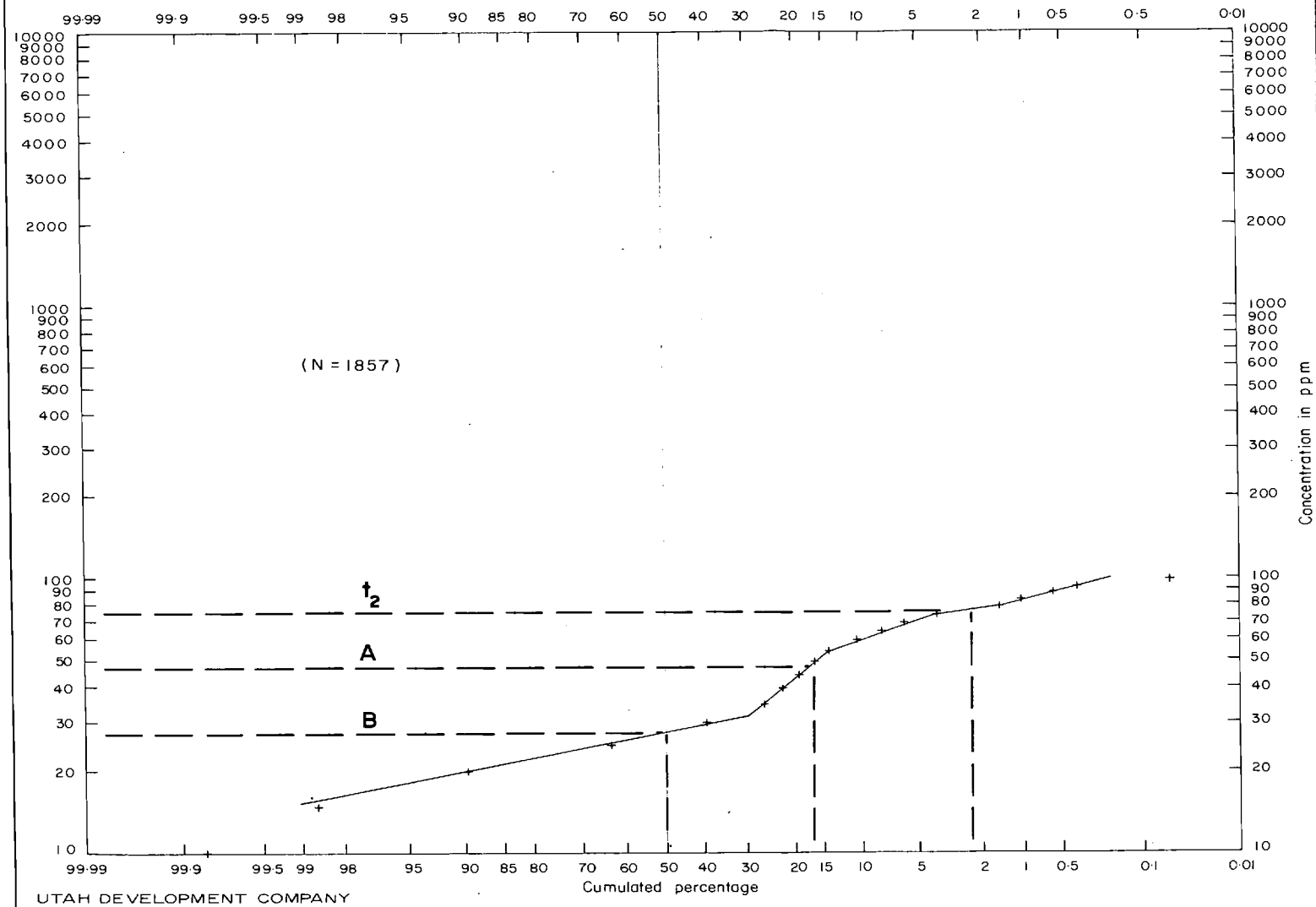
086



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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

NICKEL (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 000 – 050)

Diagram IX
Report No. 199
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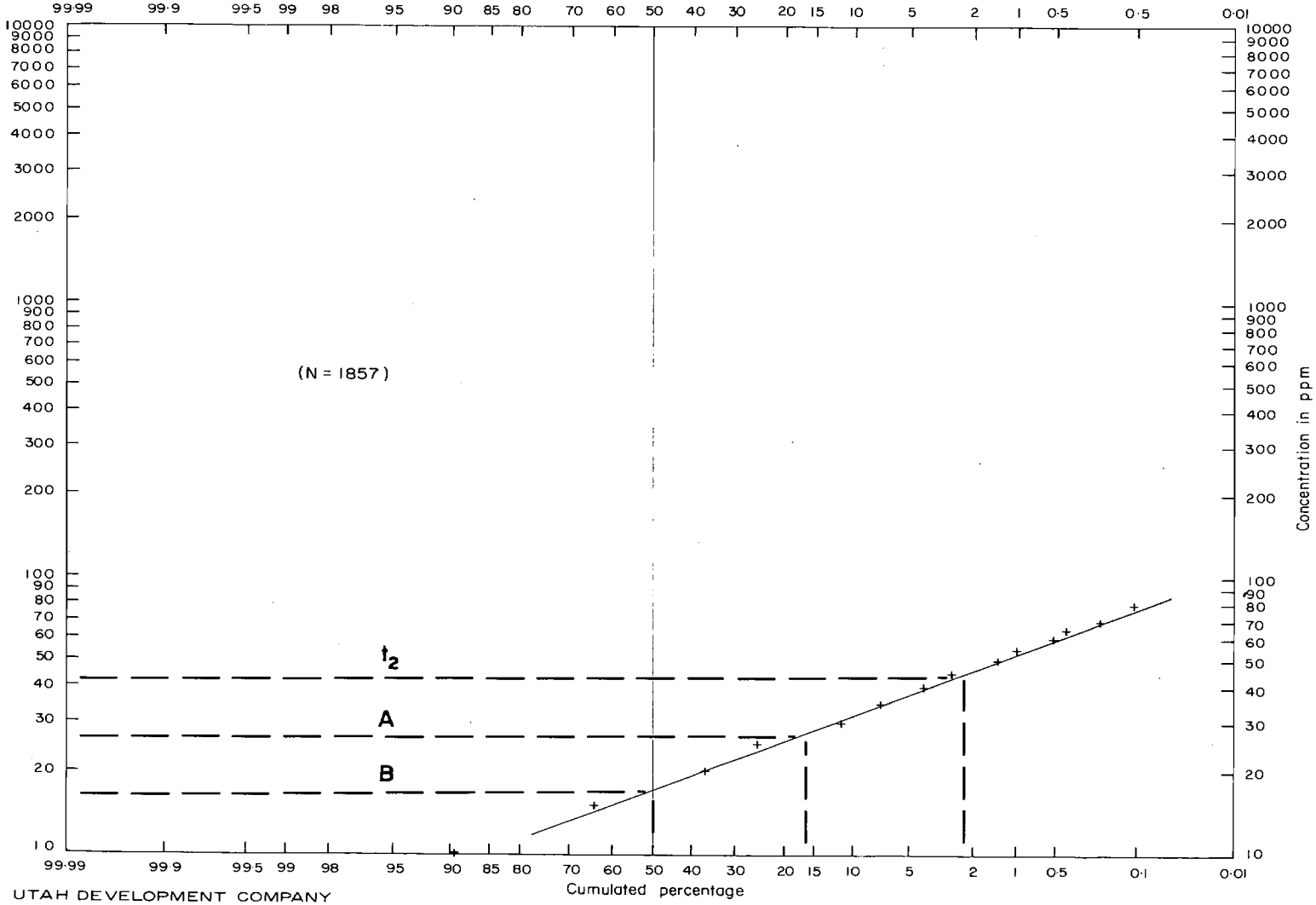

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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

COBALT (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 000 – 050)

Diagram X
Report No. 199
N. J. Rowlands
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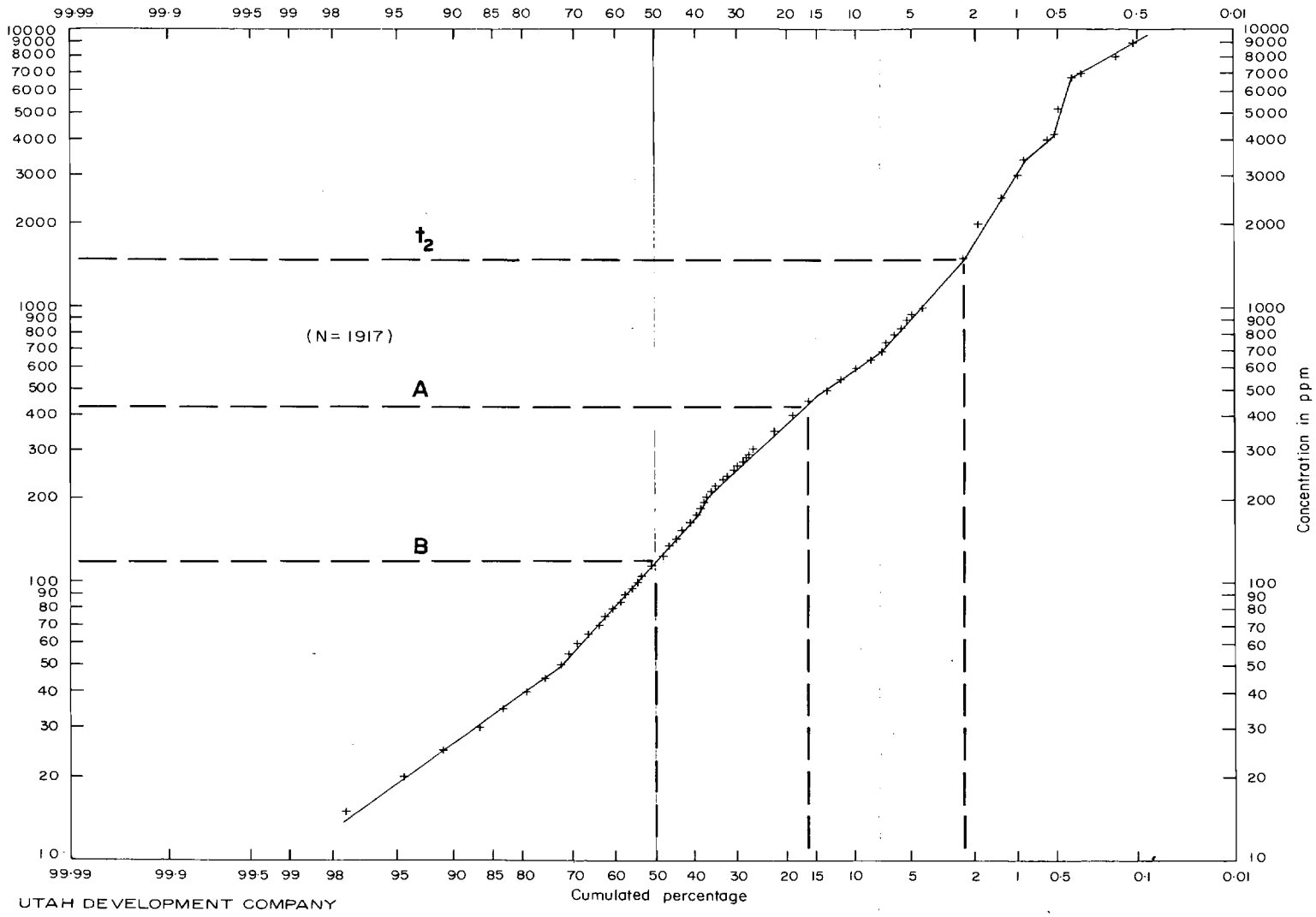
088



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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

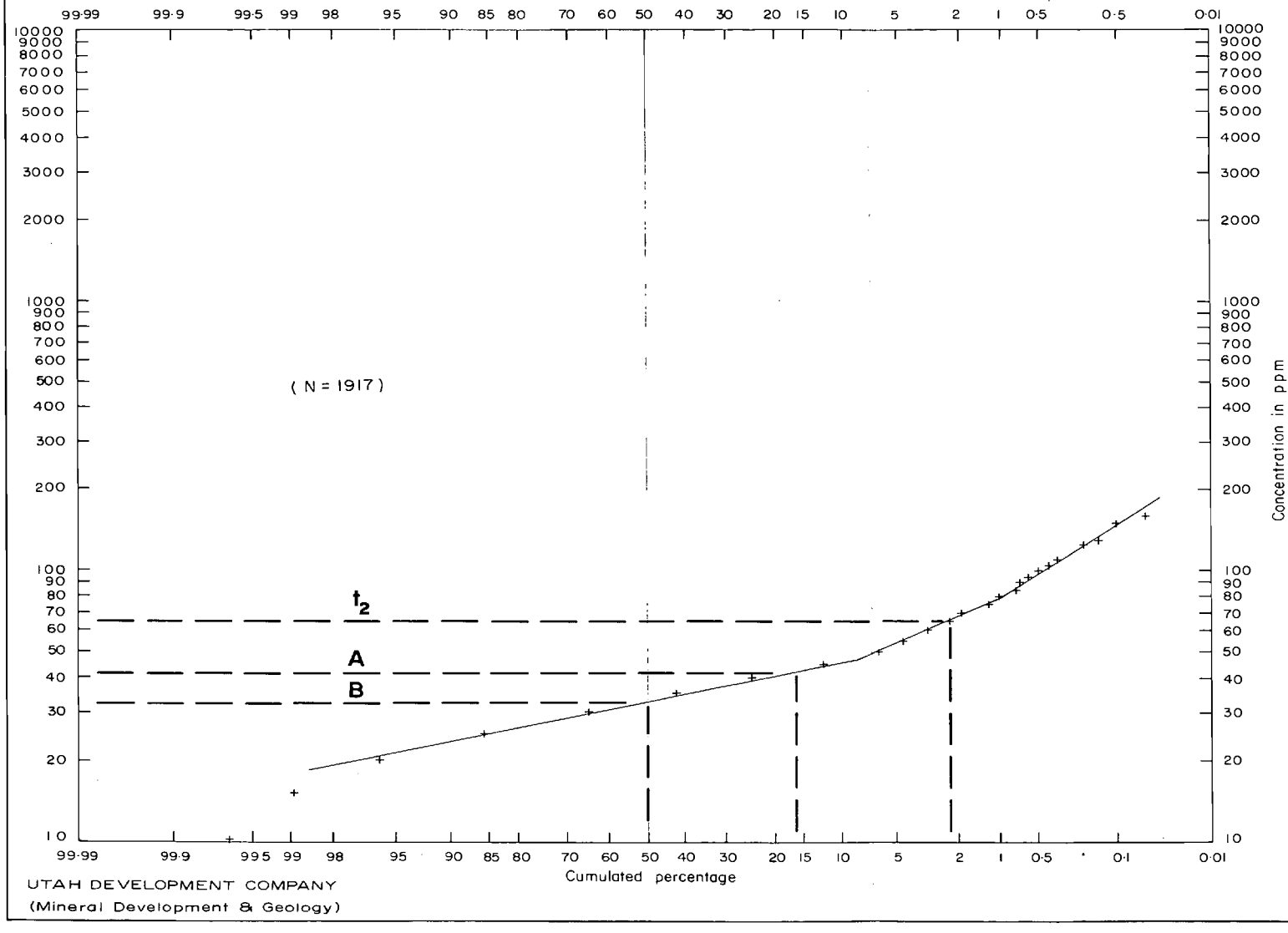
COPPER (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 052 – 172)

Diagram XI
Report No. 199
N. J. Rowlands
Adelaide
June 1972

089



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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

ZINC (Soil data)

YERELINA VALLEY

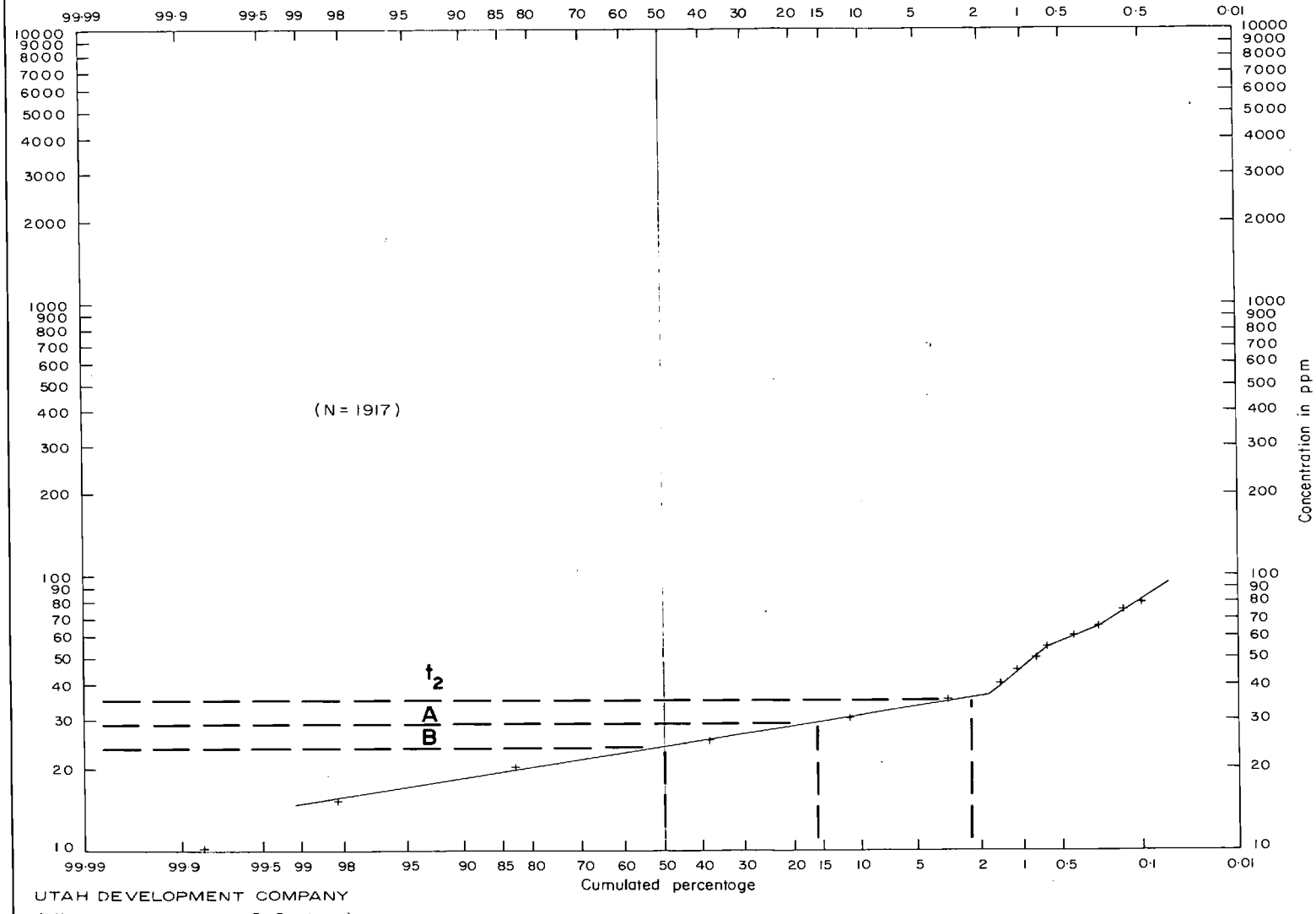
SPECIAL MINING LEASE NO. 601

YUDNAMUTANA

SOUTH AUSTRALIA

(Grid lines 052 – 172)

Diagram XII
Report No. 199
N. J. Rowlands
Adelaide
June 1972



UTAH DEVELOPMENT COMPANY
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CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

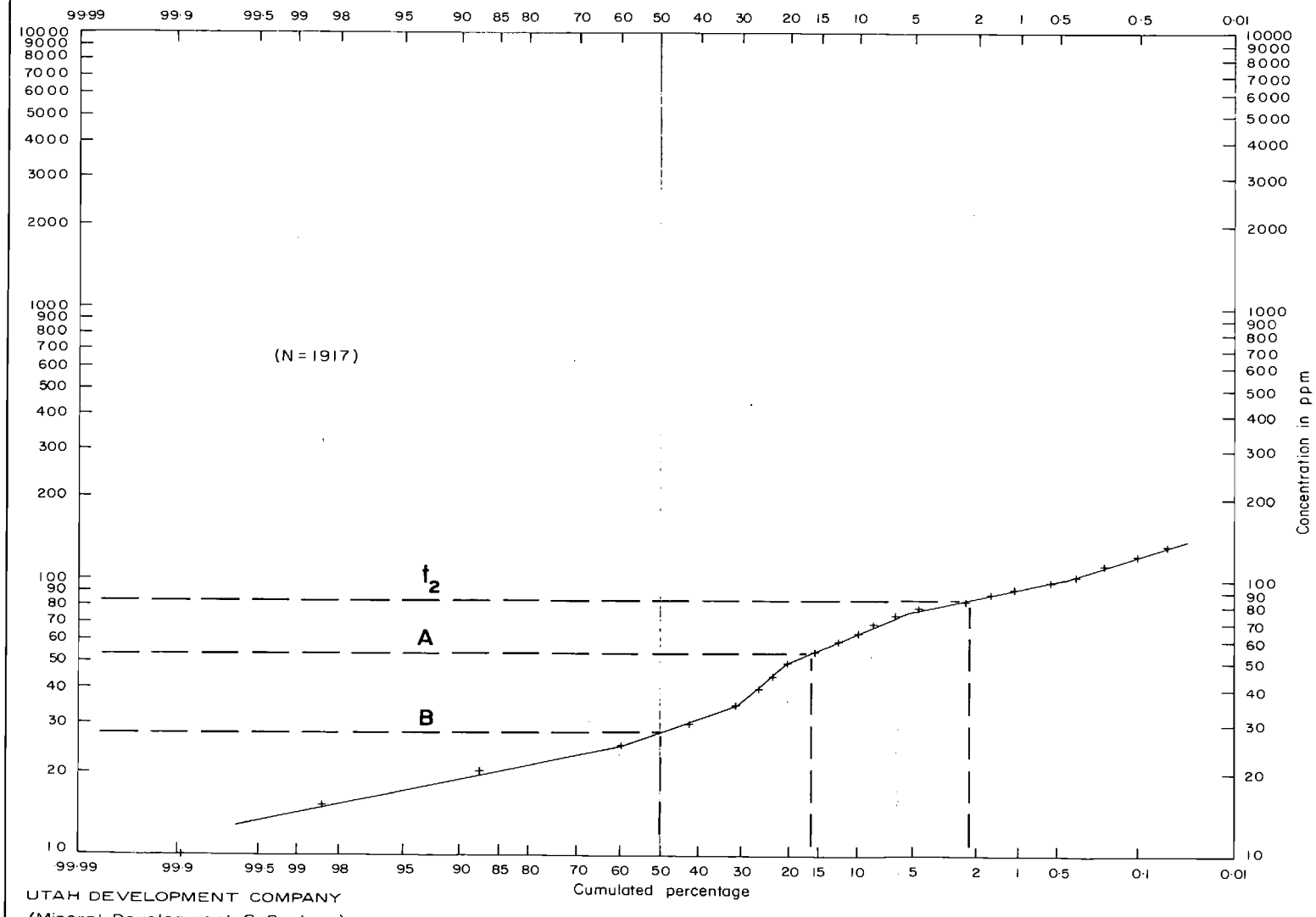
LEAD (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 052 – 172)

Diagram XIII
Report No. 199
N. J. Rowlands
Adelaide
June 1972

091



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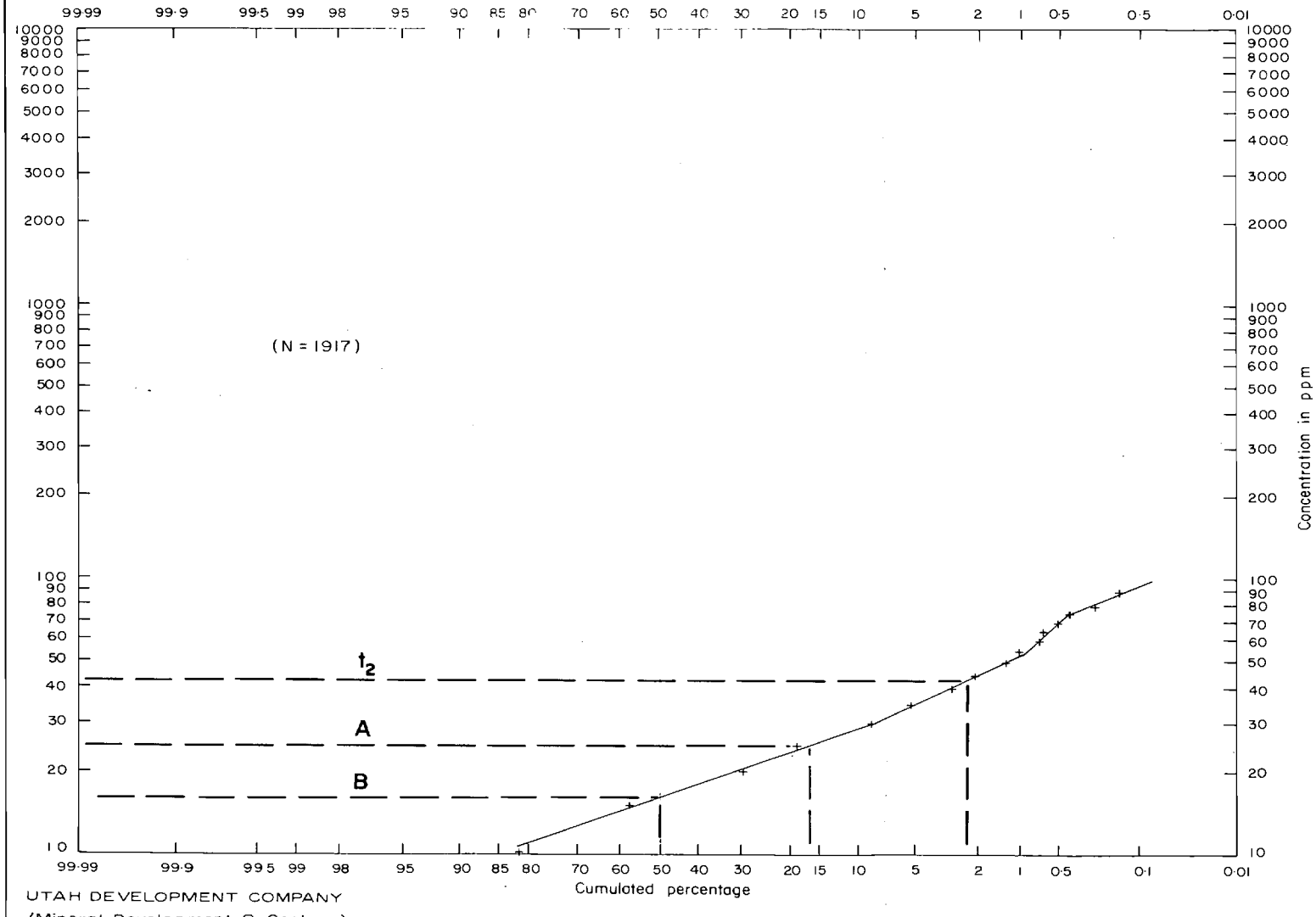
CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

NICKEL (Soil data)

YERELINA VALLEY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 052 – 172)

Diagram XIV
Report No. 199
N. J. Rowlands
Adelaide
June 1972



UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

CUMULATIVE FREQUENCY LOG PROBABILITY PLOT

COBALT (Soil data)

YERELINA VALLEY

SPECIAL MINING LEASE NO. 601
YUDNAMUTANA
SOUTH AUSTRALIA

(Grid lines 052 – 172)

Diagram XV
Report No. 199
N. J. Rowlands
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June 1972

Report No. 199.

TABLE B.

GEOCHEMICAL INTERPRETATION PARAMETERS

YERELINA GRID

ROCK CHIP ASSAY DATA

Element	Background (ppm)	Thresholds	
		Possible (ppm)	Probable (ppm)
Cu	60	2,500	3,000
Zn	7	45	50
Pb	14	50	55
Ni	18	55	110
Co	9	60	70

(N = 1,368).

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TABLE C.

GEOCHEMICAL INTERPRETATION PARAMETERS

YERELINA GRID

SOIL ASSAY DATA

Element		Background (ppm)	Threshold Possible (ppm)	Threshold Probable (ppm)
Cu	I	130	1,170	1,800
	II	110	1,500	1,530
Zn	I	32	53	60
	II	31	54	63
Pb	I	18	27	30
	II	22	38	34
Ni	I	28	76	82
	II	28	82	92
Co	I	17	43	46
	II	14	38	41

$N_I = 1,857$ $N_{II} = 1,917$

N.B.

I refers to data from lines 000 - 050

II refers to data from lines 050 - 172.

DRILLING PROGRAMMES

Yerelina Valley Percussion Drilling:

Four rotary percussion drill holes were collared in the Wywyana Formation between the Cockscomb and Black Queen East Mine.

The contractor was Boring Enterprises, Hahndorf, South Australia.

Relevant logs and completion reports are in Appendices I and II of this report.

Plate 6 shows the correlation between the Cockscomb Costean of YX03 and YX04.

Table D gives the relevant drilling information for the programme.

Encouraging copper mineralisation has been detected, and further rotary percussion drilling is scheduled.

LOGISTICS OF FIELD WORK

	This Quarter	This Year
Number of soil samples taken	-	3,787
Number of rock samples taken	-	1,378
Number of channel chip samples taken	-	18
Number of petrological samples taken	-	44
Grid area pegged and samples (sq. miles)	-	2.52
Area mapped in detail (sq. miles)	-	0.01
Area surveyed by ground magnetics	-	0.01
Number of rotary percussion holes	-	4
Percussion drilling footage	-	2,010
Number of percussion drilling samples taken	-	400
Length of track improvement (miles)	-	±5
Length of costeaning (feet)	-	1,000

TABLE D.

YERELINA GRID ROTARY PERCUSSION DRILLING

Designation	Collar Co-ordinates	Depth (ft.)	Azimuth and Depression	Mineralisation
YX01	Y083.00/104	435	180° (true bearing.) - 60°	115 - 125' av. 0.16% Cu ✓ 160 - 170' av. 0.12% Cu ✓
YX02	Y081.00/104	575 10.7m	do. 110 - 145' .42%	110 - 145' av. 0.38% Cu 180 - 195' 4.6m av. 0.64% Cu ✓
		7.6'm	210 - 235 .33%	210 - 240' av. 0.29% Cu
		3.m.	290 - 300 .29%	285 - 300' av. 0.23% Cu
YX03	Y082.00/096	500 1.5m.	do. 340 - 345 .24%	340 - 350' av. 0.16% Cu 475 - 485'
		1.5	475 - 480 .25%	av. 0.17% Cu
YX04	Y082.00/096	500	do.	

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DESCRIPTIVE LOG — Percussion Drill.

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

APPENDIX I.
HOLE NO — YX01
Sheet No. 1 of 5.

PROJECT — SML. 601
LOCATION — Yerelina Grid
LOGGED BY — R. B. Kitch

CO-ORDINATES — 104 east Y083.00 north
COLLAR ELEVATION —
BEARING — 182°M INCLINATION — -60°

DRILLED BY — Drilling Enterprises
COMMENCED — 22/11/1971
COMPLETED — 23/11/71

DEPTH From	DEPTH To	DEPTH Diff	CORE DESCRIPTION	SAMPLE NO.	ASSAYS (ppm) Cu	ppm			
0	70	70	Hornfels - weathered dark green, fine grained	YX01/0000.0/05.0	315				
			to	YX01/0065.0/05.0					
70	100	30	Felspathic amphibolite with minor dark green fine grained	YX01/0070.0/05.0	630				
			hornfels to	YX01/0095.0/05.0					
100	120	20	Hornfels - fine grained, dark green, pyrite from	YX01/0100.0/05.0	950				
			110 - 120' to	YX01/0115.0/05.0					
120	160	40	Biotite schist, amphibolite schist and slightly foliated	YX01/0120.0/05.0	820				
			hornfels. Pyrite toward bottom of section. Calcite to	YX01/0115.0/05.0					
			and gold mica.						
160	205	45	Scapolite schist, actinolite fibres.	YX01/0160.0/05.0	465				
			to	YX01/0200.0/05.0					
205	215	10	Felspathic amphibolite.	YX01/0205.0/05.0	135				
			to	YX01/0210.0/05.0					
215	240	25	Scapolite - amphibole schist - massive.	YX01/0215.0/05.0	170				
			to	YX01/0235.0/05.0					
240	270	30	Felspathic actinolite granulite	YX01/0240.0/05.0	325				
			to	YX01/0265.0/05.0					
270	315	45	Weathered hornfels and ? argillites.	YX01/0270.0/05.0	105				
			to	YX01/0310.0/05.0					
315	420	105	Oxidised hornfels, actinolite schist?, argillaceous	YX01/0315.0/05.0	400				
			sediments with occasional fresher sections of hornfels. to	YX01/0415.0/05.0					
			Quartz veins present.						
420	425	5	Dark grey siliceous hornfels.	YX01/0420.0/05.0	550				

DESCRIPTIVE LOG — Percussion Drill.

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

APPENDIX I.
HOLE NO — YX02.
Sheet No. 2 of 5.

PROJECT — SML. 601
LOCATION — Yerelina Grid
LOGGED BY — R. B. Kitch

CO-ORDINATES — 104 east Y081.00north
COLLAR ELEVATION —
BEARING — 182°M INCLINATION — -60°

DRILLED BY — Drilling Enterprises
COMMENCED — 24/11/71
COMPLETED — 30/11/71

DEPTH From	DEPTH To	DEPTH Diff	CORE DESCRIPTION	SAMPLE NO.	ASSAYS (ppm) Cu
0	10	10	Soil. Buff coloured; slight carbonate content black heavy minerals, hydro-micas, amphibole.	YX02/0000.0/05.0 to YX02/0005.0/05.0	800
10	30	20	Hornfels. Quartz vein 10-15; purplish hornfels and medium-green amphibolite schist.	YX02/0010.0/05.0 to YX02/0025.0/05.0	215
30	55	25	Amphibole schist. Weathered, minor grey hornfels.	YX02/0030.0/05.0 to YX02/0050.0/05.0	115
55	65	10	As above, but more intensely weathered to an orange-brown friable rock. Semi-translucent quartz vein.	YX02/0055.0/05.0 to YX02/0060.0/05.0	50
65	110	45	Weathered schist. Brown and green fine grained schist; white quartz, white micas, amphibole (often weathered to ?chlorite ?hematite).	YX02/0065.0/05.0 to YX02/0105.0/05.0	150
110	150	40	As above, but possibly even more weathered/more argillaceous. ?Limonite pseudomorph after pyrite 140-145'. Carbonate present.	YX02/0110.0/05.0 to YX02/0145.0/05.0	3840
150	185	35	Weathered schist? - buff v. fine material.	YX02/0150.0/05.0 to YX02/0180.0/05.0	1710
185	215	30	Calc.-silicate - fibrous actinolite, calcite and amphibolite hornfels.	YX02/0185.0/05.0 to YX02/0210.0/05.0	2500
215	220	5	Orange-red limonitic ochre.	YX02/0215.0/05.0	6800
220	235	15	Limonite-kaolin, jasperoid?	YX02/0220.0/05.0 to YX02/0230.0/05.0	2450
235	250	15	Hematite-magnetite, slightly weathered.	YX02/0235.0/05.0 to YX02/0245.0/05.0	655
250	290	40	Green-grey hornfels becoming actinolitic towards base.	YX02/0250.0/05.0 to YX02/0285.0/05.0	435
290	390	100	V. fine material, possibly actinolite schist in places weathered. Some argillaceous interbeds possible.	YX02/0290.0/05.0 to YX02/0385.0/05.0	730
390	455	65	Fibrous dark green actinolite with calcite and ?biotite, also remnants of ?interbedded argillites.	YX02/0390.0/05.0 to YX02/0450.0/05.0	265
455	470	15	Actinolite ?schist.	YX02/0455.0/05.0 to YX02/0465.0/05.0	570

DESCRIPTIVE LOG — Percussion Drill

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

APPENDIX I.
HOLE NO — YX02.
Sheet No. 3 of 5.

PROJECT — SML. 601
LOCATION — Yerelina Grid
LOGGED BY — R. B. Kitch

CO-ORDINATES — 104 east Y081.00 north
COLLAR ELEVATION —
BEARING — 182°M INCLINATION — -60°

DRILLED BY — Drilling Enterprises
COMMENCED — 24/11/71
COMPLETED — 30/11/71

DEPTH			CORE DESCRIPTION	SAMPLE NO.	ASSAYS (ppm)				
From	To	Diff			Cu				
470	490	20	Felspathic actinolite schist.	YX02/0470.0/05.0	1130				
				to YX02/0485.0/05.0					
490	575	85	Actinolite-calcite-biotite schist, occasional interbeds	YX02/0490.0/05.0	395				
			of black siliceous hornfels.	to YX02/0570.0/05.0					

DESCRIPTIVE LOG — Percussion Drill

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

APPENDIX I.
HOLE NO — YX03.
Sheet No. 4 of 5.

PROJECT — SML. 601
LOCATION — Yereline Grid
LOGGED BY — R. B. Kitch

CO-ORDINATES — 096 east Y082.00 north
COLLAR ELEVATION —
BEARING — 182°M INCLINATION — -60°

DRILLED BY — Drilling Enterprises
COMMENCED — 1/12/71
COMPLETED — 3/12/71

DEPTH From	DEPTH To	DEPTH Diff	CORE DESCRIPTION	SAMPLE NO.	ASSAYS (ppm) Cu
0	20	20	Schist - weathered amphibolite in radiating aggregates. Minor carbonate material -? calcrete along joints.	YX03/0000.0/05.0 to YX03/0015.0/05.0	45
20	90	70	Schist - green-grey amphibole in bladed and acicular habit; calcite. Weak, disseminated, fine grained pyrite mineralisation over entire section.	YX03/0020.0/05.0 to YX03/0085.0/05.0	90
90	140	50	? Amphibolite - calcite-mica assemblage, - very soft, fine powder. Pyrite grain 95-100'.	YX03/0090.0/05.0 to YX03/0135.0/05.0	155
140	175	35	Dark grey hornfels with minor dark green fibrous amphibole and biotite. Finely disseminated pyrite from 150-165'.	YX03/0140.0/05.0 to YX03/0170.0/05.0	170
175	230	55	Hornfels - medium grained with pale green fibrous actinolite, dark green amphibole (cummingtonite-grunerite/hornblend?) and biotite. Slight carbonate content. Shiny gold-brown ?mica.	YX03/0175.0 to YX03/0225.0/05.0	185
230	265	35	Calcite-amphibolite assemblage, vein quartz 250-255. Pyrite grains (0.5mm) in calcite at 230-235.	YX03/0230.0/05.0 to YX03/0260.0/05.0	200
265	270	5	No sample.	YX03/0265.0/05.0 (missing)	300
270	295	25	Hornfels - dark green-grey. Very fine pyrite - rare.	YX03/0270.0/05.0 to YX03/0290.0/05.0	360
295	320	25	Schist - amphibole, biotite with calcite grains becoming increasing towards the base of the section. Pyrite also increasing similarly.	YX03/0295.0/05.0 to YX03/0315.0/05.0	475
320	350	30	Biotite - amphibole schist - dark grey, soft friable.	YX03/0320.0/05.0 to YX03/0345.0/05.0	710
350	440	90	Calcite-amphibolite - mid green granular amphibole, biotite and calcite - slight schistose texture. Rare pyrite grains.	YX03/0350.0/05.0 to YX03/0435.0/0.50	55
440	500	60	Felspathic hornfels - dark grey with orange-pink felspars rare calcite and amphibole. Oxidised to 465 - 500.	YX03/0440.0/0.50 to YX03/0495.0/0.50	560

DESCRIPTIVE LOG — Percussion Drill

UTAH DEVELOPMENT COMPANY
(Mineral Development & Geology)

APPENDIX I.
HOLE NO — YX04.
Sheet No. 5 of 5.

PROJECT — SML. 601
LOCATION — Yerelina Grid
LOGGED BY — R.B. Kitch

CO-ORDINATES — 096 east Y082.00north
COLLAR ELEVATION —
BEARING — 182°M INCLINATION — -60°

DRILLED BY — Drilling Enterprises.
COMMENCED — 3/12/71
COMPLETED — 6/12/71

DEPTH From	DEPTH To	DEPTH Diff	CORE DESCRIPTION	SAMPLE NO.	ASSAYS (ppm) Cu
0	45	45	Hornfels, vague schistosity, green-brown due to weathering at top of section; fine grained, mica of amphibole; fine granular pyrite at 40-45'.	YX04/0000.0/05.0 to YX04/0040.0/05.0	185
45	85	40	Schist. Slight schistosity: green-grey; fine grained mica and amphibole.	YX04/0045.0/05.0 to YX04/0080.0/05.0	75
85	95	10	Scapolite schist. Green with dark mica: fibrous amphibole (actinolite).	YX04/0085.0/05.0 to YX04/0090.0/05.0	20
95	165	70	Hornfels - medium grained; dark grey-green; biotite (fine grained); granular actinolite-tremolite (fibrous 150-155); scapolitised especially 125-155'. Small grain chalcopyrite 150-155.	YX04/0095.0/05.0 to YX04/0160.0/05.0	10
165	180	15	As above, plus white translucent quartz.	YX04/0165.0/05.0 to YX04/0160.0/05.0	10
180	205	25	Hornfels. Medium grained; grey; quartz; mica, amphibole increasing in scapolite content towards base.	YX04/0180.0/05.0 to YX04/0200.0/05.0	5
205	275	70	Scapolite schist and hornfels; grey quartz hornfels and green actinolite schist with pink (potash) felspar; white and iron-stained calcite cleavage rhombs at 215-230'. Weakly pyritiferous over 220-230'.	YX04/0205.0/05.0 to YX04/0270.0/05.0	15
275	365	90	Schist. Green-grey schistose and quartzose amphibolite; fine grained mica; scapolite and carbonate 275-290'. Limonite staining 285-295'.	YX04/0275.0/05.0 to YX04/0360.0/05.0	80
365	460	95	Calcite - actinolite. Grey-green, fibrous, bladed and granular amphibole with 1 mm calcite grains; white translucent quartz, minor grey quartz hornfels. Disseminated pyrite grains 380-450'.	YX04/0365.0/05.0 to YX04/0455.0/05.0	300
460	500	40	Hornfels. Green; siliceous; massive to very fine grained; minor fibrous amphibole; micro and carbonate.	YX04/0460.0/05.0 to YX04/0495.0/05.0	315

Report No. 199. APPENDIX II.

PERCUSSION DRILL HOLE COMPLETION REPORT

Hole No: YX01

Project: SML. 601 - S. A.

Location: Yerelina Grid

Co-ordinates: Y083. 00 North 104 East

Bearing: 180°M

Inclination: -60°

Depth: 425 ft.

Date Drilled: November 23, 1971.

Drilling Contractor: Boring Enterprises, Hahndorf, S. A.

Drilling Rig: 'Megadrill'. I. R. drillmaster; and 1 trailer mounted compressor.

Number of Samples: 85 (see appended list for Field Sheet Numbers, Assay Sheet Numbers, and Job Numbers).

Sample Interval: 5 ft.

Samples Assayed by: Labtech Pty. Ltd., Midland, W. A.

Assay Method: A. A. S. On -80 mesh fraction (101B).

Appended Logs: Lithological Log by R. B. Kitch.

Most Important Intersections:

0. 16% over 10 ft. (115 - 125 ft.)

Economic Mineral Species: -

Host Lithology: -

Hole No.: YX02

Project: SML. 601, S.A.

Location: Yerelina Grid

Co-ordinates: Y081/00 North 104 East.

Bearing: 180°M

Inclination: -60°

Depth: 573 ft.

Date Drilled: November 24 - 30, 1971.

Drilling Contractor: Boring Enterprises, Hahndorf, S.A.

Drilling Rig: 'Megadrill'. I.R. drillmaster; and 1 trailer mounted compressor.

Number of Samples: 115 (see appended list for Field Sheet Numbers, Assay Sheet Numbers and Job Numbers).

Sample Interval: 5 ft.

Samples Assayed by: Labtech Pty. Ltd., Midland, W.A.

Assay Method: A.A.S. on -80 mesh fraction (101B)

Appended Logs: Lithological Log by R.B. Kitch

Most Important Intersections:

0.38% over 40 ft. (110 - 150 ft.)
0.64% over 15 ft. (180 - 195 ft.)

Economic Mineral Species: ? Copper absorbed in limonite.

Host Lithology: Weathered calcite-actinolite assemblage and limonitic ochres.

Hole No.: YX03

Project: SML. 601, S.A.

Location: Yerelina Grid

Co-ordinates: Y082.00 North 096 East.

Bearing: 180°M

Inclination: -60°

Depth: 500 ft.

Date Drilled: December 1 - 3, 1971

Drilling Contractor: Boring Enterprises, Hahndorf, S.A.

Drilling Rig: 'Megadrill'. I.R. drillmaster; and 1 trailer mounted compressor.

Number of Samples: 100. (see appended list for Field Sheet Numbers, Assay Sheet Numbers and Job Numbers).

Sample Interval: 5 ft.

Samples Assayed by: Labtech Pty. Ltd., Midland, W.A.

Assay Method: A.A.S. on -80 mesh fraction (101B).

Appended Logs: Lithological Log by R.B. Kitch.

Most Important Intersections:

0.16% over 10 ft. (340 - 350 ft.)
0.17% over 10 ft. (475 - 485 ft.)

Economic Mineral Species: -

Host Lithology: -

Hole No.: YX04

Project: SML. 601, S.A.

Location: Yerelina Grid

Co-ordinates: Y080.00N 096E

Bearing: 180°M

Inclination: -60°

Depth: 500 ft.

Date Drilled: December 1 - 3, 1971.

Drilling Contractor: Boring Enterprises, Hahndorf, S.A.

Drilling Rig: 'Megadrill'. I.R. drillmaster; and 1 trailer mounted compressor.

Number of Samples: 100 (see appended list for Field Sheet Numbers, Assay Sheet Numbers and Job Numbers).

Sample Interval: 5 ft.

Samples Assayed by: Labtech Ltd., Midland, W.A.

Assay Method: A.A.S. on -80 mesh fraction (101B).

Appended Logs: Lithological Log by R.B. Kitch.

Most Important Intersections:

0.08% over 10 ft. (420 - 430 ft.)

Economic Mineral Species: Chalcopyrite.

Host Lithology: Amphibolite.

PETROLOGY - MT. NEILL GRANITE PORPHYRY

601/01P - sheared quartz-sericite schist with martite knots. (after quartz-felspar volcanic).

Components:		
	quartz	30-40%
	sericite	>50%
	biotite	1%
	opaques (martite)	3%
	limonite	<1%
	accessory mineral	zircon.

A partially foliated schistose rock consisting of subparallel flakes of sericite distributed among allotriomorphic granular quartz. Intermittently this composition gives way to patches of elongate partly rectangular mesh of pure sericite apparently derived from phenocrysts or crystal fragments of felspar.

Shearing parallel to the foliation has produced minor fissuring along which thin hydrothermal quartz veins have been channelled. Traces of limonite staining are also spread along these fissures.

Coarse grains of quartz up to 3 mm diameter are sparsely scattered through the rock distorting the foliation. There is also a more plentiful scattering of grains of martite up to 1 mm diameter associated and often intergrown with a few flakes of biotite. The iron oxide grains tend to be irregular to rounded after oxidation, but are considered to have formed from porphyroblasts of magnetite.

The rock has probably originated from a porphyritic siliceous extrusive volcanic rock, metamorphosed, lightly sheared and hydrothermally veined.

601/02P - stressed sericitised quartz-microcline porphyry.

Components:		
	quartz	5-10%
	felspar	>50%
	biotite	5-8%
	sericite	10-15%
	opaques	3%
	accessory minerals	zircon, hornblende.

A porphyritic intrusive igneous rock consisting of phenocrysts up to 5 mm diameter in a partially metamorphosed and recrystallised groundmass.

Phenocrysts are principally subhedral quartz and microcline felspar crystals in an allotriomorphic granular quartz-felspar groundmass with interstitial flakes of sericite and patches of biotite and iron oxides. Corrosion and embayment of the quartz phenocrysts by reaction with the groundmass is extensive.

The felspars have predominantly been altered with total sericitisation of some phenocrysts. Microclines have been affected with clay-sericite forming along cleavages and the margins of semi-regular stress fractures which have traversed groundmass and phenocrysts, imparting a weak lineation.

Within the groundmass mafic silicates either consisted originally of biotite or have been converted almost entirely to that mineral, which occurs as a clustered random concentration of intermeshed flakes enclosing locally abundant fine lamellar iron oxide opaques (specularite?). Between these patches biotite gives way to a fine intergranular fleck of sericite from felspar alteration.

The rock is classified as a quartz-microcline porphyry slightly altered by stress and sericitisation.

601/03P - quartz-orthoclase porphyry (?) hydrothermally (?) altered.

Components:		
	quartz	40%
	sericite (argillic)	30-40%
	haematite (goethitic)	15-20%
	chlorite	10%

This is an extensively altered rock consisting of clusters of argillic sericite-muscovite in a matrix of vari-sized anhedral quartz with intergranular chlorite and haematite. It would appear to have formed from a quartz-orthoclase porphyry by chiefly hydrothermal alteration rather than metamorphism. The main reason for this is the absence of epidote-zoisite minerals which are metamorphic indicators.

The clusters of sericite-muscovite are broadly pseudomorphous after orthoclase phenocrysts up to $\frac{1}{2}$ cm size, and they contain some fine grained quartz as well as oxidised specularite.

There are abundant large quartz grains in the quartz-chlorite-haematite matrix and these appear to be original phenocrysts. The chloritic medium

contains finer quartz, finer sericite clusters and plenty of haematite. This was hydrothermally introduced and at the same time effected chloritisation and sericitisation, so this now represents a former groundmass which consisted of major biotite, copious quartz and minor felspar.

There was little distortion of the sericitised orthoclase phenocrysts and there is not much induced cleavage in the groundmass, indicating the lack of metamorphic influence.

Although the extent of alteration by hydrothermal influences and weathering introduces considerable doubt, it is concluded to represent a quartz-orthoclase porphyry.

601/04P - sheared limonitic quartz-sericite schist (metasediment).

Components:		
	sericite	60-70%
	quartz	30%
	limonite	5%
	opaques (martite)	1%.

A metamorphic rock consisting of alternating layers of aligned sericite and quartz-sericite, with a random spotting of coarse (2-3mm) patches of cellular limonitic staining and fine (0.2mm) grains of martite partially pseudomorphous after magnetite.

The rock has been fairly intensely sheared parallel to the foliation which is coincident with the layering. The coarse patches of limonitic staining are of rounded to ovoid form and may be the product of retrogressive alteration of garnets. The layering is interpreted as a relict structure of an originally sedimentary rock which alternated from argillaceous to arenaceous composition, best described as an arenaceous siltstone.

It is concluded that the rock was fairly intensely metamorphosed and then altered retrogressively to its present state. Some random fissures stained fairly heavily with limonite are the probable product of surface weathering.

601/05P - sericite-biotite schist - from a porphyritic micromonzonite.

Components:		
	biotite	40-50%
	muscovite	30%
	felspar and quartz (?)	15%
	limonite	2%

opaques (iron oxide)	3-5%
accessory minerals	ziron, tourmaline.

This is the metamorphic product of a very fine grained porphyritic igneous rock of intermediate composition. It was almost quartz-free and contained phenocrysts of orthoclase and plagioclase only.

It presently consists of oriented fine grained muscovite and biotite amongst which are small amounts of fine grained albite, quartz, zircon, opaque mineral and tourmaline. Considerable numbers of larger sodic plagioclase porphyroblasts exist within this medium.

It seems probable, in view of the cleavage structure, that the rock was mildly metamorphosed resulting in the albitisation of former intermediate plagioclase (the first stage of metamorphic modification), but not in its final conversion to epidote-zoisite (second stage of modification). Some of the muscovite may have been produced in this stage by sericitisation of potassic felspars, and some large elongate masses of very fine grained sericite are the equivalent of orthoclase phenocrysts.

The biotite is probably an original component of the groundmass of the porphyry. Because it is low in quartz and contained both types of felspars it is classified as a probable porphyritic micromonzonite.

601/06P - lithic-crystal tuff.

Components:		
	quartz	10-15%
	felspar	>70%
	sericite	1-2%
	tourmaline	1%
	opaques (iron oxides)	2-3%
	accessory mineral	zircon.

A pyroclastic volcanic rock with rare coarse quartz and felspar crystal fragments and more abundant lithic fragments comprised of felspathic microgranitoid rocks, and quartzites of varied grain size and texture. The groundmass is a fine to cryptocrystalline allotriomorphic granular mosaic of felspars and minor quartz. These felspars consist of mixed microcline and sodic plagioclase in almost equal proportions.

Alteration has involved some fine and often discontinuous quartz veins being introduced into the rock, formation of irregular clumps of tourmaline, and

some recrystallising of the mass of felspars in the groundmass with traces of sericitisation and merging of the fragmental felspathic material.

Opaques are fine lamellar crystals of iron oxides often coalescing into coarser clumps.

The rock is concluded to be a felspathic tuff with minor hydrothermal to pneumatolytic alteration and recrystallisation.

601/07P - quartz-orthoclase porphyry with minor pegmatite veins.

Components:		
	quartz	10%
	felspars (argillic)	>70%
	tourmaline	1%
	biotite	trace
	sericite	3-5%
	opaques	2-3%
	accessory minerals	zircon, sphene.

A porphyritic igneous rock consisting of coarse subhedral phenocrysts of quartz and orthoclase set diffusely in an hydrothermally altered groundmass of microlitic quartz and felspar.

Scattered fine veinlets traverse the rock containing anhedral quartz, tourmaline and traces of biotite. Recrystallisation of the porphyritic groundmass has been accompanied by introduction of tourmaline which is scattered as diffuse patches of fine prisms. Some argillic turbidity is widespread, and both phenocrysts and groundmass are flecked with fine flakes and tufts of sericite.

Fine dusty opaques are distributed within the groundmass passing into coarser subhedral crystals where the groundmass passes into hydrothermally recrystallised quartz-felspar mosaic. A few such zones also contain fine sphenes. Zircon crystals of coarser size are sparsely scattered.

The rock is concluded to be a quartz-orthoclase porphyry slightly altered by pneumatolytic-hydrothermal fluids.

601/08P - cordierite-biotite-quartz sericite schist (metasediment).

Components:		
	quartz	30%
	sericite	40-50%

biotite	20%
cordierite	5-8%
opaques	1%
accessory mineral	apatite.

A fine grained foliated metamorphic rock consisting of alternating bands rich in quartz and sericite. Porphyro-blastic biotite and cordierite has formed along some layers with rarer bands containing the latter mineral. Both these porphyroblastic minerals are up to 2-3 mm diameter and poikiloblastically enclose the grains of quartz and often some coarser recrystallised muscovite.

Foliation within the sericitic layers is well developed which is also parallel to the layering which is considered to be relict sedimentary structure. Some transverse shearing has taken place obliquely to the foliation causing it to be intermittently warped and crenulated.

The rock is classified as a moderately metamorphosed arenaceous argillite or similar aluminous sediment.

601/09P - albite-hornblende gneiss.

Components:		
	hornblende	60-70%
	felspars	30%
	sphene	1%
	sericite	1-2%
	opaques	1%.

A coarse grained granulose mass of stumpy green hornblende and pink albite prisms closely resembling an igneous texture. The albite is often rimmed with traces of potassic felspar and minor sericite.

Voids within the rock contain euhedral terminations of hornblende and albite. A few traces of sericitised biotite flakes are also present within some of these.

Subhedral prisms of sphene, and rare granules of opaques are intermittently scattered.

The unusual composition and a vague banding in the rock leads to the conclusion that this is not an igneous rock but a considerably recrystallised metamorphic rock of amphibolite grade.

601/10P - sheared sericitised quartz-orthoclase porphyry.

Components:		
	quartz	10%
	felspar	50-60%
	sericite	20-25%
	tourmaline	trace
	biotite	10-15%
	opaques	3-5%.

This is a porphyritic igneous rock similar in many respects to 601/07P, except that there has been marked directional shearing and intensive sericitisation of some of the potassic felspars much as in the sample 601/03P.

Plagioclase felspars are very little affected, as also the groundmass. The sericitised felspars, however, have been sheared out into parallel aligned lenticular masses of sericitic mesh. The groundmass consists of a microlitic intergrowth of quartz and felspars flecked with scattered biotite and sericite flakes, the former probably being indigenous to the porphyry.

Rare crystals of tourmaline are present.

Subhedral lamellar and granular aggregates of iron oxide opaques are scattered in the groundmass.

The rock is classified as a quartz-orthoclase porphyry altered by shearing and sericitisation.

601/11P - sheared and brecciated (?) hydrothermally altered felspathic porphyry (?).

Components:		
	quartz	25%
	sericite (argillic)	20-30%
	chlorite	10-20%
	haematite	30%.

This rock is mineralogically and texturally similar to sample 601/03P in that it consists of coarse sericitic masses enclosed in a matrix of quartz, haematite and probable chlorite. It differs, however, in that there is a distinct schistosity and quartz veins several mm. wide traverse the rock randomly.

Assuming that 601/03P does represent an altered quartz-orthoclase

porphyry, then this sample is likely to be of similar origin. The sericitic masses are difficult to account for as they have unusual irregular semi-cylindrical forms which seem to enclose portions of the matrix. Possibly, however, shearing, folding and irregular hydrothermal alteration might account for them.

The matrix contains fine quartz and earthy to granular haematite encrustations on chlorite, replacing a former groundmass which consisted of biotite mesh with quartz and felspar.

The quartz veins consist of allotriomorphic quartz which has entrained some wisps of sericite and iron oxides.

Although there is doubt because of the extent of contortion, hydrothermal influence and also weathering, this rock seems most likely to have formed from a quartz felspar porphyry.

PETROLOGY - PINNACLES AND COCKSCOMB MINE GOSSANS

PM005R - true gossan containing relict sulphides.

The following minerals were identified in a polished section of this sample (in the following approximate order of abundance):

'limonite' (goethite, Fe-Si)	) dominant
pyrite	)
digenite	subordinate
chalcopyrite	)
cuprite	)
covellite	) accessory
magnetite	)
carbonite	)
molybdenite	)
pyrrhotite	) trace
(?) pentlandite	rare trace.

The section examined consists of very ragged, relict, irregular areas of strongly brecciated pyrite up to 2 cm across enclosed within a mass of limonite.

The limonite has extensively replaced an original sulphide aggregate consisting dominantly of pyrite. It is seen in this section to pervade the margins of the remaining pyrite remnants along cubic grain boundaries and along abundant fractures and growth planes.

In areas of limonite where replacement has been complete, pseudomorphous replicas of original pyrite can be recognised. Pseudomorphous isometric subhedral outlines contain irregular, subparallel, curving and branch-like, rhythmically banded finely botryoidal goethite.

In other areas randomly wandering fine (0.01 mm) bands of limonite occur within an Fe-Si matrix. Also irregular patches consisting of an aggregate of randomly oriented and interlocking flakes of jarosite (0.5 mm) occur within an Fe-Si matrix.

Rarely in the pyrite fine (0.1 mm x 0.01 mm) inclusions of chalcopyrite are found. Chalcopyrite up to 0.2 x 0.1 mm also occurs as independent grains

within limonitised fractures cutting pyrite. (In hand specimen slightly larger anhedral grains of chalcopyrite occur enclosed in limonite).

The chalcopyrite in limonite is invariably altered and largely replaced by digenite and minor associated covellite. Isolated grains of digenite in in limonite indicate complete replacement of former chalcopyrite.

Under high magnification and oil immersion digenite-chalcocite is found as fine bands interlayered with the rhythmically banded goethite which lines fractures in, and pseudomorphs original grains of, pyrite. A given limonitised void in pyrite may consist of 70% goethite, 25-30% chalcocite-digenite and up to 5% extremely fine (?) cuprite and covellite associated with the chalcocite.

Several chalcopyrite grains (0.1 mm) have a core of pyrrhotite, the pyrrhotite carries minute spindle-like intergrowths of probable pentlandite. Chalcopyrite appears to be replacing the pyrrhotite.

Fine flakes of molybdenite (0.08 mm) are randomly scattered in trace abundance through the limonite.

Fine euhedral crystals of oxidised magnetite are apparently localised in voids filled mainly by Fe-Si adjacent to chalcopyrite bearing areas.

Minor very small areas of carbonate boxwork indicates that the original gangue was at least in part a carbonate.

CC013R - leached, open space fill of colloform limonite and hyalite with malchite, native copper and cuprite.

The following minerals were identified in polished section:

goethite
malachite
hyalite
native copper
cuprite.

The hydrated iron oxides in this sample consist essentially of irregular masses of dark brown botryoidal colloform goethite within an Fe-Si matrix.

These accumulate masses commonly enclose drewsy cavities now filled by

secondary silica - variety hyalite, and also be aggregates of malachite crystals, which occur in the hyalite.

Irregular cavities within the goethite and siliceous matrix contain earthy, yellowish-brown limonite in aggregates of poorly developed spherulitic structures.

The hyalite silica filled cavities, generally those not obvious in hand specimen, commonly contain fine irregular grains of native copper, almost invariably enveloped by cuprite.

The maximum size of these copper grains is 0.5 mm x 0.4 mm; they form an estimated 0.5% of the section examined. The cuprite appears to be replacing the copper, individual grains of cuprite of similar size and location, indicates complete replacement. Cuprite may also form up to 0.5% of the section.

The limonite forming this sample is not strictly indigenous in that it does not form gossan boxworks or replicas in situ. It seems likely that the limonite, hyalite and copper have been introduced and completely replaced an extremely leached rock with open spaces. The origin of these components is almost certainly from a nearby subjacent source.

PETROLOGY - PINNACLES MINE LOWER ADIT

Y014P - calcite-actinolite granulite with skarn mineralisation.

The following minerals were identified in a polished section of this sample (in the following approximate order of abundance):

magnetite	common
pyrite	subordinate
chalcopyrite	"
arsenopyrite (?)	trace
pyrrhotite	"
bornite (?)	"
bismuthinite	"
bismuth	"

The rock consists of medium grained allotriomorphic calcite with masses of coarse prisms of amphibole in semi-radial groups.

Subhedral to anhedral crystals of magnetite up to 1 mm diameter are scattered along vague metamorphic lineations. These contain very fine globular inclusions of chalcopyrite and pyrrhotite up to 10 microns diameter.

Sparsely distributed irregular masses of chalcopyrite of several mm length are scattered between the masses of amphibole. Slightly smaller subhedral crystals of pyrite of probable primary origin are randomly scattered or associated with the chalcopyrite. A few globules of secondary melnicovite (pyrite) are scattered along minor zones of permeability.

Sparse minute blebs of a soft highly anisotropic mineral possibly bismuthinite (< 0.02 mm) are enclosed in some calcite grains and with the minute chalcopyrites in the magnetite. There are equally small spherical blebs of native bismuth in some of the magnetites.

Y015P - calcite-actinolite granulite with skarn mineralisation.

The following ore minerals are present to the extent of approximately 5% in the polished section of this sample in the following approximate order of abundance:

magnetite (martitic)	common
pyrite	"
chalcopyrite	"
pyrrhotite	minor
arsenopyrite (?)	trace
covellite	"
chalcocite	"

It consists of a rock type similar to the sample Y014P with most opaques distributed along fairly well defined random shear or fissure directions.

One such contains principally rounded subhedral masses of magnetite crystals 1-2 mm in diameter intergrown with irregular masses of pyrite and chalcopyrite up to 0.3 mm diameter. Several of the chalcopyrite grains show fine alteration rims to chalcocite and covellite.

The other mineralised zone contains principally irregular masses of chalcopyrite 2-3 mm diameter with rare subhedral crystals of pyrite and magnetite distributed along the chalcopyrite margins. The magnetite is all partially intergrown with lamellae of secondary haematite, this being an incipient formation of martite.

Y017P - oxidised-leached sulphide-bearing calcite-actinolite granulite (skarn mineralisation).

The calcite granulite contains some decomposed silicate minerals as well as oxidised magnetite and sulphides. The order of abundance is:

magnetite and martite	common
chalcopyrite and copper oxysalts	common
pyrite replicas and goethite	common
pyrrhotite	minor.

There is a banded structure in the granulite and copious coarse grained magnetite was intergrown with chalcopyrite, pyrite and minor pyrrhotite along some of these foliae. The magnetite is variably martitised with the formation of hematite along (III) crystallographic planes. Almost all of the pyrite was oxidised to goethite pseudomorphs or leached to isometric voids. Chalcopyrite remains as corroded relics inside goethite pseudomorphs, which are commonly surrounded by microcrystalline malachite and silica. There were no chalcopyrite boxwork structures formed during the oxidation. Pyrrhotite is present as protected inclusions in some of the magnetite.

Y011P - oxidised calcite-actinolite granulite (weak skarn mineralisation).

The granulite consists mainly of calcite. It contains subordinate amphibole, and it is weakly banded. The following minerals are present in small amounts at a maximum grain size of 1-2 mm.

magnetite and martite	common
pyrite and pyrite replicas	subordinate
chalcopyrite	minor
pyrrhotite	"

The magnetite was coarsest and most widespread. Protected minute inclusions of pyrite, pyrrhotite and chalcopyrite are contained in some magnetite grains.

Most of the pyrite was present as small euhedra which were converted to goethite replicas.

Chalcopyrite is a sparse component and its grain size did not exceed 0.02 mm.

Y013P - oxidised-mineralised calcite-actinolite granulite (strong skarn mineralisation.

There is considerably more amphibole in this calc-silicate rock and the quantities of magnetite and pyrite are much larger than in the foregoing samples. There may be as much as 30% sulphides in the rock.

pyrite, mainly coarse grained	very abundant
magnetite, partly martitised	common
chalcopyrite and secondary products	moderate amounts
pyrrhotite and melnikovite pyrite	minor.

There are extensive aggregates of variably oxidised pyrite individuals many of which exceed 3 mm in size. Most of the magnetite and chalcopyrite are associated with the groups of pyrite anhedra. The chalcopyrite is usually less than 1 mm in size, and most of it displays marginal alteration to covellite.

Some finer chalcopyrite is intergrown with pyrrhotite, both of which are enclosed within the magnetite. Elsewhere, the pyrrhotite which existed alone within the granulite displays complete conversion to melnikovite-pyrite pseudomorphs.

Y016P - oxidised calcite-actinolite granulite (weakly mineralised).

Like the previous sample this consists principally of amphibole with subordinate finer grained calcite. It was poorly mineralised, and contains in order of abundance the following components:

martitised magnetite	common
pyrite replicas and relics	sparse
chalcopyrite	very minor
pyrrhotite	very minor.

The magnetite grains were extensively martitised and only specks of pyrite remain in the goethite pseudomorphs which developed from this mineral. Pyrrhotite and chalcopyrite are present only as minute blebs of 0.005 - 0.025 mm in some of the magnetites. There appear to have been no discrete particles of these two sulphides.

LIST OF FIELD AND ASSAY SHEETS

SML. 601 Yerelina Grid.

Lab. Sheet No.	Field Sheet No.	Rack No.	Job. No.	
4896/2	28047	2203	4896	S & R
4896/1	28046	2202	4896	S
4896/4	28073	2204	4896	R
4896/5	41049	-	4896	S
4896/6	41050	2205	4896	S & R
4896/7	28048	2206	4896	S
4896	28049	2207	4896	S & R
4896/9	40168	2208	4896	S & R
4896/10	40166	2209	4896	S
4896/11	40167	2210	4896	R
4896/12	40164	-	4896	S
4896/13	40165	2212	4896	S & R
4896/3	28072	-	4896	S
4896/14	28121	2211	4896	S
4897/1	32596	2220	4897	R
4897/2	32697	2221	4897	S
4897/3	32698	-	4897	R
4897	28050	2222	4897	S
4897/5	28118	2223	4897	S & R
4897/6	32699	-	4897	S
4897/7	28042	2224	4897	S & R
4897/8	28119	2225	4897	S
4897/9	28120	2226	4897	S & R
4897/10	28043	2227	4897	S
4897/11	28044	2228	4897	S & R
4897/12	28045	-	4897	R
4897/13	41048	2229	4897	S & R
4895/1	39655	2181	4895	S
4895/2	39657	2182	4895	S & R
4895/3	39656	2183	4895	S
4895/4	39658	2184	4895	S & R
4895/5	39659	2185	4895	S
4895/6	39660	2186	4895	S & R
4895/7	39661	2187	4895	S
4895/8	39663	2188	4895	S & R
4895/9	39662	2189	4895	S

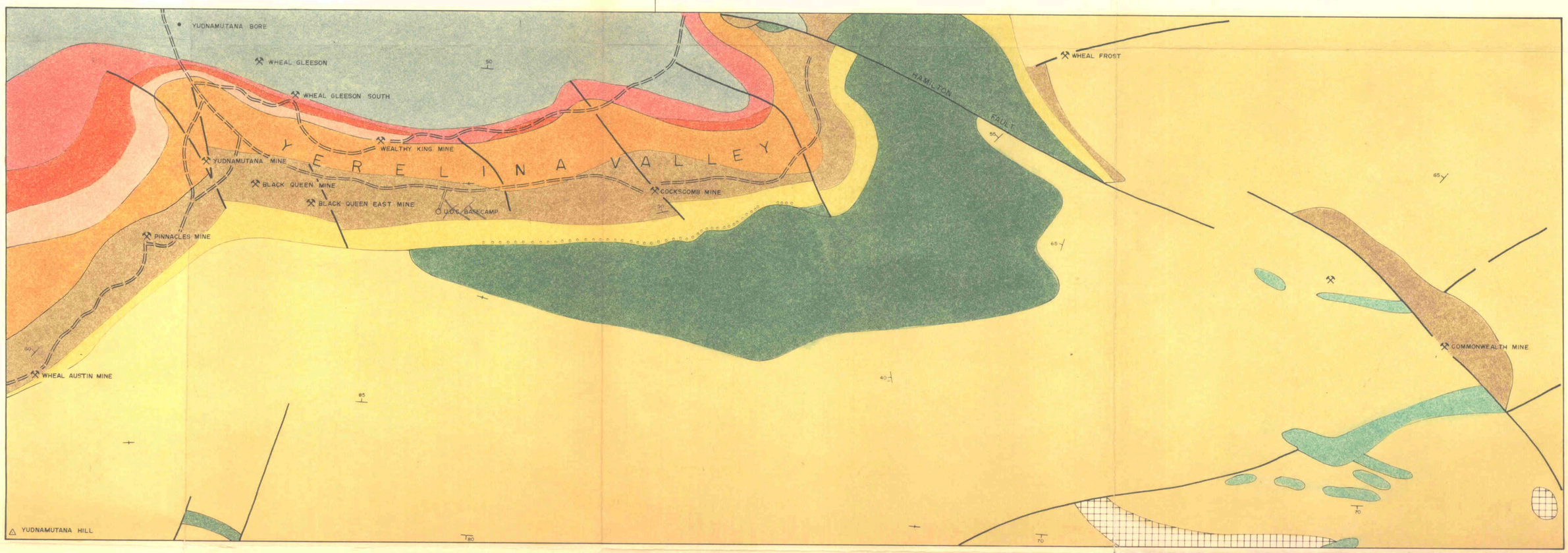
Lab. Sheet No.	Field Sheet No.	Rack No.	Job No.	
4895/10	39664	2190	4895	S & R
4895/11	39666	2191	4895	S
4895/12	39667	2192	4895	S & R
4899/1	39671	2268	4899	S & R
4899/2	39672	2269	4899	R
4899/3	39669	2270	4899	S
4899/4	39668	2271	4899	S & R
4899/5	39674	2271	4899	S
4899/6	39675	2272	4899	S & R
4899/7	39665	2273	4899	S
4899/8	39670	2274	4899	R
4899/10	38692	2275	4899	S & R
4899/9	32691	2274	4899	S
4899/11	32693	2276	4899	S
4899/12	32694	2277	4899	R
4899/13	32695	2277	4899	S
4899/14	39673	2278	4899	S
4900/1	39653	2280	4900	S
4900/2	39654	2281	4900	R & S
4900/3	39651	2282	4900	S
4900/4	39652	2283	4900	S & R
4898/1	40171	2239	4898	S
4898/2	40172	2240	4898	S
4898/3	41012	2241	4898	S
4898/4	41013	2241	4898	S
4898/5	41014	2242	4898	S
4898/6	41015	2243	4898	S
4898/7	41016	2244	4898	S
4898/8	41017	2245	4898	S
4898/9	41004	2246	4898	S
4898/10	41005	2246	4898	S
4898/11	40170	2247	4898	S
4898/12	41006	2248	4898	S
4898/13	41007	2249	4898	S & R
4898/14	41008	2250	4898	R
4898/15	40173	2250	4898	S & R
4898/16	40174	2251	4898	R
4898/17	41009	2252	4898	S
4898/18	41010	2253	4898	S & R

Lab. Sheet No.	Field Sheet No.	Rack No.	Job No.	
4898/19	41011	2254	4898	R
4898/20	41019	2255	4898	R
4898/21	40169	2256	4898	R
4898/22	41018	2257	4898	R
4936/1	39640	2376	4936	S
4936/2	39641	2377	4936	S
4936/3	39642	2378	4936	S
4936/4	39643	2379	4936	S
4936/5	39590	2380	4936	S
4936/6	39591	2381	4936	S
4936/7	39593	2382	4936	S
4936/8	39594	-	-	
4936/9	39582	2383	4936	S
4936/10	39583	2384	4936	S
4936/11	39584	2385	4936	S
4937/1	41022	2391	4937	S
4937/2	41023	2392	4937	S
4937/3	41024	2393	4937	S
4937/4	41025	2394	4937	S & R
4937/6	41020	2396	4937	S
4937/7	41021	2397	4937	S
4937/8	39587	2398	4937	S
4937/9	39588	2399	4937	S & R
4937/11	39635	2401	4937	S
4937/12	39636	2402	4937	S
4937/13	39637	2403	4937	S & R
4937/12A	39644	2386	4936	R
4936/13	39645	2387	4936	R
4936/14	39592	2388	4936	R
4936/15	39595	2389	4936	R
4936/16	39585	-	-	
4936/17	39586	2390	4936	R
4937/5	39639	2395	4937	R
4937/10	39589	2400	4937	R
4937/14	39638	2404	4937	R
4938/1	39631	2405	4938	S
4938/2	39632	2406	4938	S
4938/3	39633	2407	4938	S & R
4938/4	39634	2408	4938	R

Lab. Sheet No.	Field Sheet No.	Rack No.	Job No.	
4938/5	39579	-	4938	S
4938/6	39580	2409	4938	S
4938/7	39581	2410	4938	R
4938/8	39628	2411	4938	S
4938/9	39629	2412	4938	S
4938/10	39630	2413	4938	R
4938/11	39626	-	4938	S
4938/12	39627	2414	4938	S & R
4938/13	39601	2415	4938	S
4938/14	39602	2416	4938	S & R
4938/15	39576	2417	4938	S
4938/16	39577	2418	4938	S & R
4938/17	39578	2419	4938	R

Field Sheet No.	Assay Sheet No.	Job No.	Rack No.
Pinnacles Adit Channel Sampling:			
39695	5033/1	5033	2940
Percussion Drilling:			
43852	5047/6	5047	3038
43855	5047/7	5047	3039
39372	5047/8	5047	3041
39373	5047/9	5047	3042
39697	5047/1	5047	3033
39698	5047/2	5047	3034
39699	5047/3	5047	3035
39700	5047/4	5047	3036
43854	5047/5	5047	3037

800E



TN

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L 601

Summary geological plan of the Yerelina and Capra Valleys.

Project Senior Geologist N.J.Rowlands.
Drawn by A.J.Hitchcox.
Date June 1972.
Office Adelaide S.A.

Fig (2)

Show ① Corect ; Non-Core holes

③ Capra Valley

Name

③ Miller Fault

Cockscomb Shear

Hagt Shear

Hamilton Fault

Black Queen East Shear

Yuda Fault

John Shear

④ Number Mines + Engys

Drillholes

Y1, P2 Y3 S1-S5 ✓

⑤ Contr Grid if possible

See 1:5000 Geol. Plan

⑥ Costeen Y203-04

+ Wheal Gleeson South

fee reference plans of detail geology

LEGEND

PALEOZOIC
- Pegmatites.
- Undifferentiated breccias.

UMBERATANA GROUP
- Tapley Hill Formation.
- Bolla Bollana Formation.

BURRA GROUP
- Wortupa Quartzite.

UPPER CALLANA BEDS
- Blue Mine Conglomerate / Opaminda Formation.

PROTEROZOIC

LOWER CALLANA BEDS
- Wooltana Volcanics.
- Wywyana Formation.
- Paralana Quartzite.
- Shenahan Conglomerate Member.

MT. PAINTER COMPLEX
- Mt. Neill Granite Porphyry.
- Freeling Heights Quartzite.

- Geological boundary.
- Dip and strike of bedding.
- Strike of vertical bedding.
- Fault or shear.
- Mine or prospectors excavation.
- Track.

PLATE 2

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

3.3

3.17 X diff

REGIONAL GEOLOGY
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA

1:16,129

Fig 2.

Scale 1:15,840

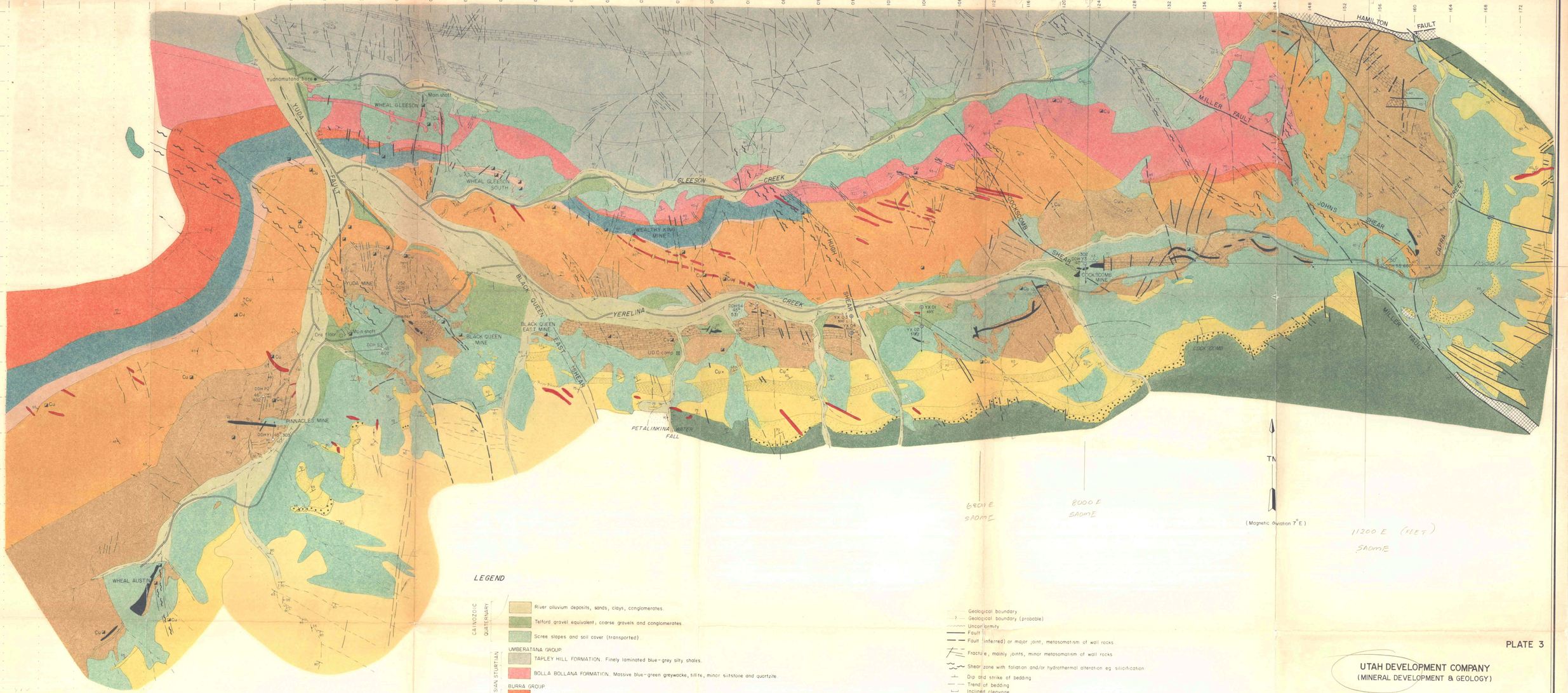
FEET 1000 0 2000 4000 6000 FEET
METRES 0 500 1000 1500 METRES

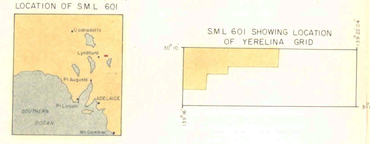
6.2

Report No. 199
June 1972
N.J. Rowlands
Adelaide

ENV 1731 (III) - 1

Fig. 2.





Project Senior Geologist N.J. Rowlands
Mapped by S.A. Mines Dept. (1970)
Redrawn by A.J. Hitchcock
Date May 1972
Office Adelaide S.A.

LEGEND

CAINOZOIC
QUATERNARY
- River alluvium deposits, sands, clays, conglomerates.
- Telford gravel equivalent, coarse gravels and conglomerates.
- Scree slopes and soil cover (transported).

PROTEROZOIC
ADELAIDEAN
TORRENSIAN STURTIAN
- UMBERATANA GROUP.
  - TAPLEY HILL FORMATION. Finely laminated blue-grey silty shales.
  - BOLLA BOLLANA FORMATION. Massive blue-green greywacke, tillite, minor siltstone and quartzite.
- BURRA GROUP.
  - WORTUPA QUARTZITE. Well bedded felspathic quartzite, in part poorly bedded. Minor arkosic grit and conglomerate.

WILLOURAN
- CALLANNA BEDS.
  - OPAMINDA FORMATION. Dark grey siltstones, green dolomitic shale, minor calc-silicate rocks and talcose magnesian dolomites, sandstone interbeds near top. Mud cracks, ripple marks.
  - BLUE MINE CONGLOMERATE. Arkosic conglomerate, minor felspathic quartzites and dark grey siltstones. Heavy mineral laminations, mud cracks.
  - WOOLTANA VOLCANICS. Melaphyres, amygdaloidal in part, minor andesite, calc-silicate metasediments, epidote quartzites.
  - WYWYANA FORMATION. Actinolitic marbles, amphibolites, minor calc-silicate hornfels and siltstones. Diapiric habit. Thin magnetite rich band, silicified at the surface giving prominent jasperoid outcrops.
  - PARALANA QUARTZITE. Medium grained grey orthoquartzites and grey-green argillaceous quartzites. Grey-green amphibolite. Basal quartzite.
  - SHANAHAN CONGLOMERATE MEMBER. Conglomerate, cobbles and pebbles of quartzite, granite porphyry and quartz.

CARPENTARIAN
- MOUNT PAINTER COMPLEX.
  - MOUNT NEILL GRANITE PORPHYRY. Massive red weathering granite porphyry, minor adamellite porphyry.
  - FREELING HEIGHTS QUARTZITE. Medium to coarse grained sericitic felspathic quartzites, minor argillaceous sandstones, arenaceous schists, grits and pebble beds, heavy mineral laminations, cross bedding, ripple marks.

- Fault breccia zone.
- Talc zone.
- Aplite or quartz vein.
- x Cu Copper occurrence — usually malachite in minor cross cutting quartz-iron-carbonate veins.

- Geological boundary.
- Geological boundary (probable).
- Unconformity.
- Fault.
- Fault (inferred) or major joint, metasomatism of wall rocks.
- Fracture, mainly joints, minor metasomatism of wall rocks.
- Shear zone with foliation and/or hydrothermal alteration eg silicification.
- Dip and strike of bedding.
- Trend of bedding.
- Inclined cleavage.
- Vertical cleavage.
- Dip and strike of jointing.
- Vertical jointing.
- Inclined foliation (in part probably parallel to bedding).
- Vertical foliation.
- South Australian Mines Dept diamond drill hole (depth, inclination and projection to surface).
- U.D.C. rotary percussion hole showing depth and projection to surface (inclination all holes = 60°).
- Open cut excavation.
- Spoil heap.
- Shaft or prospect with copper on dump.
- Costean.
- Adit.
- Creek.
- Track.
- Established grid point and sample site.

PLATE 3

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

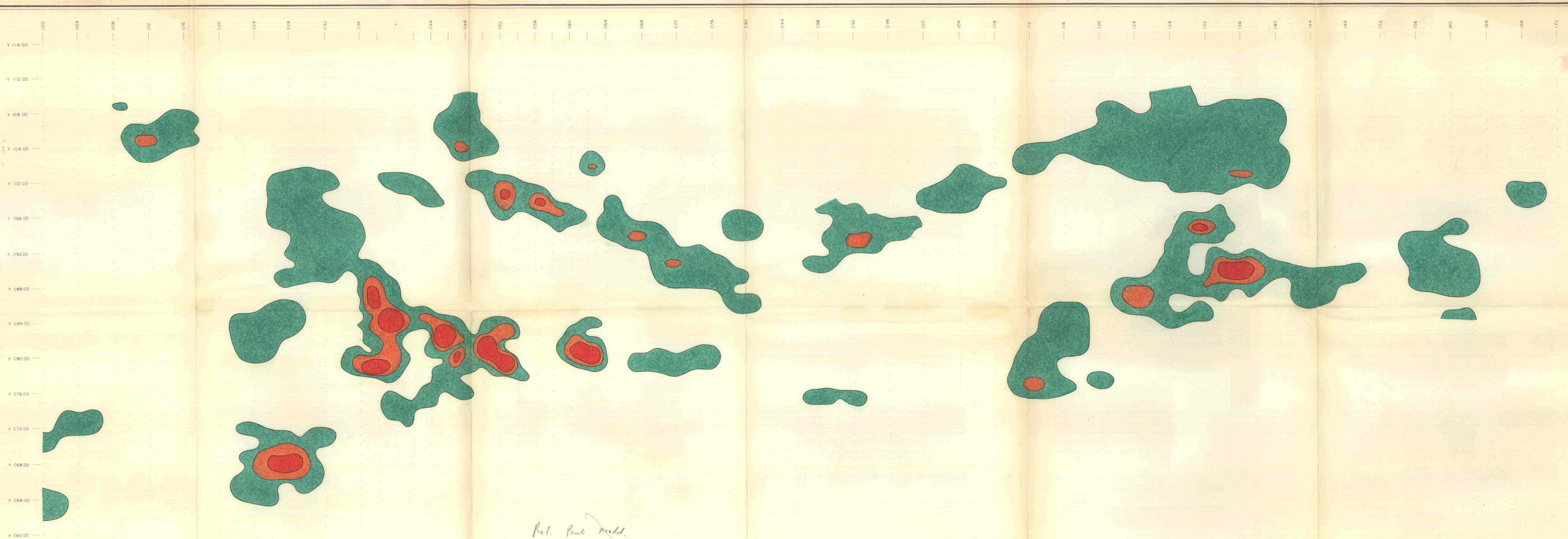
DETAILED GEOLOGY
YERELINA GRID
SPECIAL MINING LEASE 601
YUDNAMUTANA – SOUTH AUSTRALIA

Scale 1:5000

FEET 500 0 500 1000 1500 FEET
METRES 100 0 100 200 300 400 METRES

Report No. 199
June 1972
N.J. Rowlands
Adelaide

ENV 1731 (III) - 2



Ref. Point Headed.

Skew

Mrm "

See 5000 Scale Geological Plan.

COPPER CONTENT ppm

CONTOUR KEY

400 ppm — 1500 ppm Cu.

1500 ppm — 3000 ppm Cu.

3000 ppm > Cu.

INTERPRETATION PARAMETERS

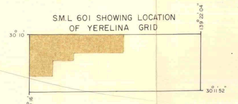
Background = 100 ppm.
Possible threshold = 400 ppm — contrast = 4:1.
Probable threshold = 1500 ppm — contrast = 15:1.

Contours redrawn from an original computer plot. Contour levels selected after assessment of computer plotted log probability diagrams.

Data on −80 mesh fraction.
Assay method − Perchloric acid attack and A.A.S. determination.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601

S.M.L. 601 SHOWING LOCATION OF YERELINA GRID



TN

(Magnetic deviation 7°E)

Project Senior Geologist N.J. Rowlands.
Computer plot by Lobtech. Midland. W.A.
Drawn by A.J. Hitchcox.
Date May 1972.
Office Adelaide. S.A.

PLATE 4

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

COPPER IN SOIL CONTOURS

YERELINA GRID

SPECIAL MINING LEASE NO. 601

YUDNAMUTANA − SOUTH AUSTRALIA

Scale 1:5000

FEET 500 0 500 1000 1500 FEET

METRES 100 0 100 200 300 400 METRES

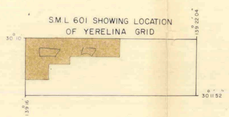
Report No. 199
June 1972
N.J. Rowlands
Adelaide

CONTOUR KEY

- 400 ppm — 1000 ppm Cu.
- 1000 ppm — 2500 ppm Cu.
- 2500 ppm — 1% Cu.
- 1% > Cu.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601

S.M.L. 601 SHOWING LOCATION OF YERELINA GRID



TN

(Magnetic deviation 7°E)

Project Senior Geologist N.J.Rowlands.
Computer plot by Lobtech. Midland. W.A.
Drawn By A.J.Hitchcox.
Date April 1972.
Office Adelaide. S.A.

INTERPRETATION PARAMETERS.

Background = 60 ppm.
Possible threshold = 2500 ppm — contrast = 42:1.
Probable threshold = 3000 ppm — contrast = 50:1.

Contours redrawn from an original computer plot. Contour levels selected after assessment of computer plotted log probability diagrams.

Data on — 80 mesh fraction (crushed).
Assay method — Perchloric acid attack and A.A.S. determination.

——— Approximate limits of ~~prospective~~ stratigraphic units.
— — — Interpreted limits of shear zones.

PLATE 5

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

COPPER IN ROCK CONTOURS
YERELINA GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA — SOUTH AUSTRALIA

Fig 10

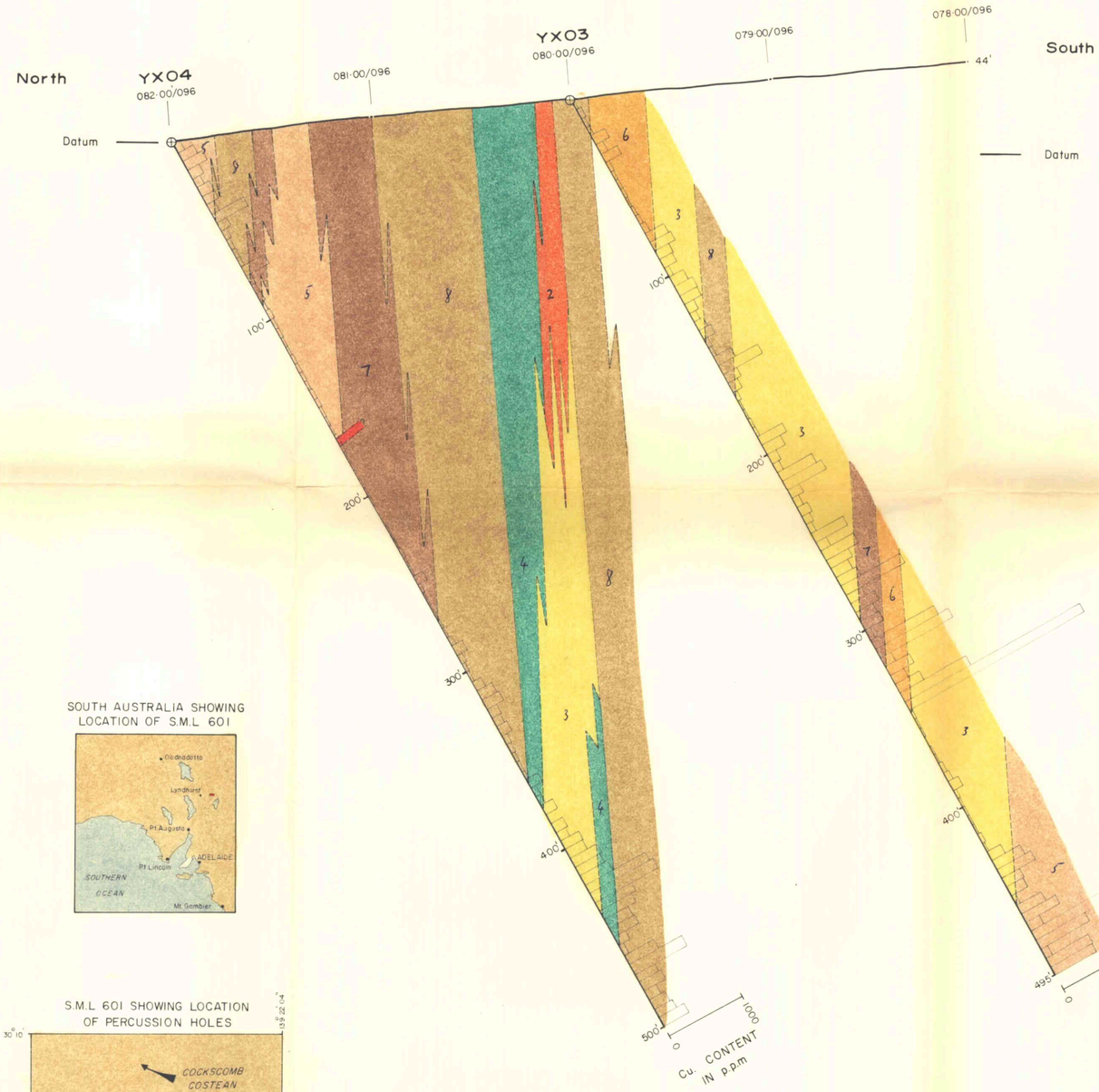
Scale 1:5000

FEET 500 0 500 1000 1500 FEET
METRES 100 0 100 200 300 400 METRES

Report No. 199
June 1972
N.J.Rowlands
Adelaide

ENV 1731 (III) — A Fig. 10.

10



Reference

WYWYANA FORMATION (Lower Callana beds)

8 SCHIST. Vague shistosity, green-grey amphibole grains, fine grained biotite. Often grades into hornfels. Pink felspar sometimes present (after argillaceous sediment?).

7 SCAPOLITE SCHIST. As above but containing blebs of scapolite up to 5mm. in diameter. Often constitutes up to 30% of total volume of rock. ? Scapolitization due to Paleozoic contact thermal metamorphism.

6 PYRITIFEROUS SCHIST. As for SCHIST but containing weak disseminated pyrite mineralization.

5 HORNFELS. Medium grained grey siliceous hornfels (after arenaceous siltstone?) sometimes scapolitized. Quartz, amphibole, mica, garnet in fine grains.

4 CALCITE – ACTINOLITE ASSEMBLAGE. Fibrous, bladed actinolite/tremolite and calcite, minor hematite, magnetite segregations. Calcite content

3 PYRITIFEROUS CALC-SILICATE ASSEMBLAGE. As above but containing 3-4mm. grains of disseminated pyrite.

2 JASPEROID. Craggy outcrops of limonite, hematite, chert, quartz and jasper. Replacement of iron-rich carbonate sediment by silica – ?hydrothermal or pedogenic (supergene).

Lower Paleozoic? (Younger granite suite)

1 QUARTZ VEIN, APLITE/PEGMATITE VEIN. Hydrothermally introduced.

Percussion holes drilled by Boring Enterprises, Hahndorf, S.A.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L 601

S.M.L 601 SHOWING LOCATION OF PERCUSSION HOLES

Project Senior Geologist	N.J.Rowlands.
Holes logged by	R.B.Kitch.
Correlation by	R.B.Kitch.
Drawn by	A.J.Hitchcox.
Date	March 1972.
Office	Adelaide S.A.

PLATE 6

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

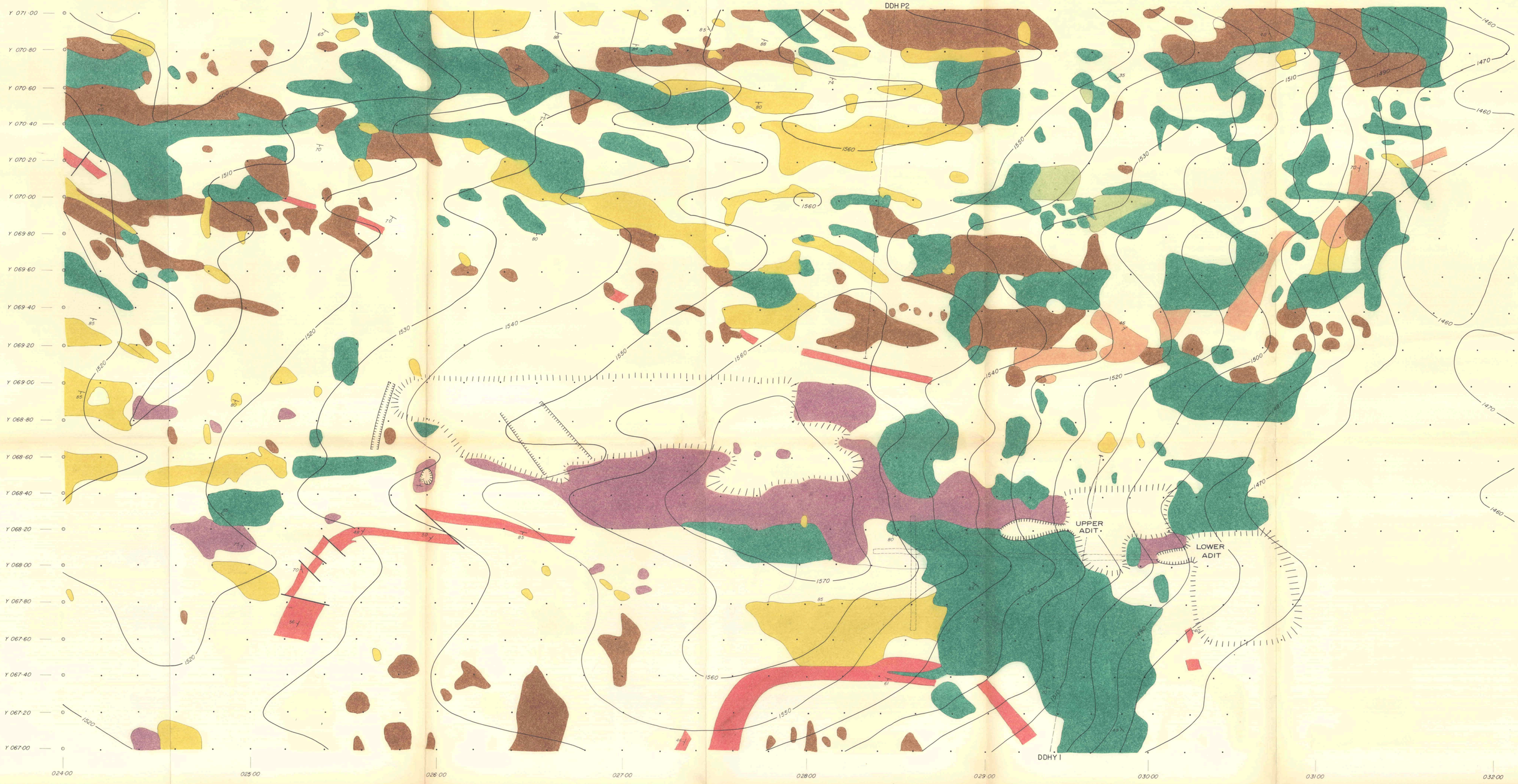
PERCUSSION DRILL HOLES YX03 & YX04
CORRELATION DIAGRAM
COCKSCOMB COSTEAN
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA

Scale 1:500

FEET 50 0 50 100 150 FEET
METRES 10 0 10 20 30 40 METRES

Report No. 199
June 1972
N.J.Rowlands
Adelaide

ENV 1731 (III) – 5



TN

(Magnetic deviation 7° E)

QUAT – ? TERTIARY ERNARY

Scree deposits and calcretion.

Jaspercid.
Cryptocrystalline silica replacement of a carbonate – rich lithology. Malachite staining evident.

LOWER PROTEROZOIC (WILLOURAN) LOWER CALLANA BEDS – WYWYANA FORMATION

Carbonate – poor amphibolite.
Massive, often silicified, sheaves of actinolite and tremolite.

Carbonate – rich amphibolite.
Actinolite and tremolite assemblage with both milky and pink calcite.

Actinolite marble.
Impure marble containing varying amounts of actinolite and tremolite.

Hornfels.
Scapolite developed in minor patches. In places porcelanitic or spilositic.
Megascopically different. Considered to reflect a facies change in the original unit.

Quartz – haematite – (magnetite).
Usually occurs in veins.

Excavation or adit.

Spoil heap.

Established baseline peg.

Established grid point.

Dip and strike of bedding.

Strike of vertical bedding.

1510 Topographic contour.

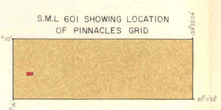
Projected underground workings.

Approximate position of projected Mines Dept. diamond drill holes.

Fault.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601

S.M.L. 601 SHOWING LOCATION OF PINNACLES GRID



Project Senior Geologist N.J. Rowlands.
Mapped by P.J. Edwards, A.J. Drummond.
Drawn by A.J. Hitchcox.
Date February 1972.
Office Adelaide S.A.

PLATE 7

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

DETAILED GEOLOGY
PINNACLES GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA – SOUTH AUSTRALIA

Scale in feet

20 0 20 40 60 80 100

Contour Interval 10 Feet

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N.J. Rowlands
Adelaide

ENV 1731 (III) – 6

Y 071·00

Y 069·00

Y 067·00

024·00

025·00

026·00

027·00

028·00

029·00

030·00

031·00

032·00

A

B

Anticline with overturned limb — direction of plunge shown

Syncline with overturned limb — direction of plunge shown

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601

S.M.L. 601 SHOWING LOCATION OF PINNACLES GRID

Project Senior Geologist	N.J. Rowlands
Mapped by	P.J. Edwards A.J. Drummond
Interpretation by	P.J. Edwards
Drawn by	A.J. Hitchcock
Date	February 1972
Office	Adelaide S.A.

TERTIARY — RECENT

Mine dump, rubble and scree

Jasperoid

WILLOURAN LIMESTONE

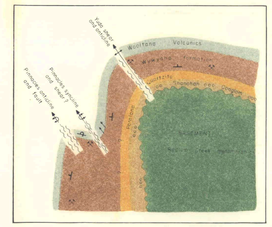
Amphibolite
Both carbonate rich and carbonate poor.

Amphibolitic marble

Marble
Actinolitic marble

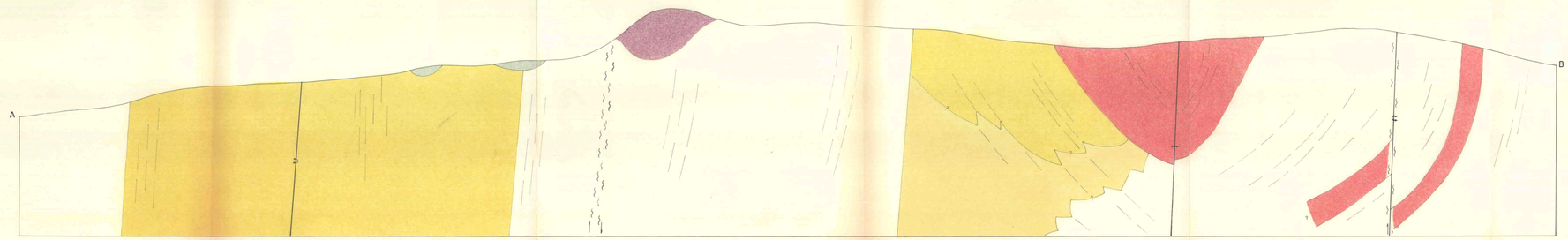
Hornfels.

TECTONIC SKETCH



Scale approximate

INTERPRETATIVE GEOLOGICAL CROSS SECTION AB.



Anticline with overturned limb — direction of plunge shown.

Syncline with overturned limb — direction of plunge shown.

Dip and strike of bedding.

Dip and strike of overturned bedding.

Fault with shearing — direction of faulting shown.

Direction of plunge of mesoscopic fold.

Facing (arrow indicates top of bed.)

Geological boundary.

Grid baseline orientation points.

Grid orientation points.

TN

(Magnetic deviation 7°E)

PLATE 8

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

INTERPRETATIVE GEOLOGY

PINNACLES GRID

SPECIAL MINING LEASE 601

YUDNAMUTANA — SOUTH AUSTRALIA

Scale in feet

20 0 20 40 60 80 100

Report No. 199
June 1972
N.J.Rowlands.
Adelaide.

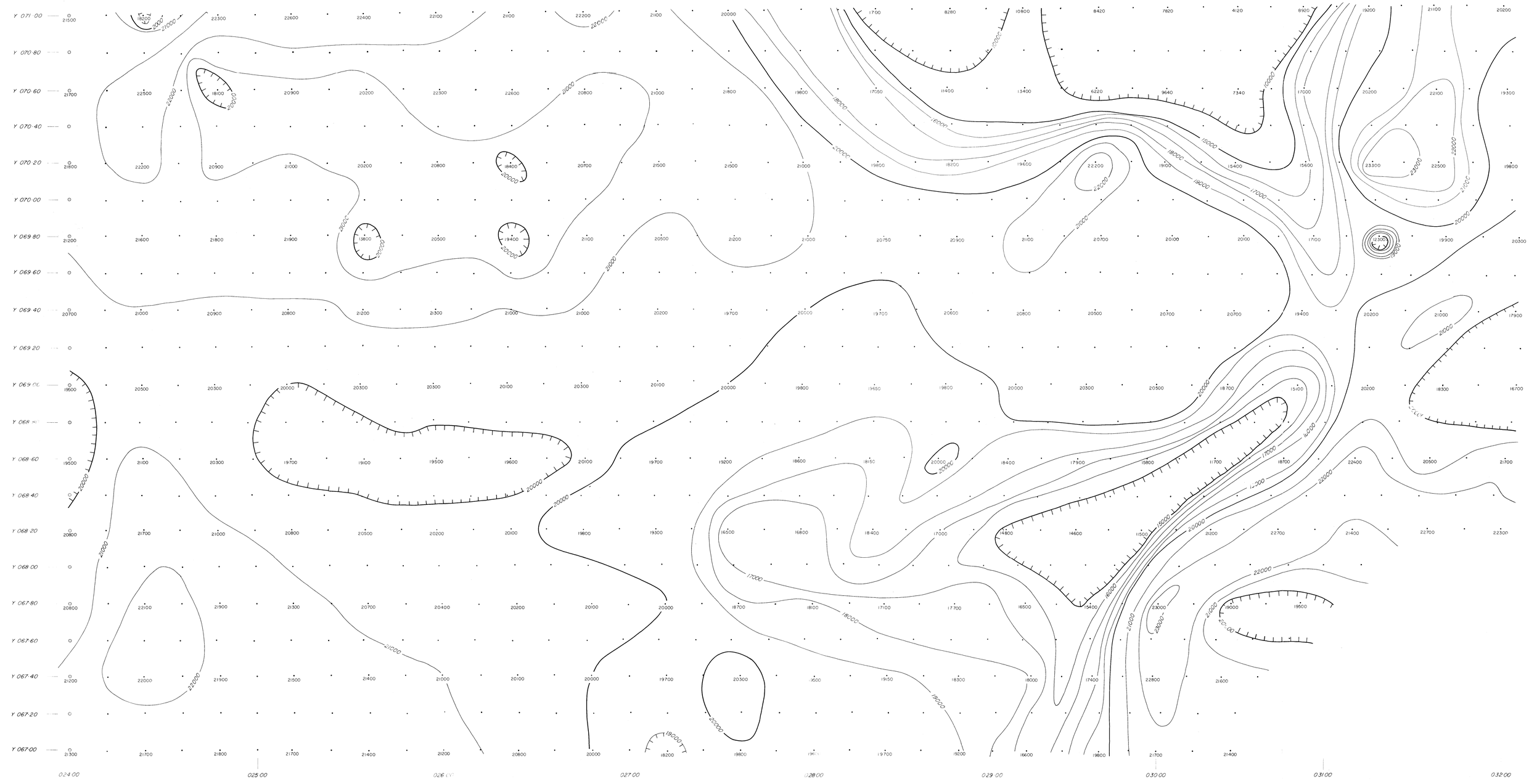


PLATE 9

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

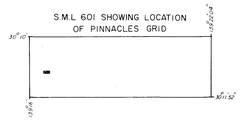
TN

(Magnetic deviation 7°E)

Base Station Y 071·00 / 028·40
Instrument MacPhar M 700.
— 15000 — Contour in gammas.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L 601

S.M.L 601 SHOWING LOCATION OF PINNACLES GRID



Project Senior Geologist N.J.Rowlands.
Surveyed by P.J.Edwards. P.M.Gruythuysen.
Drawn by A.J.Hitchcox.
Date February 1972.
Office Adelaide S.A.

VERTICAL FIELD MAGNETIC INTENSITY

PINNACLES GRID

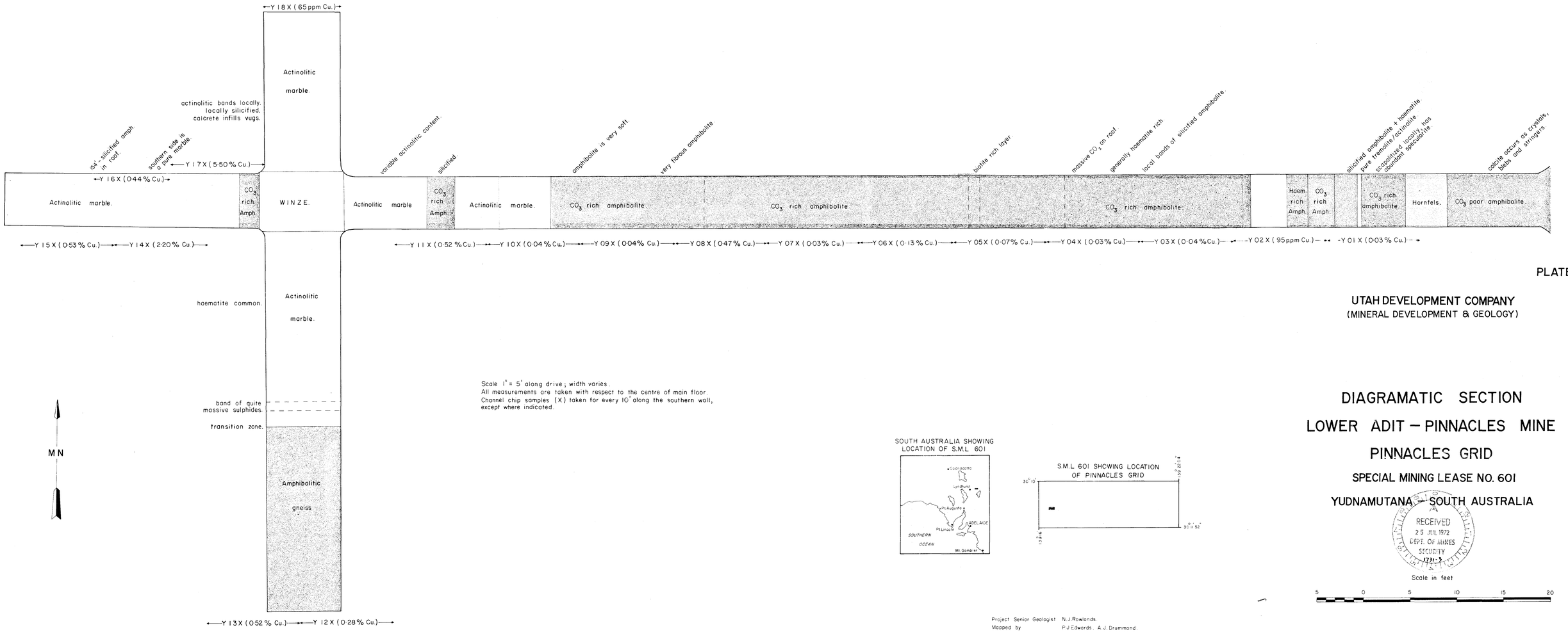
SPECIAL MINING LEASE NO. 601

YUDNAMUTANA — SOUTH AUSTRALIA

Scale in feet

20 0 20 40 60 80 100

Report No. 199
June 1972
N.J.Rowlands.
Adelaide.



Scale 1" = 5' along drive; width varies.
All measurements are taken with respect to the centre of main floor.
Channel chip samples (X) taken for every 10' along the southern wall, except where indicated.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601

S.M.L. 601 SHOWING LOCATION OF PINNACLES GRID

PLATE 10

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

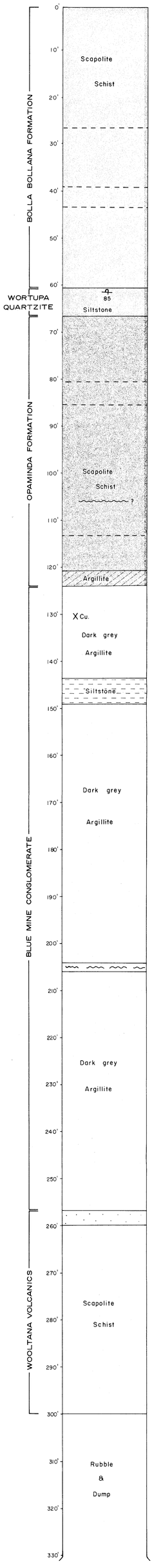
DIAGRAMATIC SECTION
LOWER ADIT — PINNACLES MINE
PINNACLES GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA — SOUTH AUSTRALIA

Scale in feet

5 0 5 10 15 20

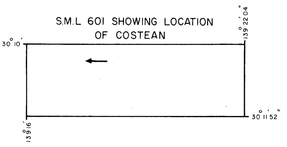
Project Senior Geologist N.J.Rowlands.
Mapped by P.J.Edwards, A.J.Drummond.
Drawn by A.J.Hitchcox.
Date February 1972.
Office Adelaide S.A.

Report No. 199
June 1972
N.J.Rowlands.
Adelaide.



SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L 601

S.M.L 601 SHOWING LOCATION OF COSTEAN



Project Senior Geologist	N.J.Rowlands.
Mapped by	P.J.Edwards A.J.Drummond.
Drawn by	A.J.Hitchcox.
Date	February 1972.
Office	Adelaide S.A.

Actual width of costean is 6-8 feet.
All measurements are taken with respect to the centre of the costean.

PLATE II

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

DIAGRAMATIC SECTION
WHEAL GLEESON COSTEAN
YERELINA GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA - SOUTH AUSTRALIA

Scale in feet

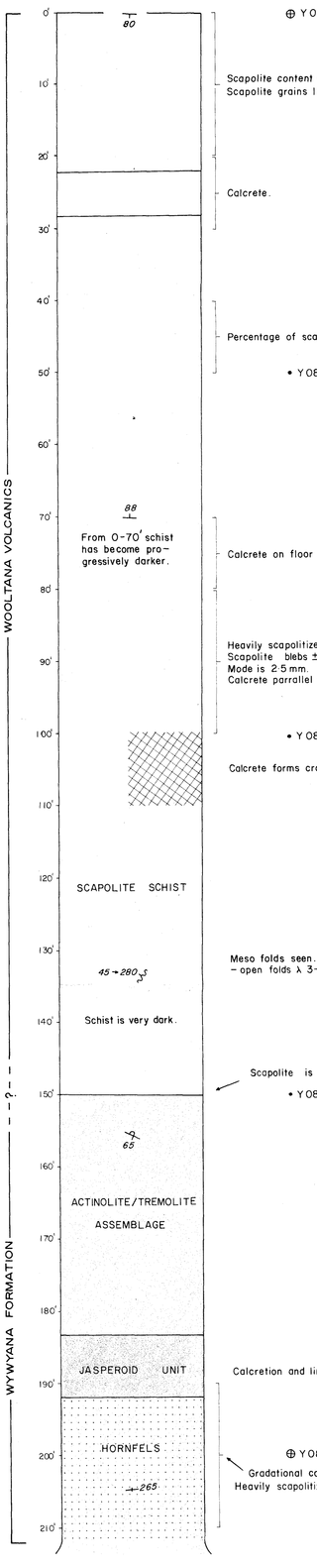
10 0 10 20 30 40

Report No. 199
June 1972.
N.J.Rowlands.
Adelaide.

ENV 1731(III) — 10

UTAH DEVELOPMENT COMPANY
(MINERAL DEVELOPMENT & GEOLOGY)

DIAGRAMATIC SECTION
COCKSCOMB COSTEAN
YERELINA GRID
SPECIAL MINING LEASE NO. 601
YUDNAMUTANA - SOUTH AUSTRALIA



YX 04
⊕ Y 082·00/096

Scapolite content variable.
Scapolite grains 1-2 mm.

Calcrete.

Percentage of scapolite up to 40%.

• Y 081·50/096

Calcrete on floor and walls.

Heavily scapolitized.
Scapolite blebs ± 5mm.
Mode is 2·5 mm.
Calcrete parrallel to ? secondary clevage.

• Y 081·00/096

Calcrete forms cross-cutting veinlets.

Meso folds seen.
- open folds λ 3-4 cm.

Scapolite is 5%.

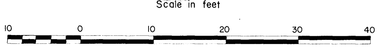
• Y 080·50/096

Calcretion and limonitization has occurred.

YX 03
⊕ Y 080·00/096

Gradational contact with a finely laminated hornfels.
Heavily scapolitized. Blebs are 1 mm.

Scale in feet

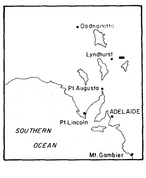


Report No. 199
June 1972
N.J.Rowlands.
Adelaide.

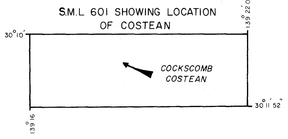
⊕ Percussion drill hole.
• Grid point.

Actual width of costean is 6-8 feet.
All measurements are taken with respect to the centre of the costean.
Strike of costean is 178° M.

SOUTH AUSTRALIA SHOWING LOCATION OF S.M.L. 601



S.M.L. 601 SHOWING LOCATION OF COSTEAN



Project Senior Geologist	N.J.Rowlands.
Mapped by	P.J.Edwards. A.J. Drummond.
Drawn by	A.J.Hitchcox.
Date	February 1972.
Office	Adelaide S.A.