ANNUAL REPORT ON EXPLORATION LICENCE

NO. 228

Compiled

by

R.G. COLVILLE

TENNANT CREEK, N.T.          AUGUST, 1975.
ANNUAL REPORT ON EXPLORATION LICENCE NO. 228

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1. **INTRODUCTION**

Exploration Licence No.228 held by Geopeko Limited and Australian Ores and Minerals Limited, was granted on the 21st May, 1972. It was renewed for a further twelve month period on the 21st May, 1973 and the area held under Licence was not reduced. A further renewal of the Exploration Licence was granted on the 21st May, 1974 and in accordance with Section 38 B Sub-section (1) of the Northern Territory Mining Ordinance 1939-1972, the area under Licence was halved.

The Exploration Licence covers an area of 237 sq.kms (91.5 sq.mls.) and its north-eastern corner is situated 28 kms on a true bearing of 236° from Tennant Creek. (see Fig.1).

Access to the Exploration Licence is via a bitumen road from Tennant Creek to the Warrago Mine of Peko Mines Ltd., thence 11.5 kms along the Wiso Bore road, to a formed dirt track that runs south for approximately 63 kms to Geopeko Limited's Rover Camp at the Rover 1 Prospect which lies on the southern boundary of the Exploration Licence. Lateral access within the Exploration Licence is via a graded track to the east and west of the Rover Camp. The track to the east provides an alternate access route to the Exploration Licence via either a track from Cabbage Gum Bore or a track from Kelly Well. Both tracks join at Kelly West, which is situated approximately 20 kms east of the Exploration Licence boundary.

This report outlines the exploration activities conducted by Geopeko Limited on the Exploration Licence for the twelve month period from the 22nd May, 1974 to the 21st May, 1975 and is the third statutory Annual Report to be presented.

Prior to the area being held as an Authority to Prospect by Australian Ores and Minerals Limited, an area which embraces the Exploration Licence was covered by an aeromagnetic survey by the Bureau of Mineral Resources. An additional low level aeromagnetic survey was conducted over the area by Geophysical Resources Development for Australian Ores and Minerals Limited in 1970-71 while the area was held as an Authority to Prospect. The tenure was subsequently converted to an Exploration Licence.
During the twelve month period, ending 21st May, 1975, two aeromagnetic anomalies detected in the 1970-71 low level aeromagnetic survey were located on the ground and covered with reconnaissance magnetics using the vehicle magnetometer-navigator. These were named the Rover 9 and Rover 15 Prospects.

The Rover 14 Prospect Grid was extended to the west to cover an aeromagnetic anomaly not previously located. This was named the Rover 16 Prospect. Reconnaissance ground magnetic traverses were conducted over the grid.

Grid extensions were surveyed in on the Rover 5 and 7 Prospects and ground magnetics carried out over the extensions.

Diamond Drilling continued on the mainbody at Rover 1 Prospect, two wedge run offs from DDH 2 were completed. A further two holes were collared, one was completed, one was abandoned.

An analysis of the results of the Rover 14 ground magnetics survey, utilising computer model studies was undertaken and a diamond drilling target was determined. Three diamond drill holes were collared on the prospect, two were completed and one was abandoned.

Leases on the Rover 7, Rover 8, Rover 9 & Rover 15 Prospects were surveyed in and applications submitted to the Mines Branch.
2. **TENURE**

The following is a list of Mineral Leases, either granted or under application, within Exploration Licence No.228.

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</table>

**NOTE:** ML 714E; ML 715E; ML 718E; ML 719E; ML 720E; ML 721E which cover part of the Rover 13 Prospect are situated outside the northern boundary of Exploration Licence.
3. **REGIONAL GEOLOGY**

The Exploration Licence is devoid of outcrop. Diamond drilling at Rover 1 and Rover 14 Prospects' in conjunction with information extrapolated from adjacent regional geology has established the stratigraphic succession shown in Table 1 below.

**TABLE 1.**

**Regional Stratigraphy of Exploration Licence No.228.**

<table>
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<th>Era</th>
<th>Period</th>
<th>Rock Unit</th>
<th>Lithology of sub-unit</th>
<th>Thickness</th>
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<tr>
<td>Cainozoic</td>
<td>Quaternary</td>
<td>Surficial Deposits</td>
<td>Sand, silt lateritic gravel</td>
<td>1-3m</td>
</tr>
<tr>
<td></td>
<td>Tertiary</td>
<td>Surficial Deposits</td>
<td>Pisolitic Laterite</td>
<td>1-3m</td>
</tr>
<tr>
<td>Palaeozoic</td>
<td>Middle Cambrian</td>
<td>Merrina Beds</td>
<td>Interbedded siltstone and dolomite</td>
<td>30-85m</td>
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<td></td>
<td></td>
<td></td>
<td>Dolomite</td>
<td>12-40m</td>
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<td>Sandstone and conglomerate</td>
<td>6-35m</td>
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<td></td>
<td></td>
<td></td>
<td><strong>Unconformity varies from 123-132m</strong></td>
<td>Vertical depth</td>
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<tr>
<td>Pre Cambrian</td>
<td>Lower Proterozoic</td>
<td>Warramunga Group</td>
<td>Shale, siltstone with minor fine greywacke, quartzite and chert</td>
<td>greater than 400m</td>
</tr>
</tbody>
</table>

The Cambrian is known to extend to the west and south of the Exploration Licence. The sediments are indicative of a shallow sea (dolomite, stromatolites, fossil detritus) with generally calm sedimentation conditions (some individual beds can be correlated over at least 70kms). The varying thickness and lack of lateral extent of the basal conglomerate unit is indicative of channel filling deposits. Within the Exploration Licence
the variation on the depth of the unconformity is small, this suggests a fairly well peneplained Precambrian land surfaces prior to Middle Cambrian deposition.

The extent and depth of the Warramunga Group sediments is unknown. The sequence consists of very fine grained clastic sediments. Bedding appears to be vertical and in most instances, cleavage parallels bedding.

Trends in the aeromagnetic results suggest major faulting.
4. REGIONAL GEOPHYSICS

Geophysical surveys that have been carried out over the area embracing the Exploration Licence are two aeromagnetic surveys in 1956 and 1960 by the Bureau of Mineral Resources and a low level aeromagnetic survey by Australian Ores and Minerals Limited in 1970-71.

The most prominent features of the low level aeromagnetic survey is the WNW-ESE magnetic ridge which cuts across the western half of the Exploration Licence. One of the anomalies (Rover 14 Prospect) adjacent to this ridge has been tested by diamond drilling and found to be due to a discrete ironstone body.

The magnetic character over the remainder of the Exploration Licence is featureless except for six magnetic highs in the extreme eastern area of the Exploration Licence. The largest of these (Rover 1 Prospect) has been tested with diamond drilling and found to be due to a large discrete ironstone body, with a smaller body developed to the west.

During the twelve month period from May 22nd, 1974 to May 21st, 1975, in addition to the twelve aeromagnetic anomalies previously investigated two low level aeromagnetic anomalies were located on the ground using the vehicle magnetometer-navigator. They are as follows:-

1. An anomaly situated at the intersection of latitude 19°58'58" with longitude 133°25'00". The anomaly was named the Rover 9 Prospect.

2. A linear anomaly whose northern high point is situated at the intersection of latitude 19°55'34" with longitude 133°26'03". The anomaly was named the Rover 15 Prospect.

The Rover 14 Prospect grid was extended to cover an anomaly situated at the intersection of latitude 19°52'23" with longitude 133°29'34". This anomaly was named the Rover 16 Prospect.
5. **PROSPECT EVALUATION**

5.1 **ROVER 1 PROSPECT**

5.1.1 **Location**

Rover 1 Prospect is situated 68 kms on a true bearing of 235° from Tennant Creek at the intersection of latitude 20° 00' 00" with longitude 133°39'08". Access (see Fig.1) is via a formed dirt road to a point 11.5 kms west of the Warrego Mine, thence on a dirt track in a southerly direction for 63 kms.

5.1.2 **Summary of Previous Activities**

The prospect is covered by five mineral leases (ML 543E to ML 546E inclusive and ML 679E). A grid has been established and a total force magnetic survey using a Geometric Magnetometer conducted over it.

Initial analysis of the ground magnetic survey indicated a target which when subsequently tested by diamond drilling in 1972 gave a negative result. A re-analysis of the geophysical data delineated the presence of two discrete bodies. Rover 1 DDH 2 and subsequent wedge run offs were designed to test the eastern H 20 body. Rover 1 DDH 3 was designed to test the western J 80 body.

5.1.3 **Summary of Activities for the Year Ending May 31st, 1975.**

(a) **Geology**

One hole (DDH 4) and two wedge run offs (DDH 2 WRO 6, WRO 7) were completed during the twelve month period. One hole was collared (DDH 5) but was abandoned.

The additional holes have not significantly altered the geology of the Rover 1 Prospect as described in the last Annual Report.

Detailed geological analysis of cross and longitudinal sections has delineated the presence of a mainbody and satellite body, within the H 20 body.

Results of Rover 1 DDH 2 WRO 6 have indicated the depth limit of the H 20 body to be approximately 600m vertically below the surface. Rover 1 DDH 2 WRO 7 confirmed the results intersected in DDH 2 WRO 1 and
WRO 2.

Rover 1 DDH 4 is the most eastern intersection of the proposed geophysical model for the body. The results were encouraging, in that, it is likely the so far untested eastern half of the body is also mineralised. The hole also has indicated a thickening of the satellite body with sympathetic thinning of the main body within the H 20 body in an eastwards direction.

(b) Diamond Drilling

i. ROVER 1 DDH 2 WRO 6

Collar Co-ordinates: Grid 1106E; 734N;
AMG Co-ordinates: 358000E; 7787550N.
Latitude: 20°00'13" Longitude: 133°38'54"
Bearing: 011° Grid: 015.5° Magnetic
Inclination: -80°
Target: 560m vertically below grid co-ordinates 1160E, 895N.

Hole Summary

BX Hall Rowe Wedge placed at 394.0m

395.4-582.5m Sequence of interbedded shale, siltstone hematite shale and chloritic shale. Silicification common from 474.4m. Typical Warramunga Group Sediments.

582.5 - 585.0m Magnetite-pyrite-hematite-chlorite lode.
585.0 - 586.0m Silicified chloritic shale.
586.0 - 587.05 Magnetite-chlorite lode.
587.05-591.5m Silicified chloritic shale
591.5 -593.6m Magnetite-hematite-pyrite-chlorite lode.
593.6 -596.5m Silicified chloritic shale.
596.5- 599.3m Magnetite-pyrite-hematite-chlorite lode.
599.3 -645.0m Silicified chloritic shale.
645.0 -650.5m Pyrite-chlorite-chloritic shale (Mineralised sediment)

650.5 -667.0m Silicified chloritic shale.
Economic Summary

Both lode intersections and sections between the lode intersections had subeconomic copper values (0-8% maximum value from 582.0-600.0m average 0.065% Cu) and subeconomic gold values (6.1 g/mt maximum value; from 626-631m averaged 2.6 g/mt).

See Appendix 1 for the core log of Rover 1 DDH 2 WRO 6. A plan and profile of the hole showing the detailed geology and structure is shown in Fig.5.

ii. ROVER 1 DDH 2 WRO 7.

Collar Co-ordinates: Grid 1106E, 734N.
AMG Co-ordinates: 358000E, 7787550N.
Latitude: 20°00'13" Longitude 133°38'54".
Bearing: 011 Grid; 015.5 Magnetic
Inclination: -80°
Target: 400m vertically below grid co-ordinates 1160E, 886N.

Hole Summary

BX Hall Rowe wedge placed at 203m.
203.0 - 406.3m Sequence of interbedded shale, chloritic shale, silicified shale, hematite shale and quartzitic siltstone Sequence is considered to be Warramunga Group sediments.
406.3 - 431.0m Quartz-hematite-magnetite lode.
431.0 - 450.2m Chloritic shale and siltstone
450.2 - 506.6m Quartz-magnetite-hematite-pyrite lode.
506.0 - 553.3m Chloritic shale and greywacke with several small jasper-hematite lodes.

Economic Summary

Patchy high copper values and negligible gold and bismuth values were intersected in the two ironstone lodes. Summary of assay results is as follows:

428 - 431m 4.57% Cu, 0.2 g/mt Au, 0.03% Bi.
460 - 465m 1.54% Cu, 0.36 g/mt Au, 0.04% Bi.

See Appendix 1 for the core log Rover 1 DDH 2 WRO 7. The plan and profile of the hole showing detailed geology and structures shown in Fig.6.
iii. ROVER 1 DDH 4

Collar Coordinates: Grid 1163.50E, 642.05N
AMG Coordinates: 359100 E, 7787500 N
Latitude 19°05'9.44". Longitude 133°39'10".
Bearing: 10° Grid, 5.3° Magnetic.
Inclination: -76°
Target: 500m vertically below grid coordinates 1200E, 890N.

Hole Summary.

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-67.0</td>
<td>No core.</td>
</tr>
<tr>
<td>67-110.25</td>
<td>Dolomite, silty dolomite.</td>
</tr>
<tr>
<td>110.25-138.40</td>
<td>Siltstone, sandstone, conglomerate.</td>
</tr>
<tr>
<td>138</td>
<td>Unconformity-Merrina Beds/Warramunga Group.</td>
</tr>
<tr>
<td>138.40-163.2</td>
<td>Phyllitic shale.</td>
</tr>
<tr>
<td>163.2-178.0</td>
<td>Chloritic shale.</td>
</tr>
<tr>
<td>178.0-182.0</td>
<td>Cherty shale.</td>
</tr>
<tr>
<td>182.0-494.4</td>
<td>Phyllitic, hematite, chloritic shale and siltstone.</td>
</tr>
<tr>
<td>494.4-545.65</td>
<td>Quartz, calcite-magnetite-hematite lode. Minor copper mineralisation.</td>
</tr>
<tr>
<td>545.65-553.5</td>
<td>Cherty slightly chloritic shale.</td>
</tr>
<tr>
<td>553.5-571.15</td>
<td>Magnetite-hematite-pyrite lode, with minor quartz jasper, calcite and chlorite. (Cherty) chloritic shale and quartzitic siltstone.</td>
</tr>
<tr>
<td>571.15-581.0</td>
<td>Chloritic shale and siltstone.</td>
</tr>
<tr>
<td>581.0-611.0</td>
<td>Chloritic shale and siltstone.</td>
</tr>
</tbody>
</table>

Economic Summary.

Two ironstone lodes with substantial subeconomic copper mineralisation and patchy gold and bismuth mineralisation were intersected.

539-540m: 5.86% Cu 2.0 g/mt Au, 0.06% Bi.
540-541m: 5.00% Cu 3.2 g/mt Au, 0.04% Bi.
overall 535-546m: 2.39% Cu 4.0 g/mt Au, 0.01% Bi.

545-546m: 3.44% Cu 33.8 g/mt Au, 0.64% Bi.
546-547m: 0.64% Cu 8.7 g/mt Au, 2.82% Bi.
551-552m: 1.26% Cu, 0.3 g/mt Au, 0.1% Bi.

See Appendix 2 for core log of Rover 1 DDH 4. The plan and profile showing detailed geology and structure is shown in Fig. 7.
iv. **ROVER 1 DDH 5**

**Collar Coordinates:** Grid 1163E, 616N.

**AMG Coordinates:** 359100E, 7787320 N

**Latitude** 20°00'16" **Longitude** 133°39'10"

**Bearing:** 10° Grid, 5.5° Magnetic.

**Inclination:** -75°

**Target:** 390m vertically below Grid Coordinates 1200E, 868N.

**Hole Summary.**

- 0-44m No core.
- 44-63.0m Silty clay.
- 63-71.92m Dolomitic siltstone interbedded with silty mudstone.
- 79.92-110.0m Dolomite.
- 110 - 116.0m Medium to coarse grained sandstone.
- 116.0-124.3m Dolomitic siltstone.
- 124.3-130.0m Sandstone and conglomerate.

The hole was abandoned when the NQ rod string became stuck and could not be retrieved. The above sequence is considered to be part of the Middle Cambrian Marrina Beds.

See Appendix 3 for core log, Rover 1 DDH 5. See Fig. 8 for Plan and Profile.

5.2. **ROVER 4 PROSPECT.**

5.2.1 **Location.**

Rover 4 Prospect is situated approximately 2.15kms on a true bearing of 028° from the Rover 1 Prospect, at the intersection of latitude 19°59'03" with longitude 133°39'44". Access (see Fig. 3) is via the Wiso Bore - Rover Camp road to a point where a graded track turns east for 0.9kms to the Rover 4 datum post.

5.2.2. **Summary of Previous Activities.**

The prospect is covered by four mineral leases (ML 685E to ML 688E inclusive,) which have been granted. A grid has been established and read with an Askania magnetometer.

5.2.3 **Summary of Activities for the Year Ending May 21st, 1975.**

a) The following grid extensions were surveyed in on Rover 4.

<table>
<thead>
<tr>
<th>Traverses</th>
<th>from</th>
<th>to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950E</td>
<td>2500N</td>
<td>3700N</td>
</tr>
<tr>
<td>2050E</td>
<td>2500N</td>
<td>3700N</td>
</tr>
<tr>
<td>2150E</td>
<td>2500N</td>
<td>3700N</td>
</tr>
</tbody>
</table>
2500E from 2500N to 3700N
2600E " 2500N " 3700N

(b) Geophysics.
The whole of the Rover 4 grid (i.e., the original grid and the above extensions) was resurveyed using an elevated sensor magnetometer. An additional magnetometer was used to monitor the magnetic drift (for results see Fig. 2). An analysis of the magnetic results using computer model studies was undertaken and a target for Rover 4 DDH 1 was determined.

(c) Drilling.
General
A drill pad and an all weather access track from Rover Camp has been constructed.

5.3. ROVER 5 PROSPECT.
5.3.1 Location.
Rover 5 Prospect is situated 6 kms on a true bearing of 017° from the Rover 1 Prospect at the intersection of latitude 19°56'58" with longitude 133°40'07". Access (see Fig. 3) is via the Wiso - Rover Camp road, the prospect is immediately east of the road approximately 7kms north of the Rover Camp.

5.3.2 Summary of Previous Activities.
The prospect is covered by nine Mineral Leases (ML 723E to ML 731E inclusive), which have been granted. A grid has been established and read using the Geometrics S9566 Magnetometer.

5.3.3 Summary of Activities for the Year Ending May 21st, 1975.
(a) Grid Surveys
Grid extensions on Rover 5 consisted of traverses 2400E, 2800E, being surveyed from 7200N to 8000N.

(b) Geophysics
The above grid extensions were read using an elevated sensor magnetometer. For results see Fig. 13.

5.4. ROVER 7 PROSPECT.
5.4.1 Location.
Rover 7 Prospect is situated approximately 9kms on a true bearing of 45° from the Rover 1 Prospect. It consists of two anomalies situated at the intersections of latitude 19°56'26" with longitude 133°42'26" and latitude 19°57'14" with longitude
133°43'27". Access (see Fig. 3) is via the Wiso Bore - Rover Camp road to a point 7kms north of the Rover Camp to a well defined vehicle track that runs east for 7kms to the Rover 7 anomalies.

5.4.2 Summary of Previous Activities.
The aeromagnetic anomaly was located on the ground using the vehicle magnetometer navigator.

5.4.3 Summary of Activities for the Year Ending May 21st, 1975.

(a) Grid Surveys.
The Rover 5 baseline (6700N) was extended from 4000m to 8900m. The following cross traverses were surveyed in:

<table>
<thead>
<tr>
<th>Grid</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>6600E</td>
<td>6700N</td>
<td>8200N</td>
</tr>
<tr>
<td>6800E</td>
<td>6700N</td>
<td>8200N</td>
</tr>
<tr>
<td>7000E</td>
<td>6700N</td>
<td>8300N</td>
</tr>
<tr>
<td>8500E</td>
<td>6700N</td>
<td>5700N</td>
</tr>
<tr>
<td>8700E</td>
<td>6700N</td>
<td>5700N</td>
</tr>
<tr>
<td>8900E</td>
<td>6700N</td>
<td>5700N</td>
</tr>
</tbody>
</table>

NB: Grid coordinates are relative to the Rover 1 datum.

(b) Tenure.
Eight Mineral Leases have been surveyed in on Rover 7 (see Fig. 3), four covering each anomaly. The Leases are Geopeko Limited and Australian Ores and Minerals Limited. The details are as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Area</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 915E</td>
<td>16ha</td>
<td>Rover 7 No. 1</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 916E</td>
<td>16ha</td>
<td>Rover 7 No. 2</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 917E</td>
<td>16ha</td>
<td>Rover 7 No. 3</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 918E</td>
<td>16ha</td>
<td>Rover 7 No. 4</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 919E</td>
<td>16ha</td>
<td>Rover 7 No. 5</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 920E</td>
<td>16ha</td>
<td>Rover 7 No. 6</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 921E</td>
<td>16ha</td>
<td>Rover 7 No. 7</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 922E</td>
<td>16ha</td>
<td>Rover 7 No. 8</td>
<td>Under Application</td>
</tr>
</tbody>
</table>

(c) Geophysics.
The Rover 7 grid was covered by an elevated sensor magnetometer survey. For results see Fig. 14.
5.5 ROVER 8 PROSPECT.

5.5.1 Location.

Rover 8 Prospect is situated approximately 20kms on a true bearing of 274° from the Rover 1 Prospect at the intersection of latitude 19°59'03" with longitude 133°27'40". Access (see Figs. 3 & 4) is via a graded track to a point approximately 20kms west of Rover 1 Prospect thence in a southerly direction on a well defined vehicle track for 15kms.

5.5.2 Summary of Previous Activities.

A grid has been established over the anomaly and a total magnetic force survey conducted over the grid using the Geometrics SN566 Magnetometer.

5.5.3 Summary of Activities for the Year Ending May 21st, 1975.

(a) Tenure.

Four mineral leases were surveyed in over the prospect (see Fig. 4). The Leases are Geopeko Limited and Australian Ores and Minerals Limited. The details are as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Area</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 911E</td>
<td>16 ha</td>
<td>Rover 8 No. 1</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 912E</td>
<td>16 ha</td>
<td>Rover 8 No. 2</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 913E</td>
<td>16 ha</td>
<td>Rover 8 No. 3</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 914E</td>
<td>16 ha</td>
<td>Rover 8 No. 4</td>
<td>Under Application</td>
</tr>
</tbody>
</table>

5.6 ROVER 9 PROSPECT.

5.6.1 Location.

Rover 9 Prospect is situated approximately 25kms on a true bearing of 275° from the Rover 1 Prospect at the intersection of latitude 19°58'58" with longitude 133°25'00". Access is via a graded track to a point 27kms west of Rover 1 Prospect thence in a southerly direction on a bush track for 0.7kms.

5.6.2 Summary of Activities for the Year Ending May 21st, 1975.

(a) Geophysics

The aeromagnetic anomaly was located on the ground using the vehicle magnetometer navigator. Nine reconnaissance magnetic traverses were conducted over the anomaly. The results were analysed and leasing requirements determined. See Figs. 12a, 12b, 12c, 12d, 12e, 12f, 12g, 12h, 12j for the Chart Records.
(b) **Tenure**

Six Mineral Leases were surveyed in over the prospect (see Fig.4). The Leases are Geopeko Limited and Australian Ores and Minerals Limited. The details are as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Area</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 929E</td>
<td>16 ha</td>
<td>Rover 9 No.1</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 930E</td>
<td>16 ha</td>
<td>Rover 9 No.2</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 931E</td>
<td>16 ha</td>
<td>Rover 9 No.3</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 932E</td>
<td>16 ha</td>
<td>Rover 9 No.4</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 933E</td>
<td>16 ha</td>
<td>Rover 9 No.5</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 934E</td>
<td>16 ha</td>
<td>Rover 9 No.6</td>
<td>Under Application</td>
</tr>
</tbody>
</table>

5.7 **ROVER 14 PROSPECT.**

5.7.1 **Location**

Rover 14 Prospect is situated approximately 14 kms on a true bearing of 288° from Rover 1 Prospect at the intersection of latitude 19°57'44" and longitude 133°31'29". Access is via a graded all weather road which turns off the Wiso Bore - Rover Camp road 3 kms north of Rover 1 and runs approximately 13.5 kms west to the Rover 14 drill pad.

5.7.2 **Summary of Previous Activities**

The prospect is covered by four Mineral Leases (ML 732E to ML 735E inclusive) which have been granted. A grid has been established over the prospect and a total force magnetic survey using a Geometric SN566 Magnetometer was conducted over it. Geophysical analysis of the results was undertaken and a diamond drilling target was determined.

5.7.3 **Summary of Activities for the Year Ending May 21st, 1975.**

(a) **Geology**

No outcrops exist at Rover 14, all geological data has been ascertained from two diamond drill holes.

i. **Cambrian**

The Middle Cambrian Merrina Beds at Rover 14 can be broadly subdivided into the following lithological units.

<table>
<thead>
<tr>
<th>Lithology</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interbedded (silty) dolomite and</td>
<td>greater than 40m</td>
</tr>
<tr>
<td>(dolomitic) siltstone</td>
<td></td>
</tr>
<tr>
<td>Dolomite, fossiliferous in places</td>
<td>40-45m</td>
</tr>
<tr>
<td>Silty dolomitic gritty sandstone</td>
<td>6-10m</td>
</tr>
</tbody>
</table>
In places, within the sequence, bedding is well defined and is horizontal or has a very gentle dip.

The zone of oxidation varies from between 52m and 62m vertically below the surface. The unconformity dips very gently to the north.

ii. **Warramunga Group**

With the exception of a variable 5m to 12m zone of cherty and siliceous shale which lies approximately 35m above the ironstone body it has not been possible to correlate lithological units within the Warramunga Group Sediments.

Rock types within the sequence consist of predominantly fine grained chloritic shale, cherty shale and chloritic siltstone. Sedimentation is finer than at Rover 1, greywackes and sandstone are rare. Generally the sediments at Rover 14 are slightly more chloritic and siliceous than those at Rover 1.

Bedding and cleavage are conformable at Rover 14. Above the ironstone body, bedding and cleavage is vertical or dips steeply to the north. Below the ironstone the sediments are highly cleaved and dip approximately 85° to the south. Possibly the ironstone body is situated within the core of a tight anticline.

The type of lode is basically comparable to that at Rover 1, except that barite is a major component of the lode and copper mineralisation is extremely low. The ironstone body is concordant with bedding and cleavage. A 5m zone of contorted mineralised sediment occurs both on the footwall and hangingwall of the ironstone. Also a halo of chloritisation is present around the lode.

(b) **Geophysics**

A reanalysis of the ground magnetic results was undertaken using computer model studies and the previous diamond drill target was refined to give the target for Rover 14 DDH 1.

(c) **Drilling**

i. **GENERAL**

A drill pad and an all weather access road from the Rover camp to Rover 14 was constructed.
ii. ROVER 14 DDH 1.
Collar Coordinates: Grid 925.5W, 2328N.
AMG Coordinates:
Latitude 19°57'37", Longitude 133°31'31".
Bearing: Grid 180°, Magnetic 180°.
Inclination: -70°
Target: 280m vertically below grid coordinates 930W, 2210N.

Hole Summary:

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-40.00m</td>
<td>Silty, sandy clay.</td>
</tr>
<tr>
<td>40.00-48.40m</td>
<td>Limonitic siltstone.</td>
</tr>
<tr>
<td>48.40-51.40m</td>
<td>Chert.</td>
</tr>
<tr>
<td>51.40-58.00m</td>
<td>Silty mudstone.</td>
</tr>
<tr>
<td>58.00-65.80m</td>
<td>Interbedded silty dolomite and siltstone. Boundary of oxidation at 65.80m.</td>
</tr>
<tr>
<td>65.80-68.30m</td>
<td>Slightly chloritic silty mudstone.</td>
</tr>
<tr>
<td>68.30-82.00m</td>
<td>Interbedded dolomite and dolomitic siltstone.</td>
</tr>
</tbody>
</table>

The hole was abandoned when a BQ rod string broke and the hole caved behind the rod string. See Appendix 4 for the core log of Rover 14 DDH 2. See Fig. 13 for Plan and Profile showing geology and structure.

iii. ROVER 14 DDH 2.
Collar Coordinates: Grid 925.52W, 2323.58N.
AMG Coordinates:
Bearing: Grid 180°, Magnetic 180°.
Inclination: -70°
Target: 280m vertically below grid coordinates 930W, 2210N.

Hole Summary:

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-58.0m</td>
<td>No core.</td>
</tr>
<tr>
<td>58.0-100.9m</td>
<td>Dolomitic siltstone.</td>
</tr>
<tr>
<td>100.9-132.1m</td>
<td>Massive dolomite.</td>
</tr>
<tr>
<td>132.1-138.0m</td>
<td>Slightly chloritised siltstone.</td>
</tr>
<tr>
<td>138.0m</td>
<td>Unconformity - Middle Cambrian Merrins Beds/ Lower Proterozoic Warramunga Group.</td>
</tr>
<tr>
<td>138.0-230.1m</td>
<td>Mainly phyllitic shale and slightly chloritic shale, very minor jasper.</td>
</tr>
<tr>
<td>230.1-230.7m</td>
<td>Baryte-jasper-hematite lode. Mineralised sediments; chlorite shale with magnetite.</td>
</tr>
<tr>
<td>-253.5m</td>
<td>Quartz-baryte-magnetite lode.</td>
</tr>
</tbody>
</table>
253.5-260.1m Mineralised sediments; chlorite shale with magnetite, quartz-chlorite-baryte veining.

260.1-343.0m Slightly chloritic, partly very slightly hematitic shale.

E.O.H.

Economic Summary.
The copper assays of lode and adjacent sections are low (0.28% Cu maximum). Baryte as the main gangue mineral in the lode was confirmed by assay.

See Appendix 5 for core log of Rover 14 DDH 2. The plan and profile of the hole showing detailed geology and structure is shown on Fig. 14.

iv. ROVER 14 DDH 3.
Collar Coordinates: Grid 915.5W, 2363N.
AMG Coordinates:
Latitude 19°57'26", Longitude 133°31'32".
Bearing: Grid 180°, Magnetic 180°.
Inclination: -70°
Target: 315m vertically below grid coordinates 930W, 2200N.

Hole Summary:

0-58.00m Very poor recovery, silty clay.

58.00-64.70m Interbedded sequence of dolomite and siltstone.

64.70-67.60m Siltstone. Oxidation boundary 65.00m.

67.60-99.00m Interbedded sequence of dolomite and sandstone.

99.00-131.16m Dolomite.

131.16-137.40m Slightly chloritic sandstone.

137.40-140.00m Coarse grained sandstone with shale flakes.

140.00m Unconformity - Middle Cambrian Merrina Beds/
Lower Proterozoic Warramunga Group.

140.00-158.50m Slightly chloritic shale.

158.50-172.20m Interbedded sequence of chloritic cherty shale and silicified chloritic shale.

172.20-195.00m Shale.

195.00-313.68m Shale and slightly chloritic shale.

313.68-319.00m Quartz-baryte-magnetite lode with minor pyrite and chalcopyrite.

319.00-350.00m Chloritic shale.

E.O.H.

Economic Summary.
The lode intersection is devoid of any significant copper or gold values.
5.8. ROVER 15 PROSPECT

5.8.1 Location

Rover 15 Prospect is situated approximately 25kms on a true bearing of 290° from Rover 1. The anomaly is linear. The Rover 15 datum is situated at the intersection of latitude 19°55'34", with longitude 133°26'03". Access (see Figs. 3 & 4), is via a graded track to a point approximately 26kms west of Rover 1 Prospect, thence on a bush track in a northerly direction for approximately 5kms.

5.8.2 Summary of Activities for the Year Ending May 21st, 1975.

(a) Geophysics

The aeromagnetic anomaly was located on the ground using the vehicle magnetometer-navigator. Eight reconnaissance magnetic traverses were conducted over the anomaly. The results were analysed and leasing requirements determined. See Figs. 15a, 15b, 15c, 15d, 15e, 15f, 15g for Chart Records, and Fig. 4 for location of traverses.

(b) Tenure

Eighteen Mineral Leases were surveyed in over the prospect (see Fig. 4). The lessees are Geopeko Limited and Australian Ores and Minerals Limited. The details are as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Area</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 935E</td>
<td>16 ha</td>
<td>Rover 15 No. 1</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 936E</td>
<td>16 ha</td>
<td>Rover 15 No. 2</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 937E</td>
<td>16 ha</td>
<td>Rover 15 No. 3</td>
<td>Under Application</td>
</tr>
<tr>
<td>ML 938E</td>
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5.9 ROVER 16 PROSPECT.

5.9.1 Location

Rover 16 Prospect is situated approximately 17.5 kms on a true bearing of 287° from Rover 1 Prospect. The Rover 16 datum is situated at the intersection of latitude 19°52'23" with longitude 133°29'34". Access is via a graded track to a point approximately 19.5 kms west of Rover 1 Prospect, thence on a bush track in a northerly direction for approximately 2 kms.

5.9.2 Summary of Activities for the Year Ending May 21st, 1975.

a. Grid Surveys

The following grid was surveyed in on the Rover 16 Prospect. The Rover 14 baseline (2500N) was extended from 1400W to 5000W.

The following cross traverses were established:

- 4100W from 2500N to 3200N
- 4200W from 2500N to 3200N
- 4300W from 2500N to 3200N
- 4400W from 1800N to 2500N
- 4500W from 1800N to 2500N
- 4600W from 1800N to 2500N
- 4800W from 1800N to 2500N

N.B.: Grid coordinates are relative to the Rover 11 datum.
6. EXPENDITURE

The total expenditure for the twelve month period from May 21st, 197 to May 21st, 1975 was $247,879:00. The expenditure commitment as prescribed under Section 1 of the Terms and Conditions Schedule of the Exploration Licence Document was $113,000: The following is a dissection of the Expenditure.

Diamond Drilling $152,448:
Assaying $ 9,231:
Surveying and Drafting $ 16,325:
Leasing $ 9,765:
Geological Services $ 12,556:
Geophysical Services $ 9,698:
Computer Services $ 2,398:
Field Supplies - Direct $ 1,711:
Administration $ 13,635:
Unallocated Field Expenses $ 20,112:

TOTAL $247,879:

a. The various sub-divisions above are costed directly, the exception being Unallocated Field Expenses, and Administration Costs.

b. Unallocated Field Expenses consist of the following overheads:-

- Field Messing
- Field Vehicle Operating
- Workshop Supplies
- Field Supplies
- Depreciation - Field Plant

c. Administration Costs are proportioned on the same basis as Unallocated Field Expenses.
7. **THE ENVIRONMENT**

**Rover Camp**

Geopeko Limited have established a semi-permanent camp at the Rover 1 Prospect. It consists of a mobile kitchen and mess, 3 mobile caravans, part of one which serves as an office and a portable 8 man bunkhouse. A shed has been erected to store messing and drilling supplies. An ablation block containing a septic tank, washing machine and hot water service has been installed.

A 15 KVA generator supplies the camp with power. Water is pumped from a water bore to a 500 gallon tank situated on a stand in the central camp area.

A fuel dump for both petrol and diesel has been established approximately one (1) km west of the camp. A large pit 500m south of the fuel dump has been excavated for the purpose of dumping rubbish. This is burnt daily.

**Roads and Access Tracks**

The main Viso Bore - Rover Camp road is graded twice a year. Once prior to the wet season, and once after to repair wet season damage. Concurrent with this the Rover Airstrip is graded to clear it of low scrub and spinifex.

Access to the prospects within Exploration Licence No.228 is via a partially formed graded track that runs from the Rover camp to 3 kms east of the Point Wakefield Trig. Each prospect is reached by following the initial track from the above main road to the prospect. Although these are not necessarily the shortest routes to the prospects, no new tracks have been established. Application for permission to grade these well defined vehicle tracks and establish several new graded tracks has been submitted to the Mines Branch. Employees working on Exploration Licence No.228 are instructed to use only the existing tracks in an effort to minimise the disturbance of the vegetation and ground surface.
8. BIBLIOGRAPHY

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The Geology of Rover 1.
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Tennant Creek, N.T.
APPENDIX 1

CORE LOG OF ROVER 1 DDH 2P WRO 6 & DDH 2P WRO 7
PROSPECT/MINE: Rover 1

Log of Hole: WRO6 (starts off WRO5)

Location: EL 228, Southwest of Tennant Creek

Purpose of Hole: To test lode 20m E of lode-intersection in DDH2 WRO2

Proposed By: W. Maehl Date: 30.11.73
Proposed Target: 1160 E: 895 N: -560 R.L.
Hole Planned By: R. Maher Date: 28.3.74 Checked: W. Mayer
Hole Approved By: B.T. Williams
Hole Logged By: W. Mayer

Collar Co-Ordinates:

Surveyed: E: N: R.L. Surveyed in By: Date:
Actual: E: N: R.L. Picked up By: Date:

Collar Bearing:

Proposed: N.A. Grid: Magnetic:
Surveyed: Grid: Magnetic: Surveyed in By:
Actual: Grid: Magnetic: Picked up By:

Collar Inclination:

Proposed: N.A.
Surveyed: Surveyed in By:
Actual: Picked up By:

Target Depth: 605 m.
Proposed Final Depth: 650 m.
Actual Final Depth: 667.0 m.

Hole Terminated By: W. Mayer

Reason for Termination: Normal termination - lode zone appeared to be completely intersected

Drilling: Date Commenced: 20.5.74 Date Completed: 4.7.74

Drilled By: Geopako Drilling Division

Wedges Placed At: BX Hall Rowe Wedge at 394.0m BX Clappison Wedge at 409.0

Remarks: WRO6 intersected anticipated lode zone 25m E of proposed target

Hole was cemented from 570m to 667.0m.

Economic Summary Result: Both lode-intersections and sections in between have subeconomic Cu-values (max. 0.16%) and subeconomic Au-values (max. 6.1 g/m^t, 626-631m: 2.6g/m^t).
ROVER 1 WRP 6, HOLE 2
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GEOLOGICAL SUMMARY.

WO 6 commenced at 391.0m and cored a sequence of Warramunga - Group -
dediments i.e. mainly shale, hematite shale and chloritic shale;
dilicification is widely present from 474.4m downwards.
5 relatively short lode intersections (with only minor chalcopyrite) were made:

582.5 - 585.0 Magnetite - pyrite - hematite - chlorite.
586.0 - 587.05 magnetite - chlorite.
591.5 - 593.6 magnetite - hematite - pyrite - chlorite.
596.5 - 599.3 magnetite - pyrite - hematite - chlorite.
645.0 - 650.5 pyrite - chlorite - chloritic shale (mineralised sediment).

Silicified chloritic shale is the main - country rock between the
lode - intersections.

Pink cherty shale (possible marker - section) was intersected from
659.25 - 661.4m.

No major faults were intersected.

Economic Summary: Both lode-intersections and sections in between
have subeconomic Cu values (maximum 0.16%) and
subeconomic Au values (maximum 6.1 gm/mt; 626-631m; 2.6 gm/mt).
ROVER 1 DDH 2 WRO 6.

395.4 - 396.2

PHYLITIC SHALE
Bedding indicated some contortions and displacements; 395.7 - 395.8 a few 2-3mm calcite-chlorite veins subparallel to Core Axis.

396.2 - 399.0

FINEGRAINED QUARTZITE MINOR SHALE
Core rather broken up in places;
397.15 - 397.35 many irregular 1-3mm quartz-chlorite veins
397.35 - 397.5 1cm wide zone of 1-2mm quartz-calcite-chlorite veins parallel bedding in shale; bedding angle to Core Axis: 7°
397.9 - 397.95 Zone with quartz - dark green
398.2 - 398.25 chlorite - red feldspar pockets
398.35 - 398.4 - veins.

399.0 - 403.3

INTERBEDDED SHALE, SILTSTONE, FINEGRAINED QUARTZITE
Beds average 3-5cm true width
399.2 Bedding angle to Core Axis: 12°
400.0 Bedding angle to Core Axis: 14°
401.1 Bedding angle to Core Axis: 12°
401.3 - 401.5 Quartz - red feldspar - chlorite vein
403.1 Bedding angle to Core Axis: 15°
403.1 - 403.15 a few contorted 2-5mm quartz veins.

403.3 - 406.0

QUARTZITIC SILTSTONE-FINEGRAINED QUARTZITE.
Bedding visible in places;
403.3 - 403.6 joint angle ≈ shearing angle to Core Axis: 2°.
404.1 Bedding angle ≈ shearing angle to Core Axis: 12°.
405.1 joint angle ≈ shearing angle to Core Axis: 10°.
SHALE
With 2 zones of quartz - chlorite - veins and pockets (406.0 - 406.2, 406.8 - 406.9): core rather broken up along joint

SHALE, A FEW BEDS OF QUARTZITIC SILTSTONE.
Mostly bedded.
407.0 - 407.5 shearing angle to Core Axis: 0° - 3°
408.9 bedding angle = shearing angle to Core Axis: 10°.

WEDGE - NO CORE RECOVERY.
412.0 - 412.6 bedding angle to Core Axis: 0° - 5°
(contorted)
412.6 - 412.9 Chlorite (olive green) - chlorite - shale with a central 1cm quartz - chlorite vein parallel Core Axis.
413.3 bedding angle = shearing angle to Core Axis: 15°.
413.4 - 413.8 Cherty chloritic shale, slightly contorted bedding.

QUARTZITIC SILTSTONE - SILICIFIED SHALE, MINOR
FINEGRAINED QUARTZITE.
Bedded in places.
413.8 - 413.95 cherty chloritic shale
413.95 - 414.2 silicified shale
414.4 - 414.5 0.5-5cm long lenticular cherty shale fragments in quartzitic siltstone; some 2-3mm diameter pink calcite - aggregates.
415.9 bedding angle to Core Axis: 10°
416.4 bedding angle to Core Axis: 15°
417.6 bedding angle to Core Axis: 3°
418.5 bedding angle to Core Axis: 5°
418.3 - 419.3 finegrained quartzite.
419.4 shearing angle =? bedding angle to Core Axis: 10°.
420.75 - 421.2  joint angle = shearing angle =
bettengangle to Core Axis: 0-3°.

421.1 - 421.4  bedding angle to Core Axis:
3°; thrust plane angle to
Core Axis: 15°.

421.4 - 422.0  bedding angle to Core Axis: 1°.

422.0 - 423.3  QUARTZITIC SILTSTONE
Bedded; faulted Footwall - contact
422.0 - 422.3  bedding angle to Core Axis: 1°
(hangingwall contact)

422.9 - 423.3  set of 1-10mm quartz - calcite
-veins, angle to Core Axis:
60.70°.

423.3 2x1cm quartz - chorite - veins: angle to
Core Axis: 60°.

423.3 - 430.1  HEMATITE SHALE
Well bedded to laminated, with typical brickred
1mm beds, only slight contortions and a few
dislocations.

423.7  bedding angle to Core Axis: 10°.

424.2  bedding angle to Core Axis: 4°.

424.3 - 426.0  bedding angle = joint angle to
Core Axis: 0°-2°.

427.4 - 430.0  set of 1-5mm quartz - calcite
-veins, angle to Core Axis:
60 - 80°, some veins arecontorted.

427.4 - 430.1  bedding angle = joint angle
Core Axis: 0-5.

430.1 - 435.8  HEMATITE SHALE AS 423.3 - 430.1

430.2  bedding angle = shearing angle
to Core Axis: 5.

431.0 - 432.1  2cm - bed of chlorite shale with
central and marginal 1mm quartz
-dolomite - layers parallel
bedding angle = shearing angle
to Core Axis: 0-2°.

432.8  bedding angle to Core Axis: 0°,
joint angle to Core Axis: 4°.
432.1 - 435.5 Bedding angle = shearing angle to Core Axis: 0-3°.

434.1 - 435.5 1-2mm quartz - layer parallel bedding and chlorotic bed, probably same as 431.0 - 432.1. core rather broken up

435.8 - 435.9 QUARTZ AND CHLORITE (olivegreen, blackgreen) as blobs and contorted veins.

435.9 - 437.5 SLIGHTLY CHLORITIC SHALE Bedded in places, slight contortions and a few dislocations.

436.2 bedding angle = shearing angle to Core Axis: 14°.

436.45 - 436.7 Zone with big quartz and chlorite blobs and veins.

437.2 bedding angle to Core Axis: 5°.

437.4 bedding angle to Core Axis: 12° (close to fault).

438.0 bedding angle to Core Axis: 5°.

437.5 - 439.0 PHYLLITIC SHALE Bedding angle = shearing angle to Core Axis: 0°.

439.0 - 445.1 HEMATITE SHALE As 423.3 - 430.1: gradational boundary with Footwall.

439.5 bedding angle to Core Axis: 3°.

440.3,445.0 bedding angle to Core Axis: 5°.

445.1 - 446.0 SLIGHTLY CHLORITIC SHALE. Bedded, slight contortions and minor dislocations, a few in 1-2mm quartz - dolomite - veinlets.

446.0 - 451.8 SLIGHTLY CHLORITIC SHALE. Silicified in places, with some quartzitic siltstone - beds with loadcasts; bedding in places; medium contortions and dislocations;
rather extensive 1-5mm quartz - dolomite chlorite layers subparallel Core Axis almost throughout, gradational boundary with Footwall. 446.0 - 446.6 dykelike 5mm quartzitic siltstone - bed, pinched out and disrupted, bedding angle to Core Axis: 5°.

447.8 - 448.0 joint angle to Core Axis: 0°, 5mm quartz - dolomite - vein parallel Core Axis.

448.1 bedding angle to Core Axis: 10°.

448.6 - 449.8 0-5cm quartzitic siltstone - bed with loadcasts, bedding angle = shearing angle to Core Axis: 0-2°.

451.8 bedding angle = shearing angle to Core Axis: 5°.

HEMATITE SHALE
Bedded, but beds not sharply defined; medium to strong contortions and dislocations throughout; extensive 1-2mm quartz - dolomite - chlorite veins parallel bedding.

452.0 - 452.6 bedding angle = shearing angle to Core Axis: 0°-2°.

453.0 bedding angle = shearing angle to Core Axis: 5°.

453.9 bedding angle to Core Axis: 10°.

HEMATITE SHALE
Basically as 451.3 - 454.0, but slight medium contortions, only a few disruptions; some irregular 1-2mm dolomite - quartz - veinlets in places.

454.2 bedding angle to Core Axis: 0°.

455.0 - 455.8 0.5cm quartzitic siltstone - bed with cross bedding and loadcasts, undulating bedding - contact, angle to Core Axis: 0°.

456.6 bedding angle to Core Axis: 6°.

459.1 - 459.5 0.5 cm quartzitic siltstone - bed, heavily dislocated and contorted.

460.3 bedding angle to Core Axis: 7°.

460.7 - 461.5 some 0.3 - 0.5cm carbonaceous quartzitic siltstone - beds, contorted and disrupted to 5 - 10cm long lenticular fragments;
angle to Core Axis: 0-3°.

SLIGHTLY HEMATITIC PHYLITIC SHALE

Purplish-grey, apart from a quartzitic siltstone bed (463.6 - 464.5) no bedding visible, gradational boundary with Hangingwall and Footwall.

HEMATITE SHALE

As 454.0 - 462.4, a few sections show hardly any bedding and are phyllitic.

bedding angle to Core Axis: 1°.

bedding angle to Core Axis: 0°-2°.

phyllitic shale

bedding angle to Core Axis: 10°.

HEMATITE SHALE

Fairly well bedded, only a few minor dislocations;

bedding angle to Core Axis: 20°.

1-3cm quartz - dolomite - chlorite - vein, footwall - contact parallel bedding angle to Core Axis: 45°.

bedding angle to Core Axis: 35°.

bedding angle to core Axis: 45°.

1.5cm wide greygreen bed, bedding angle to Core Axis: 43°.

Contorted, faulted Footwall contact.

QUARTZITIC SILTSTONE - SILICIFIED SHALE

Mainly bedded sequence;

bedding angle to Core Axis: 35°.

joint bedding =? shearing angle to Core Axis: 10°.

bedding angle to Core Axis: 20°.

bedding angle to Core Axis: 48°.

5cm wide zone of silicified purple-brown shale with 1-5cm long lenticular cherty shale fragments aligned parallel shearing angle to Core Axis: 20°.
FINEGRAINED QUARTZITE
No bedding Visible.

FINEGRAINED QUARTZITE
No bedding visible, sheared Footwall - contact:
shearing angle to Core Axis: $8^\circ$.

SILICIFIED SHALE - QUARTZITIC SILTSTONE
Mainly bedded, a few contortions and disruptions.

479.4 - 479.7 cherty chloritic shale, strongly
sheared, but massive core.

480.0 bedding angle to Core Axis: $25^\circ$.

480.3 - 480.4 silicified chlorite (creamy
colours) within cherty chloritic
shale (480.1 - 480.6)

481.5 0.5cm wide zone of less than or
equal to 1mm silty beds, very
finely crenulated, bedding angle
to Core Axis: $45^\circ$.

482.7 bedding angle to Core Axis: $40^\circ$.

482.85 - 482.9 well bedded silicified shale
with 2-3mm long chlorite - spots
aligned parallel shearing:
angle to Core Axis: $22^\circ$, bedding
angle to Core Axis: $50^\circ$, angle
between shearing/bedding: $28^\circ$.

484.5 - 484.6 3-10mm long ill defined chloritic
spots aligned parallel shearing.

486.0 bedding angle to Core Axis: $30^\circ$.

486.2 - 487.0 sheared section with lam quartz
-chlorite- veinlets parallel
shearing/; shearing angle to
Core Axis: $20^\circ$.

SILICIFIED SHALE - QUARTZITIC SILTSTONE AS 479.4 -

487.0 bedding angle to Core Axis: $37^\circ$.

488.2 bedding angle to Core Axis: $42^\circ$.

489.4 shale sections are mainly cherty
chloritic shale.

490.0 - 492.5 bedding angle to Core Axis: $45^\circ$.

490.95 shearing angle to Core Axis: $17^\circ$.
bedding angle shearing: 28°.

2cm wide quartzitic siltstone -
bed with abundant 1-2mm diameter
white feldspar - spots, possibly
MARKERBED.

bedding angle = joint angle = ?
shearing angle to Core Axis: 23°.

quartzitic siltstone - fine-
grained quartzite.

SILICIFIED AND CHERTY SHALE

Zone of intense shearing and faulting (shearing
angle to Cor Axis changes considerable over length
of zone) with rich chlorite - veinings, 493.6 - 493.
8: cherty shale brecciated in situ; sheared
Hangingwall - contact: angle to core Axis: 25°
(2cm zone of sheared chlorite- vein).

494.3 - 494.5 core rather broken up.

CHERTY SHALE - QUARTZITIC SILTSTONE.

SILICIFIED (PARTLY CHERTY) SHALE- QUARTZITIC
SILTSTONE

Well bedded sequence;

1cm quartz - chlorite - vein

bedding angle to Core Axis: 48°.

1cm quartz - chlorite - vein,
angle to Core Axis: 30°.

bedding angle to core Axis: 47°.

bedding angle to Core Axis: 43°.

3cm quartz - dolomite - chlorite-
vein, contorted Footwall contact.

bedding angle to Core Axis: 35°.

bedding angle to Core Axis: 32°.

0.5cm calcite - chlorite - vein
parallel bedding, bedding angle
to Core Axis: 37°.

bedding angle to Core Axis: 40°.
SILICIFIED SHALE - QUARTZITIC SILTSTONE

Well bedded sequence; most quartzitic siltstone beds (5-20cm thick) show graded bedding, thinning towards collar of hole. Only a few dislocations:

503.5  
bedding angle to Core Axis: 40°.

505.1, 507.1  
bedding angle to Core Axis: 43°.
minifault, angle to Core Axis: 15°.
displacement: 1cm; bedding angle to Core Axis: 42°.

509.1  
bedding angle to Core Axis: 43°.

510.6  
minifault, angle to Core Axis: 30°.
displacement: 0.5cm; angle to Core Axis: 38°.

SILICIFIED (PARTLY CHERTY) SHALE

Only very minor quartzitic siltstone (0.5 - 1cm beds), well bedded; 514.8 - 517.1: abundant 0.5-3cm wide dirty purple beds; almost hematitic shale.

511.9  
bedding angle to Core Axis: 35°.

513.2  
bedding angle to Core Axis: 32°.

514.1  
bedding angle to Core Axis: 28°.

514.3  
bedding angle to Core Axis: 17°.
(locally anomalous value).

514.5  
0.5cm pink quartz - chlorite - vein parallel bedding, bedding angle to Core Axis: 25°.

515.1, 516.1  
bedding angle to Core Axis: 46°.

517.0  
bedding angle to Core Axis: 53°.

518.2  
bedding angle to Core Axis: 60°.

518.67 - 518.70 silicified olive-green chlorite.

RED JASPER

Many quartz-filled fractures, but massive core; some 1-10mm quartz-veins. Hangingwall - contact angle to Core Axis: 65°.

519.65 - 519.7 silicified olive-green chlorite, sheared, shearing angle to Core Axis: 40°.
521.4 - 522.2  **CHERTY CHLORITIC SHALE**
Well bedded; a few quartz - dolomite - chlorite - veins and pockets; bedding angle to Core Axis: 45-50°; A few 1-2mm wide gritty beds at Footwall.

522.2 - 524.0  **SILICIFIED HEMATITIC SHALE**
Well bedded; 2-8mm lighter - coloured beds (some are disrupted and/or minifaulted) cause visible bedding in the dark-purple shale.
522.5  bedding angle to Core Axis: 55°.

524.0 - 524.9  **SILICIFIED AND CHERTY CHLORITIC SHALE**
Mostly bedded, a few dislocations; rather extensive 1-2mm quartz - veins at 524.7 - 524.9.

524.9 - 525.2  **SILICIFIED HEMATITIC SHALE**
As 522.2 - 524.0; bedding angle to Core Axis: 55°.

525.2 - 526.5  **SILICIFIED AND CHERTY SHALE**
Rather disturbed section with many dislocations and disruptions; rich 1-5mm quartz - veins at 525.4 - 525.5.

526.5 - 527.7  **SILICIFIED HEMATITIC SHALE**
With only a few lighter coloured shale - beds;
526.5  bedding angle to Core Axis: 40°; shearing angle to Core Axis: 20°; shearing angle bedding: 20°.
526.8 - 526.9  2 x 1cm bloblike quartz - chlorite veins parallel bedding.

527.7 - 530.0  **SILICIFIED HEMATITIC SHALE**
As 526.8 - 527.7
528.0, 529.0; bedding angle to Core Axis: 39°.

530.0 - 530.6  **CHERTY SHALE**
Bedded a few dislocations
530.3 - 530.6  5mm wide zone of contorted quartz - chlorite - veinings
SILICIFIED HEMATITE SHALE
Well bedded to laminated,
530.7 bedding angle to Core Axis: 37°.
530.9 - 532.0 several 1-5cm milky quartz veins with 1-5mm apophyses of quartz - red feldspar - chlorite.
532.7 bedding angle to Core Axis: 20°.

532.8 - 533.05 CHERTY SHALE
Well bedded, bedding angle to Core Axis: 20°.

533.05 - 533.15 BED OR VEIN?
Fine-grained "CONGLOMERATE" (parallel bedding) of 1-3mm diameter fragments of quartz and red feldspar, chlorite as filling material, POSSIBLY MARKERBED.

533.15 - 535.5 SILICIFIED HEMATITE SHALE
Well bedded to laminated: 2cm zone of quartz - chlorite - veining at Hangingwall - boundary; gradational Footwall - boundary;
533.7 - 534.7 Typical rech quartz - chlorite - feldspar - veining as 530.9 - 532.0.
535.2, 535.35, 535.45, 3x1cm zone of sheared chlorite - quartz - veins (black-green and light olive-green).

535.5 - 535.9 SILICIFIED SHALE
Laminated, bedding angle to Core Axis: 32°.

535.9 - 536.4 SILICIFIED SHALE AND SILTSTONE
Bedded, a few min faults, gradational boundary with Footwall.

536.4 - 540.9 HEMATITIC SHALE AND HEMATITE SHALE
Bedded - laminated:
536.4 - 536.95 slightly hematitic shale; only a few distinguishable beds;
536.95 - 537.0 4cm wide zone of intense red layered jasper and quartz parallel bedding;
537.0 - 539.8 Mainly hematite shale with many grey-green 1-5mm wide interbeds, 537.65: 0.5cm layer of intense red jasper parallel bedding.
539.8 - 540.05 hematite shale with beds of virtually pure hematite; 0.5cm bed with pyrite crystals.
539.0, 540.8 bedding angle to Core Axis: 30°.
539.3 - 539.6 a few 2-10cm diameter blobs of red jasper with hematite - pockets and specks of chalcopyrite in contorted hematite shale.

540.9 - 541.6 SILICIFIED SHALE
Well bedded, with a few 0.5-1cm hematitic beds -
541.1 bedding angle to Core Axis: 32°.
541.2 - 541.25 disturbed section with contorted 1 - 2mm quartz veins.

541.6 - 542.0 HEMATITIC SHALE
Bedded, bedding angle to Core Axis: 30-33°.

542.0 - 544.0 SILICIFIED SLIGHTLY CHLORITIC SHALE
Well bedded - laminated;
542.2 bedding angle to Core Axis: 38°
543.0 bedding angle to Core Axis: 28°
543.5 - 543.55 2cm wide reddish cherty bed.
543.65 - 543.7 disturbed zone with disrupted quartz - chlorite veining.
543.8 bedding angle to Core Axis: 30°.
543.9 - 543.95 chloritic siltstone - bed with graded bedding fining towards collar.

544.0 - 551.9 SILICIFIED CHLORITIC SHALE
Bedded; some 1-10mm contorted quartz - veins in places; mostly undisturbed bedding; little chalcopyrite in places.
544.0 - 545.1 abundant 1-10mm contorted quartz - veins.
545.1 - 546.1 slightly chloritic shale, well bedded with a few 1-4cm wide beds of light olive-green chlorite and two short sections with chlorite-spots, elongated, aligned and parallel, shearing = bedding; bedding angle = shearing to Core Axis: 40°.
548.2 - 548.6 some small veinlets and blobs of pyrite and chalcopyrite.

548.5 bedding angle to Core Axis: $30^\circ$.

550.2 - 550.3 3.5 mm wide pyrite - lenses aligned parallel shearing = bedding.

551.2 bedding angle to Core Axis: $40^\circ$.

551.9 - 553.7 CHLORITIC QUARTZITIC SILTSTONE - SILICIFIED CHLORITIC SHALE

Some gritty beds; bedding mostly possible; a few minifaults.

553.2 - 553.4 cherty shale lenses (=broken up beds) in gritty chloritic matrix, bedding angle = shearing angle to Core Axis: $35^\circ$.

553.7 - 559.5 SILICIFIED SLIGHTLY CHLORITIC SHALE

Bedding mostly visible, gradational boundary with Footwall.

554.0 bedding angle to Core Axis: $38^\circ$.

555.0 - 555.4 cherty shale beds, often broken up to

557.1 - 558.0 lenticular fragments parallel shearing.

559.5 - 561.3 CHLORITIC QUARTZITIC SILTSTONE - FINEGRAINED CHLORITIC GREYWACKE

Bedding not visible, a few minifaults, very gradational boundary with Footwall.

560.9 big cherty shale lens (broken up bed) in finegrained chloritic greywacke.

561.3 - 566.9 CHLORITIC QUARTZITIC SILTSTONE - SILICIFIED CHLORITIC SHALE

Bedding visible in a few places; a few minifaults and contortions and a few quartz - veinlets and blobs in places; rich pyrite in places and finely disseminated pyrite almost throughout.

562.6 bedding angle to Core Axis: $28^\circ$.

563.1 - 563.5 finegrained chloritic greywacke, fining towards bottom of hole; -7 overturned beds.

563.7 bedding angle to Core Axis: $27^\circ$. 
564.1 medium pocket of chalcopyrite.
565.7 - 566.1 rich pyrite as 0.3-4cm layers, very minor chalcopyrite.
566.4 2 vughs with small perfect rock - and chalcopyrite - crystals.

566.9 - 568.0 **CHERTY CHLORITIC SHALE**
Bedding not visible, gradational boundary with Hangingwall, finely disseminated pyrite throughout.

568.0 - 574.5 **CHLORITIC QUARTZITIC SILTSTONE**
Bedding not visible, some 1-3mm quartz - veins throughout medium pyrite as 3-5mm wide vein like blobs throughout and as Less than or equal to 1mm diameter crystals in places.

574.5 - 574.8 **CHERTY CHLORITIC SHALE**
Without abundant healed fracturing and several 1-10mm contorted quartz - veins; little pyrite as 1-2mm diameter crystals along fractures.

574.8 - 576.3 **CHLORITIC SHALE**
Planar bedding, a few 3-20mm quartz - chlorite - layers parallel bedding;
575.2 bedding angle to Core Axis: 40°.
576.2 bedding angle to Core Axis: 35°.

576.3 - 582.5 **SILICIFIED CHLORITIC SHALE - SILTSTONE**
Bedding mostly visible, rather undisturbed sequence;
575.3 bedding angle to core axis: 35°
575.45 minifault - plane: angle to core axis 15°
576.7-577.0 disrupted bedding of chlorite - shale intruded by quartzitic siltstone
578.2 bedding angle to core axis 40°
582.0-582.5 cherty chloritic shale, bedding not visible

582.5 - 585.0 **LODE**

582.5 - 584.5 **MAGNETITE (80%)-PYRITE (10%)-HEMATITE (5-10%)-CHLORITE (12%)**
Complete replacement of sediment; rather sharp Hanging-
GEOLOGY LOG...contd.

wall - contact (within 5cm); specular hematite as irregular 1-2mm veinlets or as intergrowth with pyrite; pyrite occurs enriched in certain sections (up to 30%) as 2-5mm diameter aggregates in intergrowth with hematite;

584.1-584.5  magnetite (95%)-chlorite (5%), little pyrite

584.5 - 585.0  

SILICIFIED CHLORITIC SHALE

Sharp Footwall - contact; angle to core axis 25°

584.5-584.7  massive magnetite with rich 2cm pyrite - layer at Footwall; joint angle to core axis 23°

584.7-584.9  massive chlorite, slightly sheared

584.9-585.0  almost massive magnetite with some chlorite and pyrite

585.0 - 586.0  

SILICIFIED CHLORITIC SHALE

Bedding indicated;

585.6  bedding angle to core axis 35°

586.0 - 587.05  

LODE

586.0 - 587.05  

MAGNETITE (50%)-CHLORITE (50%)-PYRITE (1%)

Both magnetite and chlorite occur as 1-5cm wide bed-like layers or blobs; little chalcopyrite as small pockets

587.05 - 589.0  

CHERTY AND SILICIFIED CHLORITIC SHALE

Bedding not visible; a few 1-5mm quartz-veins; little pyrite as veinlets in places

589.0 - 590.0  

CHLORITE, slightly sheared

589.65-589.8  quartz-chlorite-veining in contact with cherty chloritic shale, contact angle to core axis 0°

590.0 - 591.2  

CHERTY AND SILICIFIED CHLORITIC SHALE

Bedding visible in places, medium pyrite in places.
590.0-590.35 \( \text{slightly chloritic cherty shale;}
\)
heavily fractured - brecciated, but
fractures healed with chlorite and pyrite.

591.1
bedding angle to core axis \(40^\circ\), a few
minifaults and 1-2mm quartz-veins.

591.2 - 591.5 \( \text{CHLORITE (591.2-591.35) AND QUARTZ-CHLORITE (591.35-}
\)
591.5)\)

591.5 - 593.6 \( \text{LODE}
\)

591.5 - 592.0 \( \text{MAGNETITE(70\%)-CHLORITE (30\%)}
\)
A few veins of specular hematite; medium pyrite
finely disseminated in magnetite at Hangingwall
contact.

592.0 - 593.6 \( \text{MAGNETITE (60\%)-HEMATITE (20\%)-PYRITE (10\%)-}
\)
\text{CHLORITE (10\%)}
Hematite, pyrite and chlorite occurs as veins and
blobs with the magnetite; very little chalcopyrite.

593.6 - 594.75 \( \text{CHLORITE SHALE}
\)
With very rich pyrite-sections; pyrite occurs in ill
defined 2-10mm wide layers (probably partly replaced
sediment-beds), pyrite-rich sections 3-10cm wide; a
few sections with rich quartz-chlorite-veining.

594.75 - 595.45 \( \text{SILICIFIED CHLORITIC SHALE}
\)
Bedding indicated; only very little pyrite in thin
layers parallel ? bedding.

595.45 - 596.5 \( \text{CHLORITE SHALE}
\)
With rich pyrite-layers; ill defined bedlike layers
2-10mm wide; 596.0-596.5; pyrite decreases and is
replaced by many 3-5mm wide massive magnetite-layers
increasing towards Footwall; very gradational trans.
Footwall.
GEOLOGY LOG....contd.

596.5 - 599.3  LOADE

596.5 - 597.2  MAGNETITE (70%)—PYRITE (25%)—CHLORITE (5%)
Chlorite-pyrite-rich sections have ill defined layered structure.

597.2 - 598.4  PYRITE (90%)—MAGNETITE (5%)—HEMATITE (5%)
Little chalcopyrite

598.4 - 599.3  MAGNETITE (90%)—HEMATITE (5%)—PYRITE (5%)
Medium chalcopyrite as small-medium veinlets and pockets, enriched in certain sections; sharp Footwall contact, angle to core axis 33°

599.3 - 600.1  SILICIFIED CHLORITIC SHALE
Mostly bedded, no mineralisation visible
600.0  bedding angle to core axis 45°

600.1 - 601.5  SILICIFIED CHLORITIC SHALE - SILTSTONE
Bedding indicated, no mineralisation visible; a few light contortions and 1-2 mm quartz veins; very gradational trans. Footwall.

601.5 - 608.5  SILICIFIED SLIGHTLY CHLORITIC SHALE—SILTSTONE
Well bedded, planar bedding-planes; chloritisation increasing from 607.0 downwards;
602.0  bedding angle to core axis 45°
603.5  bedding angle to core axis 50°
605.0-605.1  typical section with many 2-5 mm wide red and purple shale beds; bedding angle to core axis 55°
608.1  bedding angle to core axis 60°
608.9-607.3  very contorted 3 mm quartzitic siltstone beds.
607.4  1 cm wide pyrite layer parallel bedding
607.6  a few 3-5 mm quartz—chlorite veins parallel bedding.
608.1  bedding angle to core axis 65°
**GEOLOGY LOG...contd.**

**608.5 - 610.8**

**CHLORITIC SHALE-SILTSTONE**

Bedded; a few minor disruptions and contortions

- 608.8 bedding angle to core axis 60°
- 609.1-610.05 chlorite-chlorite shale, bedding indicated;
- 609.4-609.5 some less than or equal to 1mm chlorite and minor calcite-veinlets parallel bedding (chlorite section)
- 610.7 bedding angle to core axis 55°

**610.8 - 612.2**

**FINEGRAINED CHLORITIC GREYWACKE, possible markerbed**

Gneissic appearance, typical metamorphic parallel texture; small quartz lenses (1-3mm long) aligned parallel shearing; bedding indicated in places; 2 planar 0.5cm quartz-veins at 611.9 and 612.2

- 611.0 shearing angle to core axis 50°
- 611.4 bedding angle to core axis 60°
- 612.0 shearing angle to core axis 50°

**612.2 - 616.2**

**CHLORITE (MASSIVE, GREY-GREEN VARIETY) AND CHLORITIC SHALE**

(613.0-614.0, bedded); several 3-20cm sections of rich quartz-chlorite-veining (613.6-614.0, 614.4-614.6, 614.9).

- 613.9 bedding angle to core axis 55°

**616.2 - 621.05**

**CHLORITIC-SLIGHTLY CHLORITIC SHALE**

A few quartz-chlorite veins in places.

- 616.2-617.2 chloritic shale, bedded, bedding angle to core axis 70°
- 617.2-619.0 slightly chloritic shale, bedding indicated in places
- 619.0-621.05 chloritic shale, bedding indicated;
- 620.85-620.9 abundant 1-3mm very contorted quartz-chlorite veins.

**621.05 - 622.15**

**QUARTZ-CHLORITE** as small-large contorted veins and blobs intruding **SILICIFIED CHLORITIC SHALE**

- 622.0-622.15 100% quartz-chlorite as vein like blobs.
622.15 - 624.2
SILICIFIED-CHERTY CHLORITIC SHALE
Bedding indicated in places; a few 1mm quartz-veinlets throughout; a few 1-2mm pyrite veinlets in places
623.2 bedding angle to core axis 25°
623.8 bedding angle to core axis 40°

624.2 - 624.5
GRITTY CHLORITIC QUARTZITIC SILTSTONE
Fine banded = ? bedding; medium 1-2mm quartz veinlets throughout; a few
624.5 1.5cm hematite-chlorite-pyrite vein

624.5 - 624.7
SILICIFIED CHLORITE
With rich pyrite as ill defined 0.5 - 1cm bands and rich hematite as 0.5cm veins and some 1-3mm dolomite veinlets.

624.7 - 629.6
BANDED CHLORITIC COARSE GRAINED QUARTZITE - FINE-GRAINED GREYWACKE
Rather irregular but often undulating inter bedding of 1-3mm pinkish coarse impure quartzite-bands with 1-3mm illdefined 1mm diameter chlorite-grain-bands which have some dispersed 1mm pink quartz-grains; banding represents most likely original bedding; bands are often slightly contorted, disrupted and cut by mini-faults; bottom half is finegrained and more quartzitic than top half; several small-big pockets and veins with rich mineralisation: rich spicular hematite, some magnetite, rich pyrite, medium dolomite and chlorite, some chalcopyrite.
625.7 3cm wide vein: hematite-dolomite-chlorite, little pyrite
626.1-626.3 rich pockets and veins: hematite-magnetite-chlorite-chalcopyrite-pyrite.
627.5-627.7 100% mineralisation: hematite-magnetite-chlorite-pyrite-quartz-dolomite;
628.20-628.35 big veinlike pockets; hematite-magnetite-chlorite, very little chalcopyrite.
GEOLOGICAL LOG...contd.

628.4-628.43 banded mineralisation; hematite-
pyrite-chlorite-magnetite-dolomite-
chalcopyrite.

628.7-628.9 ? bedding angle to core axis 20°

629.8 - 632.8

SILICIFIED-CHERTY SLIGHTLY CHLORITIC SHALE

Planar bedding in a few places; some 1-5mm quartz-
veins and minifaults throughout; a few mineralised
veins.

629.6-629.8 some 0.5-1cm mineralised veins; hema-
tite-chlorite, medium chalcopyrite-
pyrite

630.1 0,3-1cm vein: hematite-magnetite-chlorite-pyrite, little chalcopyrite.

630.1-630.2 2 x 5cm diameter blobs of Hangingwall
rock (bandied quartzite), only partly
faulted - contacts.

630.8 0.5cm quartz vein with rich chalco-
pyrite pockets.

631.25 2cm wide bed of quartzitic siltstone
with graded bedding, fining towards
bottom of hole - ? overturned; bed-
ing angle to core axis 17°

632.1 minifault angle to core axis 55°
bedding angle to core axis 20°

632.2 1cm wide pyrite-chlorite-vein, sub-
normal to core axis.

632.8 - 634.5

SILICIFIED SLIGHTLY CHLORITIC SHALE

Bedded; chloritisation increasing towards Footwall;
some contorted 1-3mm quartz veins with rich pyrite
and medium chalcopyrite.

633.0 bedding angle to core axis 20°

634.5 - 640.7

SILICIFIED CHLORITE, MINOR CHLORITE SHALE

Bedded in places, rich quartz-chlorite-veining in
places; very little mineralisation

634.95-635.0, 635.2-635.3; 5cm and 2cm quartz-
chlorite vein.

635.8-635.9 2 x 1-3mm very contorted quartz veins
GEOLOGICAL LOG...contd.

638.3-637.3 pyrite as less than or equal to 0.5mm grains finely disseminated throughout; some bands (bedding ?) appear in the chlorite; bedding angle to core axis 35°

638.9-639.9 chlorite shale with 1-2mm red-brown siltstone beds

639.1 bedding angle to core axis 43° shearing angle to core axis 65° bedding angle shearing 22°

639.6-640.7 many 1-20mm quartz-chlorite veins

640.7 - 645.0 SILICIFIED CHLORITIC AND SLIGHTLY CHLORITIC SHALE
bedding in places, 2 QUARTZ-CHLORITE SECTIONS
641.0-642.0, 642.8-643.0; no visible mineralisation apart from very finely disseminated pyrite at 643.0-645.0; a few 1-5mm quartz veins in places.
643.2-644.5 bedded section, bedding angle to core axis 45-55°

LODE (MIN.SED.) 645.0-650.5

645.0 - 646.7 SILICIFIED CHLORITIC SHALE
With very rich pyrite mineralisation; pyrite occurs in 0.3-5cm wide layers in intergrowth with chlorite; original bedding visible in places, but usually very disturbed; many 1-2mm quartz veinlets throughout; very gradational boundary with Footwall.

646.7 - 648.2 CHLORITE-(80%)-PYRITE (20%); MAGNETITE
Occurs increasingly from 647.5-648.2; pyrite occurs mainly as ill defined, contorted 0.3-5cm layers; a few short sections of silicified chloritic shale still present.

648.2 - 650.5 PYRITE (60-70%)-CHLORITE (30-40%)
Mostly bedded; a few minifaults in places; pyrite occurs a very fine to coarse grains in bands which appear to represent original beds and finely disseminated in between these pyrite-rich beds; some
chalcopryte as thin veinlets; sharp boundary to unmineralized Footwall;
648.2 2cm quartz-chlorite vein

650.5 - 656.5
SILICIFIED CHLORITIC SHALE
Bedding not visible; sequence appears rather undisturbed; some 1-2mm quartz veinlets in places;
650.5-654.0 finely disseminated pyrite.
651.05-651.95 silicified chlorite
652.35-652.4 contorted quartz-chlorite veins-blobs
652.7-652.8 very finegrained chloritic greywacke, fining towards bottom of hole —? overturned.

656.5 - 659.25
SILICIFIED SLIGHTLY CHLORITIC SHALE
Bedded at 658.6-659.05; contorted 1-3mm quartz-chlorite veins at 657.9-658.0, 659.05-659.25;
finely disseminated pyrite in places
659.0 bedding angle to core axis 60°

659.25 - 661.4
CHERTY SHALE — POSSIBLY MARKERBED
Pink, bedded; grey chloritic beds (2-10mm) have rich finely disseminated pyrite, pyrite also in the pink cherty shale finely disseminated, and as maximum 5mm diameter crystals; very gradational boundary Footwall.
660.0 bedding angle to core axis 65°
661.0-661.1 cherty chloritic shale, bedded, with pyrite parallel bedding.

661.4 - 662.4
SILICIFIED AND CHERTY CHLORITIC SHALE
Mainly with many small lenticular cherty shale — fragments aligned parallel shearing; bedding indicated; several faulted and disrupted contacts; some pyrite as maximum 3mm cubes.

662.4 - 663.75
CHERTY CHLORITIC SHALE
Bedding indicated in places; 662.7-663.0: brecciated in situ with rich quartz-veining as crackfilling finely disseminated pyrite in places.
GEOLOGICAL LOG...contd.

663.75 - 665.1

**SILICIFIED CHLORITIC SHALE**

Ill defined ? bedding throughout; a few cherty shale - lenses (1-2cm long) in places; finely disseminated pyrite in places

664.0

? bedding angle = shearing angle to core axis 70°

665.1 - 667.0

**SILICIFIED CHLORITIC SHALE**

Ill defined ? bedding; 3-10mm long cherty shale - fragments aligned paralleled shearing in places; finely disseminated pyrite throughout;

665.15

5cm diameter cherty shale - fragment with indented contacts.

665.2

shearing angle = ? bedding angle to core axis 70°

E.O.K.
GEOPEKO LIMITED
TENNANT CREEK
Northern Territory

PROSPECT/MINE: ROVER 1
Log of Hole: WRO 7 (Starts off WRO 2)
Location: EL 228, Southwest of Tennant Creek
Purpose of Hole: To test lode 20m E of lode-intersection in DDH2 WRO1

Proposed By: B.T. Williams Date: 13-6-74
Proposed Target: 1160 E: 888 N: -400m R.L.
Hole Planned By: R. Maher Date: 4-7-74 Checked: W. Mayer
Hole Approved By: B.T. Williams
Hole Logged By: W. Mayer

Collar Co-Ordinates: N.A.
Proposed: E: N: R.L.
Surveyed: E: N: R.L. Surveyed in By: Date:
Actual: E: N: R.L. Picked up By: Date:

Collar Bearing:
Proposed: Grid: Magnetic:
Surveyed: Grid: Magnetic: Surveyed in By:
Actual: Grid: Magnetic: Picked up By:

Collar Inclination:
Proposed:
Surveyed: Surveyed in By:
Actual:

Target Depth: 445 m.
Proposed Final Depth: 525 m.
Actual Final Depth: 553.3 m. Hole Terminated By: P.L. Kitto

Reason for Termination: Normal termination-lode zone appeared to be completely intersected.
Drilling:- Date Commenced: 5-7-74 Date Completed: 22-10-74
Drilled By: Geopeko Drilling Division

Wedges Placed At: BX Hall Rowe Wedge at 203m, BX Clappison Wedge at 223m,
Remarks: BX Clappison Wedge at 269, BX Clappison Wedge at 331m Wedge
RO 7 intersected lode approximately 6m W of and 21m below proposed
target; the lode-intersections were not cemented to allow geophysical-
al downhole probing.

Economic Summary Result: Patchy high Cu values and negligible Au and Bi values in the two
lode zones.

429-430m: 8.00% Cu; 0.1 g/m² Au; 0.06% Bi
422-431m: 4.57% Cu; 0.2 g/m² Au; 0.03% Bi
463-464m: 4.00% Cu; 0.7 g/m² Au; 0.02% Bi
460-465m: 1.54% Cu; 0.36% g/m² Au; 0.04% Bi

S.Med. 11917/1103
### SURVEYS

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*Figures in brackets are assumed or interpolated
GEOLOGICAL SUMMARY

WRO 7 started at 203m and cored a sequence of Warramunga Group sediments, i.e. mainly (silicified) (chloritic) shale and (quartzitic) siltstone and hematite shale. Chloritisation and silification occur commonly in many sections, chloritisation particularly close to and in between the 2 lodes. 2 Ironstone lodes of varying composition (mainly quartz-hematite-magnetite-sulphides) were intersected from 406.3-431.0m and 450.2-506.5m; the centrepoint of the mainlode is 1154E/888H/-423m RL. Both lodes contain patchy highgrade Cu-mineralisation. 3 short jasper-hematite lodes were intersected past the second (= main) ironstone lode.

No major faults were intersected.

WRO 7 can be relatively well correlated with WRO 1, the centrepoint of lode being approximately 15m E of the centrepoint of WRO 1.

ECONOMIC SUMMARY

Patchy high Cu values and negligible Au and Bi values in the 2 ironstone lodes. The sediments are virtually devoid of mineralisation,

429-430m: 8.00% Cu; 0.1 g/mt Au; 0.06% Bi.
overall429-431m: 4.57% Cu; 0.2 g/mt Au; 0.03% Bi.
463-464m: 4.00% Cu; 0.7 g/mt Au; 0.02% Bi.
overall460-465m: 1.54% Cu; 0.36g/mt Au; 0.04% Bi.
### ROVER 1 DDH 2 WRO 7

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GEOLOGICAL LOG

By W. Mayer

BO CORE FROM 208.0 to E.O.H

203.0 - 208.0
WEDGE - NO CORE RECOVERY

208.0 - 210.7
CHLORITIC SILTSTONE

Bedding not visible, shearing indicated in places; many healed fractures and mini-faults;
208.6-209.0m - joint sub-parallel to core axis
210.0-210.15m - 3cm wide zone with 0.5-1cm long lenses of shale (disrupted beds);
cleavage to core axis 10° at 210.1m.

210.7 - 222.5
HEMATITIC PHYLLITIC SHALE

Greyish-purple, typical shiny phyllitic look in places, bedding mostly visible; many mini-faults, contortions, healed fractures and quartz-veinlets; on most joints hematitic clay-coating.
213.6m 2-3cm wide fractured quartz-vein with hematite as filling material.
220.7-221.5m 1-2mm quartz-chlorite-vein parallel to core axis
221.5-222.0m several very contorted 1-3mm quartz-chlorite veinlets.

Bedding to core axis 3-5° at 213.0m
Bedding to core axis 5° at 215.8m
Bedding to core axis 18° at 218.7m
Joint to core axis 0° at 218.7m
Bedding to core axis 25° at 219.2m
Bedding to core axis 35° at 219.8m

222.5 - 225.3
WEDGE - NO CORE RECOVERY

225.3 - 229.9
CHLORITIC QUARTZITIC SILTSTONE AND SILICIFIED-CHERTY SHALE

Bedding visible in a few places; hematitic clay-coating on joints; some minifaults and healed fractures,
a few quartz-veinlets, sharp footwall contact (probably faulted).

227.3-228.3m cherty chloritic shale, gradual transition to footwall and hangingwall.

228.3-228.6m Lenticular shalebeds, disrupted by shearing.

cleavage to core axis 10° at 225.3m

traces of pyrite at 225.6m

PHYLITIC HEMATITIC SHALE

229.9-234.5

Basically as 210.7-222.5m, but much less disturbed; many joints parallel to sub parallel to core axis/bedding to core axis 0-5°.

QUARTZITIC SILTSTONE

234.5-237.1m

No bedding visible; hematitic joints; rather undisturbed sequence; core broken up to 2-10cm pieces.

SILICIFIED-CHERTY CHLORITIC SHALE AND CHLORITIC SILTSTONE

237.1-240.7

Bedding indicated in places; mini faults, disruptions and shearing almost throughout; many joints parallel and sub parallel to core axis.

237.8-238.4m breccia-type shale (disrupted cherty shale beds).

PHYLITIC HEMATITIC SHALE

240.7 - 252.0

Basically as 229.9-234.5; hematitic joints, many joints parallel and sub parallel to core axis; only a few mini faults and slight contortions; some 1-2mm quartz-veinlets (healed fractures);

242.8-243.0m a few big contorted quartz-chlorite veins

244.9-245.1m; 245.6-245.7; 247.9-248.3; 1-2mm pyrite-quartz layers.

Bedding to core axis 0° at 240.9m

Bedding to core axis 5° at 244.0m

Bedding to core axis 10° at 245.0m

Bedding to core axis 0-5° at 251.0m
GEOLOGICAL LOG...contd.

Little pyrite in places (set of ill-defined 1-2mm wide pyrite-quartz layers parallel bedding).

252.0-258.1

CHLORITIC SHALE AND SILTSTONE, some sections of HEMATITIC SHALE.

Bedding visible in places; some healed fractures almost throughout, quartz-chlorite-veining in places; hematitic joints.
253.15-253.2m bloblike veining of quartz-chlorite-hematite.
254.3-254.6m rich contorted bloblike quartz-chlorite veins.
254.6-255.0m hematitic shale
255.6-255.7m jasperlike sherry shale, dirty-pinkish many healed fractures
255.7-255.9m brownish-pink shale, bedding indicated some lenticular fragments (disrupted shale-beds).
255.9-256.6m hematitic and hematite shale, bedding indicated, graditional boundary with footwall.

Bedding angle to core axis 10° at 252.8m
Bedding angle to core axis 20° at 254.3m
Bedding angle to core axis 25° at 255.8m
Bedding angle to core axis 25° at 256.2m

258.1-284.0

CHLORITIC AND SLIGHTLY CHLORITIC SILTSTONE

Bedding indicated in a few places; hematitic joints, only a few fractures, very little quartz-veining; very graditional boundary with footwall.
264.5-265.0m quartzitic siltstone, ill-defined bedding
274.0-274.3m many healed fractures and bloblike quartz-chlorite-veining

284.0 - 292.0

CHLORITIC SILTSTONE

Bedding indicated in a few places; average chlorite-content appears higher than in hangingwall, otherwise
the same; rather undisturbed sequence; hematitic joints.
Bedding angle to core axis 10° at 288.1m.

292.0-299.2

CHLORITIC SILTSTONE

As above, but slightly disturbed sequence with many healed fractures and quartz-veinlets in places;
292.5-292.8m illdefined 1cm wide bed with a few 1mm diameter quartz-grains;
297.1-297.3m chloritic siltstone-breccia with illdefined 1-10mm diameter fragments.
299.0-299.2m chloritic siltstone-breccia, similar to above, slightly undulating footwall contact; angle to core axis 12°.

299.2-355.3

INTERBEDDED SEQUENCE OF NON OR VERY SLIGHTLY CHLORITIC SILTSTONE TO CHERTY SHALE WITH CHLORITIC SHALE AND SILTSTONE

Bedding indicated in a few places; gradational inter-bedding boundaries; hematitic joints down to 308.0m, some chlorite shale sections very broken up core.
299.2-300.4m slightly silicified chloritic shale with a few quartzitic siltstone-beds; medium quartz-veins; core rather broken up.
300.4-300.9m quartzitic siltstone
300.9-302.8m chlorite and chloritic shale, core broken up along cleavage sub-parallel to core axis.
302.8-304.6m quartzitic siltstone-cherty shale
304.6-305.0m chloritic shale
305.0-306.6m slightly chloritic quartzitic siltstone.
306.6-307.5m chloritic shale and chlorite shale
307.5-308.0m quartzitic siltstone
308.0-308.4m chloritic shale, no more hematitic joints; cleavage and bedding dip opposite way, angle between shearing and bedding 25°.
GEOLOGICAL LOG...contd.

308.4-309.3m very slightly chloritic quartzitic siltstone

309.3-311.3m chloritic quartzitic siltstone-cherty shale

311.3-312.3m chloritic shale, contorted bedding contact at 312.0-312.3 angle to core axis 0-20°

312.3-313.0m slightly chloritic cherty shale

313.0-318.8m chloritic and chlorite shale, faulted irregular footwall contact

314.8-320.9m chloritic cherty shale-quartzitic siltstone, contorted bedding at 316.4m

320.9-322.5m chloritic and chlorite shale

322.5-326.2m chloritic cherty shale-quartzitic siltstone

326.2-326.5m extensive quartz-chlorite veining sub parallel to core axis

326.5-331.0m chloritic cherty shale-quartzitic siltstone, possible relic-bedding at 330.7; shearing effect looks similar to bedding.

Bedding angle to core axis 15° at 300.8m
Cleavage angle to core axis 0°-5° at 300.9-302.8m
Cleavage angle to core axis 10° at 306.6m
Bedding angle to core axis 15° at 308.5m
Cleavage angle to core axis 15° at 308.4m
Cleavage angle to core axis 20° at 312.7m
Bedding angle to core axis 10° at 313.2m
Cleavage angle to core axis 20° at 321.5m
Cleavage angle to core axis 20° at 324.1m
Cleavage angle to core axis 30° at 325.5m
Cleavage angle to core axis 27° at 328.9m
Cleavage angle to core axis 22° at 330.7m

Some pyrite in places (as 0.5m wide quartz-pyrite veins) - 229.2m
Trace chalcopyrite (veinlet) - 300.4m

A few 0.5 quartz pyrite veins - 302.8m
331.0 - 334.0

**WEDGE - NO CORE RECOVERY**

334.0-334.9m chloritic and chlorite shale; core rather broken up; some quartz-chlorite-veining at 334.4m

334.9-335.1m quartzitic siltstone

335.1-335.8m chloritic shale; some joints are hematitic.

335.8-341.0m chloritic and slightly chloritic quartzitic siltstone, some quartz-veining parallel to cleavage at 337.0-337.3m

341.0-341.6m very slightly chloritic quartzitic siltstone-quartzite; sheared, but rather compact core; flexure at 341.2m

341.6-342.1m chloritic and quartzitic siltstone

342.1-343.5m quartzitic siltstone, purple-grey, bedded.

343.5-350.5m chloritic and slightly chloritic quartzitic siltstone, bedding possibly indicated in places; some joints are hematitic; good core.

350.5-351.6m chloritic shale; some 1-2mm diameter quartz-grains in very ill-defined layers

351.6-353.7m chloritic siltstone and silicified chloritic shale, bedding indicated in a few places; rich contorted quartz-veins at 353.1-353.2m

353.7-353.9m chlorite-mylonite; very uneven joints with small chloritic slickensides.

353.3-355.3m partly cherty chloritic and slightly chloritic shale, bedding indicated in places; contorted quartz-olive green chlorite-veining at 354.6-354.7m set of 1-3mm quartz-veins at 354.7-355.3m

Cleavage to core axis 20° at 335.1m
Cleavage to core axis 20° at 335.8m
Bedding to core axis 30° at 343.0m
Cleavage to core axis 20-25° at 343.5m
Bedding to core axis 25° at 353.3m
Bedding and cleavage to core axis 30\(^\circ\) at 354.5m
little pyrite chalcopyrite (small veins and blobs) at 334.0m-334.3m
small chalcopyrite blobs at 338.0m

355.3-359.6m

**HEMATITIC SHALE**

purple, mostly bedded; core rather broken in places; gradational boundary with footwall.

355.3-355.5m set of 0.5-2cm quartz-chlorite-veins subnormal to core axis

358.8m a few specular hematite-veins with traces of pyrite

358.9-359.0m minor fault with cm displacement sub parallel to core axis; bleached section with minor small vughs.

Bedding to core axis 30\(^\circ\) at 359.5m.

359.6-360.4

**SLIGHTLY CHLORITIC SILTSTONE**

Cleavage to core axis 30\(^\circ\) at 359.8m

360.4-360.4

**GRIT BED**

Approximately 5cm wide, estimate 50% red feldspar, 40% quartz as 1mm diameter grains, 10% chlorite (matrix); conformable hangingwall contact, faulted footwall contact; appears to be a markerbed.

Cleavage to core axis 30\(^\circ\) at 359.8m

Bedding to core axis 20\(^\circ\)

360.6 - 362.0m

**HEMATITE SHALE**

Purple, fine bedded to laminated, almost undisturbed sequence.

361.4m 1cm quartz-feldspar-chlorite zone parallel to bedding.

361.8-362.0m Transition zone to footwall; 2 siltstone beds with graded bedding fining up to the top.

Bedding to core axis 30-40\(^\circ\)
GEOLOGICAL LOG...contd.

362.0 - 365.65  QUARTZITIC SILTSTONE

Well bedded, planar bedding planes, some beds show graded bedding; almost undisturbed sequence except 365.1-365.65. Many contorted 1-10mm wide quartz-chlorite veins and quartz-chlorite filled 1-2mm wide mini-fault zone at 365.6; gradational boundary with footwall.
Bedding angle to core axis 35-45°.

365.65 - 367.4  MAINLY HEMATITE SHALE, MINOR SLIGHTLY HEMATITIC SHALE

Well bedded to laminated, planar bedded planes; mostly almost undisturbed sequence; gradational boundary with footwall.
365.65-366.0, rich contorted 1-10mm quartz-chlorite
366.5-366.7: veins and blobs.

367.4 - 368.1  I BED OF FINEGRAINED QUARTZITE FINING UP TO QUARTZITIC SILTSTONE

Pinkish-grey; sharp boundary with footwall
Bedding angle to core axis 45-50°.

368.1-369.5  SILTSTONE

Bedded with a few beds of quartzitic siltstone and cherty chloritic shale; a few minor contortions and dislocations.
369.4m 1cm wide quartz-dolomite layer parallel to bedding.
Bedding angle to core axis 35-45°.

369.5 - 370.0  SLIGHTLY HEMATITIC SHALE

Well bedded laminated; gradational boundary with footwall.
Bedding angle to core axis 35-45°

370.0 - 373.2  SILTSTONE AND SHALE

Well bedded sequence, planar bedding, only a few slight contortions and dislocations
370.0-370.6m Siltstone and quartzitic siltstone
GEOLOGICAL LOG ... contd.

370.6-371.0m mainly shale with some quartz-filled fractures and minifaults
371.0-372.2m siltstone and slightly hematitic shale; slight flexure at 371.9m
372.2-373.0m mainly cherty chloritic shale, interbedded with slightly hematitic shale
373.0-373.2m shale and siltstone, disrupted footwall contact.

Bedding angle to core axis 40° at 370.0m
Bedding angle to core axis 40° at 371.0m
bedding angle to core axis 40-50° at 372.2m
bedding angle to core axis 50-60° at 373.0m
bedding angle to core axis 55° at 373.2m

373.2-373.4m QUARTZ-CHLORITE VEIN
Massive; chlorite occurs as bloblike veins around footwall and hangingwall; 5cm at bottom are contorted.

373.4 - 375.3m MAINLY HEMATITE SHALE minor SLIGHTLY HEMATITIC SHALE
Well bedded; mainly only minor dislocations and healed fractures, except 374.7-374.9; several 1-5mm quartz-chlorite veins parallel to bedding and disrupted chlorite layers.
375.0-375.3m silicified section with heavy fracturing and brecciation, possibly fault.
Bedding angle to core axis 50-55° at 375.3m

375.3 - 375.8m SILTSTONE AND SHALE
Interbedded; 10cm on top are silicified.
Bedding angle to core axis 60-70°

375.8 - 376.0m QUARTZ CHLORITE VEIN
Massive.

376.0 - 378.0m SILTSTONE AND SHALE
Interbedded, brownish-grey, planar bedding planes, quartzitic siltstone bed show graded bedding, fining
GEOLOGICAL LOG...cont.

up to the top; almost undisturbed sequence; very
gradational boundary with footwall.

376.0-376.4m some healed fractures and slightly
contorted quartz-veins.

377.6-378.0m typical interbedding of 2-3mm greenish
grey beds with 0.5-1cm brownish-grey
beds.

Bedding angle to core axis 50-65° at 378.0m

378.0 - 383.45m

QUARTZITIC SILTSTONE AND SHALE

Interbedded, greenish-grey, bedding clearly visible,
but many quartz-filled fractures and minor disloca-
tions almost throughout.

381.2m little chalcopyrite as 1mm layer parallel to
bedding.

Bedding angle to core axis 60-70°

383.45 - 385.9m

QUARTZ-CHLORITE-RED FELDSPAR? VEIN

Massive; some short sections of silifified siltstone
close to footwall and hangingwall.

385.2m 5cm diameter vein almost completely
filled with pyrite and biotite?

385.9 - 386.25m

SILICIFIED HEMATITIC SHALE

Bedded. Bedding angle to core axis 50°-60°.

386.25 - 387.0

SILICIFIED-CHERTY SLIGHTLY CHLORITIC SHALE

Well Bedded. Bedding angle to core axis 50°.

387.0 - 387.4

ABUNDANT QUARTZ-CHLORITE BLOBS PREVAILING SILICIFIED
SHALE RELICS

387.4 - 390.2

SLIGHTLY CHLORITIC SHALE AND SILTSTONE

Interbedded, but rather ill-defined bedding bound-
aries (possibly by chloritisation), almost undisturb-
ed, a few minor contortions.

388.0-389.2m some beds of quartz (40%) - red feld-
spar (30%) - chloritic matrix (30%)
GEOLOGICAL LOG... contd.

grit, average grain size 0.5-1 mm diameter, graded bedding, possibly marker bed.

Bedding angle to core axis 70-75° at 387.4 m-390.2 m

390.2 - 391.1

HEMATITIC SHALE

Well bedded, planar bedding planes, almost undisturbed, gradational boundary with footwall and hanging-wall (appears slightly silicified)

Bedding angle to core axis 70-75°

391.1 - 397.3

MAINLY SLIGHTLY SILICIFIED SLIGHTLY CHLORITIC SHALE -SILTSTONE, MINOR CHERTY AND CHERTY CHLORITIC SHALE

Sequence mostly bedded, but ill-defined bedding boundaries in places; some sections have lenticular beds (probably result of shearing) and have appearances of metamorphic texture; almost undisturbed sequence except substantial shearing effects.

391.1-392.5 m shale and siltstone, interbedded, a few cherty beds; 2 cm wide quartz chlorite layer parallel bedding at 392.5 m

392.5-393.1 m Cherty shale - chert, bedded in places set of 1-3 mm wide quartz-chlorite veins at 15-25° to core axis.

393.1-394.3 m silicified and cherty slightly chloritic shale, illdefined bedding 1 cm wide quartz-chlorite layer parallel bedding at 394.2 m

394.3-395.35 m silicified slightly chloritic shale with banded texture, small shale lenses (disrupted beds) parallel to cleavage in places.

395.35-396.0 m slightly chloritic cherty shale-chert, bedding indicated, 10 cm on top are heavily disrupted and brecciated.
GEOLOGICAL LOG...contd.

396.0-396.9m  silicified quartzitic siltstone with mainly lenticular beds (disrupted beds metamorphic look, possibly relic-bedding parallel to cleavage.

396.9-397.3m  silicified slightly chloritic shale; relic-bedding indicated at footwall.

Bedding angle to core axis 75° at 391.1m-392.5m
Bedding angle to core axis 70° at 392.5m-393.1m
Bedding and cleavage angle to core axis 75° at 394.8
Bedding angle to core axis 70° at 395.5m
Bedding and cleavage angle to core axis 70° at 396m
Cleavage angle to core axis 70° at 398.5m-397.3m

397.3 - 397.9

SLIGHTLY CHLORITIC CHERTY SHALE

No bedding visible (relict bedding in places)
Faulted footwall and hangingwall contact.

397.9 - 399.2

IMPURE QUARTZITE

Pinkish, with 10-20% chloritic material mainly as 1-3mm illdefined layers aligned parallel cleavage; original bedding seems to be destroyed (several 1-2cm subangular quartzite-fragments; broken up beds) and replaced by metamorphic looking parallel texture; a few slight contortions and minifaults.
Cleavage angle to core axis 55-65°.

399.2 - 402.3

SILICIFIED CHLORITIC AND SLIGHTLY CHLORITIC SHALE.

MINOR SILTSTONE

With various amounts of brownish cherty shale fragments (angular - subangular, lenticular, 3-30mm long, with indentations, broken up beds, mainly aligned parallel to cleavage); no bedding visible; gradational boundary with footwall.

399.4-400.6m  many cherty shale fragments
400.6-402.3m  core more chloritic than above and broken up to 2-5cm pieces.
402.25-402.3m  several disrupted cherty shale beds
Cleavage to core axis 60° at 399.8m
Cleavage to core axis 65° at 402.8m
SILICIFIED CHLORITE SHALE - CHLORITE

No bedding visible, cleavage poorly developed; some dislocations; core broken up to 2-5cm pieces, very broken in places.

405.2-406.2m massive dark green chlorite, higher silicified than above

406.2-406.3m 0.3-2cm quartz and chlorite-vesins pockets, little chalcopyrite

Cleavage angle to core axis 40° at 406m.

LODE

SPECULAR HEMATITE (80%) - MAGNETITE-RICH SHALE (15%) QUARTZ-CHLORITE-PYRITE (5%)

Basically banded feature; shale-blobs are still clearly distinguishable; many dislocations; pyrite as fractured 1-2mm vein together with quartz and chlorite close to hangingwall.

Hangingwall contact: cleavage to core axis 55°.

QUARTZ (20%) Jasper (60%) HEMATITE (20%)

Complete replacement, typical jasper look; jasper is intensely red; brecciation in places (406.75-406.9) quartz as irregular 1-10mm veinlets, veins and blobs, minor as veins and interstitial filling; medium pyrite and chalcopyrite as small-medium veins and blobs.

HEMATITE (95%) - MAGNETITE AND QUARTZ (5%)

Magnetite: as illdefined medium blobs within the specular hematite, little pyrite and very little chalcopyrite.

409.3-409.6m well developed joint with shiny hematite tarnish

Joint angle to core axis 0°
GEOLOGICAL LOG...contd.

410.05 - 410.9m  QUARTZ (40%) - JASPER (40%) - HEMATITE (15%) - MAGNETITE (5%)

Basically as 406.75-409.3m; joints with small crystal of quartz, specular hematite, pyrite; medium-rich pyrite (small-medium aggregates and veins), little chalcopyrite.

410.9 - 411.9m  HEMATITE (95%) - MAGNETITE (5%)

Medium-rich pyrite (medium-large aggregates mainly together with or within magnetite)

411.9 - 413.9m  HEMATITE (55%) - MAGNETITE (45%)

Both magnetite and hematite occur as rather monomineralic compact sections of 5-20cm length; magnetite appears to enrich towards footwall; rich (very rich in places) pyrite (medium-large aggregates, also aligned in stringers, mainly within magnetite), little chalcopyrite.

413.7-413.9m  mineralised hematite rich shale relics and very rich pyrite, minor chlorite as filling material.

413.9 - 415.3  MAGNETITE (95%) - HEMATITE (5%)

Medium-rich pyrite (small-medium aggregates enriched in illdefined 0.5-5cm bands), medium chalcopyrite (medium blobs)

414.3m  planar 2cm vein: hematite (80%) - quartz (10%) - chlorite (10%), angle to core axis 45°

415.3 - 422.1  QUARTZ (50%) - HEMATITE (25%) - MAGNETITE (25%)

The three main minerals occur fairly evenly distributed throughout mainly as small-medium aggregates and veinlike blobs; veintype character only in a few short sections (421.9-422.0); a few 2-20cm sections with 80-90% quartz (big quartz veins with both sharp and illdefined contacts) partly with white dolomite; little-medium pyrite (small-medium aggregates,
GEOLOGICAL LOG...contd.
sometimes aggregated to illdefined veins, medium chalcopyrite (very rich in places). (small-medium blobs, 3cm diameter blobs at 420.75m)
416.9-417.4m small-medium vughs with specular hematite crystals.

422.1 - 423.9 QUARTZ (20%) HEMATITE (80%)
Quartz as 3-5mm relic-blobs and veins rather evenly distributed in specular hematite and as a few 0.5-5cm illdefined veins, 2-3% magnetite is present mainly as 2-3mm bioblike veins, little-medium pyrite (small aggregates). Very little chalcopyrite.

423.9 - 425.8 MAGNETITE (80%)-HEMATITE (20%)
Hematite as 2-10mm veins and big illdefined blobs, (mixed with magnetite); rich pyrite (small-medium aggregates; medium-rich chalcopyrite (small-medium blobs and veins, usually enriched over short sections gradational boundary with Footwall.

425.8 - 427.2m MAGNETITE (95%)-SULPHIDES (5%)
Less than 1% hematite, medium rich pyrite and chalcopyrite (pyrite as small-medium aggregates, often enriched in illdefined parallel layers; chalcopyrite as small-medium blobs and veinlets); sharp Footwall boundary.

427.2 - 428.7m QUARTZ (60%)-JASPER (30%)-HEMATITE-MAGNETITE (10%)
Typical Jasper look: Brecciation and veintype character inplaces: hematite and magnetite occur both finely disseminated and as small-medium veinlike blobs; little pyrite; little-medium chalcopyrite (small-medium blobs).

428.7 - 430.2m QUARTZ(60%)-JASPER (10%)-HEMATITE (15%)-MAGNETITE(5%)
-CHALCOPYRITE (10%)
Appearance basically as above, but eyecatching big massive blobs of chalcopyrite (3-10cm long); pyrite
430.2 - 430.7
QUARTZ (60%) - JASPER (20%) - HEMATITE (15%) - MAGNETITE (5%)
Little-medium pyrite and chalcopyrite (small aggregates and veinlets)

430.7 - 431.0m
HEMATITE (50%) - MAGNETITE (45%) - CHLORITE (5%);
Illdefined 3mm hematite-magnetite banding at 430.85 -
431.0; chlorite as bloblike veins; rather sharp
footwall contact; medium pyrite (small aggregates
and illdefined veinlets); little chalcopyrite.

431.0 - 432.2m
MAINLY CHLORITE, MINOR SLIGHTLY CHLORITIC SHALE

431.0 - 431.4m Chlorite, dark green, no bedding
visible; some 1-10mm quartz chlorite
veins; core broken up to 0.5-5cm
pieces; gradational boundary with
Footwall.

431.4 - 431.65m slightly chloritic shale, bedding
indicated, some mini-dislocations;
faulted Footwall contact.

431.65 - 432.2m Hematitic chlorite; purple-green;
appears bedded in places; a few
contorted quartz veinlets; faulted
and contorted boundary with Footwall.

432.2 - 447.0m
MAINLY CHLORITIC, MINOR VERY CHLORITIC AND SLIGHTLY
CHLORITIC SHALE AND SILTSTONE,
bedded in places; minifaults, disruptions and a few
contortions in places.

432.2 - 433.7m very fine-grained quartzitic siltstone
purple-grey, and silicified chloritic
shale, bedding indicated in places;
a few shale fragments (disrupted
silicified shale beds) throughout,
but rich and typical section at 433.0
- 433.2m; bedding and cleavage.
angle to core axis = 70°; sheared Footwall contact.

$433.7-435.4m$ silicified-cherty chloritic and slightly chloritic shale; planar bedding in places; disrupted-brecciated section at $434.2-434.3m$; some contorted 0.3-3cm quartz veins towards Footwall, sheared Footwall contact.

$435.4-435.7m$ red jasper with substantial quartz veining Hangingwall and Footwall contact disrupted.

$435.7-438.9m$ mainly cherty, minor silicified chloritic shale; planar bedding in a few places, rather undisturbed sequence; a few quartz veins parallel to cleavage in places; $436.9-437.3m$ very chloritic cherty shale, fine bedded; bedding angle to core axis: 45° at $437.1m$

$438.9-440.3m$ slightly chloritic quartzitic siltstone, bedding not visible; gradational boundary with Footwall.

$440.3-447.0m$ chloritic and slightly chloritic shale, mostly bedded; very disturbed and contorted zone with quartz chlorite veining at $440.8-441.0m$ and $443.8-444.0m$; gradational boundary with Footwall;

Bedding to core axis 25° at $440.7m$, locally anomalous value.

Bedding to core axis 55° at $441.5m$

Bedding to core axis 45° at $441.9m$

Bedding to core axis 50° at $444.7m$

**CHLORITE AND CHLORITE SHALE**

Bedding not visible; some quartz veining at $449.5-451.1m$; core rather broken up, very broken up at $447.0-447.2m$. 
GEOLOGICAL LOG...contd.

450.2 - 506.6m  LODE

450.2 - 452.2m  JASPER (70%)-QUARTZ (20%)-HEMATITE (10%)

Mainly sections with one component prevailing; hematite as specular hematite in thick vein at 451.5-451.7m with some pyrite aggregates; at Hangingwall and Footwall 5cm wide zone with prevailing chlorite as bloblike veins,

Cleavage to core axis; 40° at 450.2m
Pyrite - very little

452.2 - 454.0m  HEMATITE (60%)-MAGNETITE (30%)-QUARTZ (10%) MINOR
CHLORITE

Hematite and magnetite occur both mixed together and either prevailing.
Rich pyrite (veinlike), little chalcopyrite (small veins and blobs).

454.0 - 454.5m  QUARTZ (90%)-HEMATITE > MAGNETITE (10%)

Medium chalcopyrite as veinlike blobs close to Footwall and Hangingwall.

454.6 - 456.5m  MAGNETITE (90%)-QUARTZ (10%)

Little specular hematite as veinlets; little medium pyrite (aggregates), little-medium chalcopyrite (veinlets)

456.5 - 460.1m  QUARTZ (50%)-HEMATITE (30%)-MAGNETITE (10%)-PYRITE (10%)

Components rather evenly distributed and occur mainly as illdefined blobs and veins; layered texture prevailing at 456.5-457.0m; rich pyrite as medium-big aggregates enriched in illdefined blobs.

460.1 - 460.5  QUARTZ (95%)-CHALCOPYRITE (5%)

Little specular hematite.

460.5 - 467.0m  QUARTZ (30%)-MAGNETITE (40%)-HEMATITE (30%)

Lode-type very similar to 456.5-460.1m; long hematit
joint at 464.7-465.6, angle to core axis; 0-5°.
Big chalcopyrite blobs at 463.2-463.3m, 463.5-
463.6m, 464.35-464.45m; a few small-medium chalco-
pyrite blobs in places; little-medium pyrite.

467.3 - 482.0

QUARTZ (5%)-CALCITE (10%)-MAGNETITE (60%)-HEMATITE-
(5%)-PYRITE (20%)
Veintype and blob texture prevailing; magnetite
occurs as massive intersection with some pyrite at
471.1-472.0m; otherwise components rather mixed;
pyrite and white and pink calcite usually occur
closely together; pyrite has strong oxidation-colours
in places and tends to prevail over short sections.

482.0 - 484.3m

CALCITE (30%)-MAGNETITE (35%)-PYRITE (35%)
Magnetite as 0.3-1cm long oval or lenticular blobs
often aligned in layers parallel to cleavage; pyrite
tends to prevail in some sections.

484.3 - 506.6m

QUARTZ (30%)-DOLOMITE (20%)-MAGNETITE (40%)-HEMATITE
(10%)
Bloblike veintype texture prevailing; components
rather well intermixed; hematite tends to enrich
in certain sections; a few unmineralised quartz-
sections at 484.5-484.6m, 489.1-489.5m, 492.5-492.8m;
big chalcopyrite blobs at 497.4 and 498.4m; medium-
rich pyrite, some quartz-spectacular hematite filled
medium sized vugs in places.

496.8m
Big vug with dolomite, specular
hematite, attapulgite? (white round
knobs) and mimetite? (1mm diameter
hemispheres)

Sharp Footwall contact, cleavage angle to core axis
= 30°, a few small pockets of chlorite close to
footwall.

506.6 - 515.1

CHLORITE AND CHLORITE SHALE
Bedding indicated in places;
506.6-507.5m some contortions and sliplocations, a
few contorted 1-3mm quartz veins, very gradational boundary with footwall, some 1-2mm dia. euhedral pyrite crystals at 507.1m, a few chalcopyrite veinlets;

507.5-508.0m big disrupted blobs of jasper and chlorite with central magnetite and little pyrite.

508.2-508.4m some contorted 1-10mm quartz veins with little pyrite and chalcopyrite.

508.9m cleavage angle to core axis: 50°

509.3m ?bedding angle to core axis: 35°

511.0-512.0m a few 103mm contorted quartz veins with a chalcopyrite veinlet.

513.6m ?bedding angle to core axis: 40° cleavage angle to core axis: 55°

513.9-515.1m Chlorite, massive, dark green, with a few 1mm dia. pyrite crystals almost throughout; cleavage angle to core axis: 30°, 55°.

515.1 - 525.4m CHLORITIC AND SLIGHTLY CHLORITIC SHALE AND SILTSTONE.

Bedding visible in places; a few minor contortions in places.

520.0-520.2m undulating bedding-planes, bedding angle to core axis: 15-20°.

520.6-521.4m silicified shale, bedding not visible, brownish

523.1m 1cm zone with contorted bedding.

522.3-525.4m evenly disseminated 0.5-1mm dia. chlorite-grains, in chloritic shale.

524.6-525.4m Bedding angle to core axis: 35° Cleavage angle to core axis: 65-75°, Bedding angle to cleavage: 30°

525.4 - 526.0m VERY SLIGHTLY HEMATITIC SHALE

Greyish-purple, bedded; bedding angle to core axis: 40°.
526.0 - 527.9m

**CHLORITE SHALE (526.0-527.0) AND SILICIFIED CHLORITE (527.0-527.9m)**

- **526.2-526.9m** Bedding to core axis: 45-50°, a few minifaults.
- **527.5-527.9m** Silicified chlorite shale and chlorite with a few 1-2cm wide contorted and brecciated jasper and hematitic beds; a few small blobs of pyrite and chalcopyrite.

527.9 - 530.1m

**JASPER (50%)-HEMATITE (50%)**

Mainly banded character; 0.5-1cm wide hematite bands interbedded with 0.5-5cm wide red jasper bands; slight-medium contortions, many disruptions and some veining of quartz, specular hematite and pyrite; medium pyrite as medium-large bloblike veins; little-medium chalcopyrite as veinlets and blobs.

- **529.3, 530.0m** Bedding angle to core axis: 30°

530.1 - 535.0m

**MAINLY CHLORITE SHALE AND CHLORITIC SHALE**

Minor slightly chloritic shale; mostly bedded; slight contortions are some disruptions almost throughout; very little pyrite

- **530.3m** 1-2cm wide slightly contorted laminated jasper band with tiny veinlets of chalcopyrite and pyrite
- **533.3-534.3m** Bedding angle to core axis: 40°
- **534.5m** 2cm wide zone of quartz chlorite veins parallel with bedding
- **534.6m** Bedding angle to core axis: 38°
  - Cleavage angle to core axis: 50°
  - Bedding angle to core axis: 12°
- **534.9m** Bedding angle to core axis: 30°
  - Cleavage angle to core axis: 60°
  - Bedding angle to cleavage: 30°

535.0 - 535.9m

**VERY SLIGHTLY HEMATITIC SHALE**

Greenish-purple, could be chloritised hematitic shale; bedding contorted; cleavage angle to core axis: 60°.
535.9 - 536.5m JASPER (40%) - HEMATITE SHALE (50%) - CLORITE > QUARTZ (10%)
Typical jasper look, jasper brecciated, banded hematite shale (almost pure hematite) extremely contorted; quartz and chlorite as blobs and veins; no sulphides visible.

536.5 - 537.2 SILICIFIED CHLORITIC AND SLIGHTLY HEMATITIC SHALE
Bedding indicated, some 1-2mm quartz veins, some contortions and dislocations, faulted Footwall and Hangingwall contact.

537.2 - 537.8 HIGHLY SILICIFIED HEMATITE SHALE
Very contorted and disrupted,
537.20-537.28 jasper section, faulted Footwall and Hangingwall contact

537.8 - 538.2 HIGHLY SILICIFIED ZONE OF QUARTZ-CHLORITE VEINS AND BLOBS
Chlorite is mainly dark green, minor as light olive green veinlets; this zone is possibly a FAULT?

538.2 - 539.1m SILICIFIED HEMATITE SHALE
Bedding, heavily contorted at 538.5-538.7m
538.5-538.6 heavily contorted silicified chloritic shale with thin gritty beds.
538.8-538.9 bedding angle to core axis: 85°

539.1 - 544.6 CHERTY SHALE, CHERTY QUARTZITE, CHERT
Bedding visible in places; some dislocations and disruptions, gradational boundary with Footwall
540.3-541.7m 1-10mm long lenticular cherty fragments in chloritic cherty shale partly graded bedding + overturned?
Bedding angle to core axis 60° at 542.4m

544.6 - 549.3 MAINLY SILICIFIED CHLORITIC SHALE AND SILTSTONE
With many interbedded hematite rich 1-5cm beds and
layers: bedding indicated; slight contortions and some disruptions; rather inhomogenous section
544.6-546.2m hematitic beds prevail chloritic beds
545.8-545.95 red chert, jasperlike; banded; a few disruptions
546.2-546.5m fine banded (=? bedded) very hematite-rich shale with an 0.3cm red jasper band
547.3-547.35m quartz > chlorite vein, massive
547.35-548.3m some contorted 1-2mm quartz veins, often subparallel to core axis
549.05-549.1m fine banded jasper, medium pyrite as blobs
549.1-549.3m chlorite with contorted veins of rich specular hematite, little pyrite and chalcopyrite; disrupted Footwall contact.

Cleavage to core axis 80° at 549.0m
Bedding to core axis? :75° at 546.6m
Bedding to core axis? 80° at 549.1m

549.3 - 549.75m JASPER-HEMATITE
Banded, some contortions and substantial disruptions, some pyrite and chalcopyrite and specular hematite in places as veinlets; faulted Footwall contact; angle to core axis: 40°
549.6-549.75m fine banded very hematite rich shale.

549.75- 551.9 CHLORITIC SHALE INTERBEDDED WITH VERY CHLORITIC GREYWACKE
Graded bedding in greywackes indicated in places; main components of greywacke: 1-2mm red feldspar and 1-3mm quartz grains; gradational boundary with Footwall.
550.9-551.0m 0.3-3cm dia. subrounded chert fragments (accretions?)
551.0-551.1 chert, dirty pink.
GEOLOGICAL LOG...contd.

551.9 - 553.3 CHLORITIC SHALE

With a few 1-5cm quartzitic siltstone beds; bedding indicated; minor contortions and disrupted cherty beds in places.
Cleavage to core axis 30° at 552.8m

E.O.H.
PROSPECT/MINE: ROVER 1.

Log of Hole: 4 PARENT

Location: E.L. 228, South-west of Tennant Creek.

Purpose of Hole: To test H2O - Body on 1200mE Cross Section.

Proposed By: B.T.Williams Date: 13/6/1974

Proposed Target: 1200 E: 890 N: -500 R.L.

Hole Planned By: R.Maher Date: 4/7/1974 Checked: W.Mayer

Hole Approved By: B.T.Williams

Hole Logged By: W.Mayer

Collar Co-Ordinates:

Proposed: 1164 E: 642 N: R.L.
Actual: 1163.50 E: 642.05 N: 1000.24 R.L. Picked up By: B.Harding Date: 7/3/75

Collar Bearing:

Proposed: 10° Grid: 5.5° Magnetic: Surveyed in By: J.Ackland
Surveyed: 10° Grid: 5.5° Magnetic: Picked up By:
Actual: 10° Grid: 5.5° Magnetic:

Collar Inclination:

Proposed: -76° Surveyed in By: J.Ackland
Surveyed: -76° Picked up By:
Actual: -76°

Target Depth: 580 m.
Proposed Final Depth: 650 m.
Actual Final Depth: 611.0 m. Hole Terminated By: W.Mayer

Reason for Termination: Normal termination - lode zone appeared to be completely intersected.

Drilling:- Date Commenced: 10/7/1974 Date Completed: 28/11/1974

Drilled By: Geopeko Limited Drilling Division.
Wedges Placed At: Nil.

Remarks: Big difficulties with water loss and caving in ground from 97-117m. No drilling from 8/8/74 to 6/10/74; double shifts from 23/10-28/11/74. Hole was cemented from 494m - 611m.

Economic Summary Result: 2 ironstone lodes with substantial subeconomic Cu-mineralisation and patchy Au and Bi-mineralisation were intersected.
ROVER 1/4 PARENT.

DRILLING PARTICULARS.

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Casing Placed

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Remarks.

No wedges were placed.

Big difficulties with caving in ground, cavities and water loss from 97 - 117m.

Hole was cemented from 494 - 611m.


Drilling Materials and Fluids Used.

Romud, Cement, Gyseal, Woodshavings,.

Universal Drilling Oil, Mytilus Grease, Domus B Oil.
**ROVER 1/4 PARENT.**

**SURVEYS**

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**FIGURES IN BRACKETS ARE ASSUMED OR INTERPOLATED.**  * = Magnetics affected.
## ROVER 1/4 PARENT

### ASSAYS

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### ROVER 1/4 PARENT.

#### Assays (continued)

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### ROVER 1/4 PARENT.

**Assays (Continued)**

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ROVER 1/4 PARENT.

GEOLOGICAL SUMMARY.

RL/4/P was planned to intersect the H 20 body on the 1200E Cross Section at -500m RL. The hole intersected at the planned Easting, but about 40m above the planned target (-460m RL instead of -500m RL) due to stronger flattening out effect than anticipated.

The stratigraphy and lithology of the Mid-Cambrian Merrina Beds section is very similar to the previous holes, but caused more drilling problems due to big cavities with complete water-loss and strong caving in from 97-117m. The unconformity between the MidCambrian and the Warramunga Group rocks was intersected at 138.4m (= -134m RL).

The range of Warramunga Group rocks is basically the same as in the previous holes, i.e. mainly different types of shales, hematitic shales and siltstones, minor greywackes, chert and jasper. Chloritisation and silification occur commonly in some sections, particularly close to, in and between the 2 ironstone-lodes. The 2 ironstone lodes intersected from 494.4-545.65m (CPL: 1200mE/860mN/-444m RL) and from 553.5-571.15m (CPL: 1203mE/898mN/-463m RL): the previous satellite lode was increased in size to a 5m intersection, while the previous mainlode decreased in size to a 18m intersection. Both lodes are massive ironstone bodies and consist mainly of magnetite, hematite, quartz, jasper, calcite and sulphides. Past the second lode the usual shale-siltstone sequence and two short jasper-hematite-pyrite lodes were intersected.

No major faults were intersected.

ECONOMIC SUMMARY RESULT.

Two ironstone lodes with substantial sub-economic Cu-mineralisation and patchy Au & Bi-mineralisation were intersected.

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<th>Cu (%)</th>
<th>Bi (%)</th>
<th>Au (g/t)</th>
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ROVER 1/4 PARENT.

GEOLOGICAL LOG

67.0m - 75.1m SHALE INTERBEDDED WITH DOLOMITIC SILTSTONE;
Bluish grey, fresh, planar bedding, thickness of beds varies from 1mm to 50mm; some beds show graded bedding and cross bedding, load casts and other synsedimentary structures.

67.0-67.5m Cherty siltstones, small corepieces, 20% Recovery.

67.5-68.5m Ochre shale and siltstone.

67.0-75.1m Bedding angle to core axis =80°.

75.1m - 75.35m DOLOMITIC SILTSTONE
Bedding indicated.

75.35m - 77.5m SHALE.
Grey, fresh, well bedded, planar bedding, bedding angle to core axis = 80°.

77.5m - 79.1m SHALE, grey INTERBEDDED
- with 0.5-1cm wide DOLOMITE BEDS, whitish, nodular; bedding angle to core axis = 80°.

79.1m - 79.2m DOLOMITE.
Massive, bedding not visible, some vughs with ochre stains.

79.2m - 80.4m SILTY DOLOMITE.
i.e. 0.5-2cm nodular and lenticular dolomite blobs separated by thin dolomitic shale veinlets and layers, extremely disturbed b-type, i.e. bedding only indicated.

80.4m - 82.15m DOLOMITE.
Yellow-grey, massive, bedding not visible, many small-big leached vughs at 80.8-81.2m; some early stage stylolites in places; gradational boundary with footwall.

82.15m - 83.0m DOLOMITIC SHALE-SILTSTONE.
Bluish-grey, bedding not indicated, a few ochre 1-2mm wide joints (=bedding-planes); very
gradational boundary with footwall.

**DOLOMITIC SILTSTONE.**
Red-brown, bedding only indicated, very disturbed bedding-type; mainly broken up beds and blobs in a vein like matrix, very similar to 79.2-80.4m.

**SILTY DOLOMITE.**
Mainly bluish-grey, bedded only at 84.8-85.0m, elsewhere no bedding, or rather disturbed bedding similar to 79.2-80.4; Dolomite, dark brown and whitish beds.

**DOLOMITE.**
Massive, bedding mostly indicated.

**SILTY DOLOMITE.**
Bluish-grey with many ochre fractures, veinlets and lenses; relic bedding indicated.

**DOLOMITIC SILTSTONE.**
Red brown, as 83.0m-84.6m; gradational boundary with footwall.

**SILTY DOLOMITE.**
Bluish-grey, very disturbed bedding as 84.6-85.0m

**DOLOMITE.**
Mainly yellowish-grey, bedded; some bedding planes are wavy; some small-medium leached vughs in places.

2cm thick dolomite bed, with shrinkage-cracks.

**DOLOMITIC mudstone, partly decomposed to clay.**

Badly leached dolomite, third of core is a vugh.
91.15m - 92.3m

**DOLomite.**
1-10cm wide dark brown beds interbedded with 1-3cm wide white beds or big nodules (probably silicified dolomite), very distinct colour boundaries; bedding angle to core axis = 75°-85°.

92.3m - 101.0m

**Fossiliferous Dolomite.**
Rich fossiliferous layers of various thickness, interbedded with non-fossiliferous sections; bedding indicated, but bedding planes rather undulating; fossil content appears to be mainly 1 species, i.e. dolomite-filled cones 2-5mm diameter, some medium-big vughs, and early stage stylolites in places, some ochre joints. Semi-chaotic bedding in places; nodular contorted blobs, big surrounded dolomite pebbles, with fossils and pockets of fossil-debris.

97.0-101.0m

101.0m - 103.15m

**Nodular Dolomite.**
Whitish amoeboid nodules (1-3cm long) with often illdefined outlines in dark grey veinlike matrix; massive core very few vughs.

103.15m - 104.7m

**Dolomite.**
Massive-unbedded, very leached, many medium-big vughs; fossil debris and early stylolites in places.

104.7m - 108.0m

1.3m RECOVERY (=30%) Dolomite Mud-Silt-Stone.
Whitish-grey, bedding not visible, very soft rock.

105.0-105.2m: Core broken up to very small pieces.

108.0m - 109.0m

**Cavity - No Core Recovery -**
- except 5cm of 0.5cm diameter mudstone-fragments.
109.0m - 110.25m

**DOLOMITIC SILTSTONE.**
Red-brown, illdefined veinlike bedding.

109.20-109.23m Massive dolomite bed.

110.25m - 116m

**SANDSTONE-CONglomerATE-SEQUENCE.**
Bedding indicated in a few places; sandstones range from dense finegrained dolomitic to coarse grained porous material and conglomerate sandstone; conglomerates occur mainly as 10-50cm wide sections with 0.2-2cm diameter subrounded quartz and quartzite fragments in sandy-silty matrix and are poorly cemented in places with substantial pore volume.

110.25-111.0m Fine grained dolomitic sandstone with a few gritty sections.

111.0-112.0m Medium grained dolomitic sandstone interbedded with gritty conglomerate sections.

112.0-112.5m Coarse gritty sandstone, gradational boundary with footwall.

112.5-113.1m Fine-medium conglomerate; mainly quartz fragments, subangular-subrounded, not sorted.

113.1-113.6m Medium-coarse grained sandstone.

113.6-115.0m Fine gritty conglomerate, quartz fragments average only 2-3mm diameter; 2cm wide dolomite bed at 114.9m.

115.0-116.0m Medium coarse grained sandstone; a few leached vughs.

116.0m - 117.6m 1.6m NO CORE RECOVERY.

117.6m - 119.4m **SILTSTONE.**
Bedding not visible, chocolate brown

117.6-117.9m Whitish.

119.4m - 122.1m

**Silty FineGrainEd Sandstone.**
Chocolate brown, bedding very disturbed, a few 2-3 diameter quartz fragments in places. Some small vughs in places.
122.1m - 128.3m MEDIUM-COARSE GRAINED SANDSTONE. 
-with a few short conglomeratic sections.

128.3m - 131.9m FINE-MEDIUM QUARTZ-CONGLOMERATE; 
as 127.2-127.8m; loose rounded and sub-rounded quartz and quartzite pebbles at 
127.0m-130.1m; pebbles of feldspar-porphry 
at 130.6m.

131.9m - 136.3m MEDIUM-COARSE GRITTY SANDSTONE GRADING INTO 
MEDIUM QUARTZ-CONGLOMEREATE: 
Graded bedding indicated in places. Very porous.

136.3m - 137.8m FINE-MEDIUM GRAINED SANDSTONE—
With a few short silty sections, bedding 
indicated.

137.8m - 138.4m FINE, MEDIUM GRAINED CONGLOMERATE.
Angular-sub-angular 0.2-2cm long fragments 
of quartz, quartzite and phyllitic and 
chloritic shale. No conglomerate-bed 
directly on unconformity.

138.4m UNCONFORMITY.
Well defined lithological boundary between 
Warrawanga Group sediments and Cambrian sediments.

138.4m - 140.3m PHYLLITIC SHALE BRECCIA.
Fresh phyllitic shale breccia in situ: Ill-defined 
3-10mm diameter fragments.

138.7m: 2cm diameter pocket of Cambrian sandstone 
gradational boundary with footwall.

140.3m - 151.2m PHYLLITIC SHALE.
Purple-grey, many small disruptions, bedding 
not visible, core rather broken up along 
cleavage, gradational boundary with footwall.

151.2m-157.0m SLIGHTLY CHLORIFIC PHYLLITIC SHALE.
Bedding indicated, numerous small disruptions, 
gradational boundary with footwall.

151.5-151.7m: Some contorted quartz veins and blobs.

154.0-154.7m: Bedding angle to core axis: 15-20°.
157.0m-163.1m

PHYLLITIC SHALE.

Purplish-grey, numerous small disruptions, bedding indicated in places. Gradational boundary with footwall.

162.0-163.1m: Bedding angle to core axis = 25°

163.1m-169.4m

CHLORITIC and SLIGHTLY CHLORITIC SHALE.

Bedding indicated in places, some disruptions.

163.5-164.0m: Bedding angle to core axis = 10-30°
164.6-165.0m: Many contorted 1-20mm quartz veins and blobs.

165.0-169.4m: Highly sheared sequence with many 3-5cm thick beds of silicified chloritic shale. Bedding less visible than cleavage. Cleavage angle to core axis = 15-30°.

167.4-167.6m: Several big (max.10cm long) oval chert fragments aligned parallel to cleavage, probably broken up cherty beds.

169.4m-171.9m

SANDY SHALE and SILTSTONE.

Cherty in places, indications of intense shearing at 169.4-170.5m

170.6m: Bedding angle to core axis.

171.9m-177.0m

CHLORITIC and CHERTY CHLORITIC SHALE.

Bedding indicated in places, some contortions and disruptions, silicification in places.

172.7-173.2m: Many contorted 2-30mm wide quartz-chlorite veins.

174.0m: ?Cleavage angle to core axis = 5-20°

175.6m: ?Cleavage angle to core axis = 25°

177.0-178.0m

HIGHLY SILICIFIED SHALE TO CHERT.

Many fractures, some quartz veins and in places. Core rather broken, very broken at 177.8-178.0m.
178.0m-181.7m

**QUARTZ-PINKISH JASPER-CHLORITE.**
Mainly massive as veins and blobs.
178.0-179.8m: Quartz-pinkish jasper, mainly massive, partly pseudo-breccia.
179.0-181.7m: Quartz-chlorite, as contorted veins and blobs.

181.7m-185.0m

Mainly HIGHLY SILICIFIED PINKISH SHALE TO CHERT, minor IMPURE QUARTZITIC SILSTONE AND QUARTZITE. Some disruptions and a few quartz veins.

185.0m-229.6m

**PHYLLITIC SHALE.**
Mainly dark-purple-grey, bedding indicated in places by a few 1-2mm contorted quartzitic siltstone beds. Many mini-contortions and mini-disruptions.
185.0-185.15: Quartz-chlorite, as contorted veins and blobs, some vughs with specular hematite coating.
185.15-186.0m: Very slightly chloritic phyllitic shale, gradational boundary with footwall.
185.0m: Bedding angle to core axis = 50° (locally anomalous value).
185.8m: Bedding angle to core axis = 8°
187.9m: Bedding angle to core axis = 20°
197.0m: Bedding angle to core axis = 35°
197.5-199.1m: Chlorite as contorted veins and blobs.
199.5-201.0m: Slightly chloritic phyllitic shale, bedded.
199.5m: Bedding angle to core axis = 25°
200.0m: Bedding angle to core axis = 40°
200.5m: Bedding angle to core axis = 10°
202.0m: Bedding angle to core axis = 0.5°
204.0m: Bedding angle to core axis = 20°
204.4-205.0m: Many contorted 1-5mm Quartz-chlorite veins in chlorite shale.
205.0-220.0m: Phyllitic shale as above, but more bedding and only minor contortions and disruptions.

205.4m, 208.5m:

210.0m, 213.4m: Bedding angle to core axis = 15°
218.0m, 219.8m:

205.8m: Bedding angle to core axis = 30°
215.8m: Bedding angle to core axis = 10°
220.0-225.9m: Phyllitic shale, bedding only slightly contorted, but many mini-disruptions.

225.2-225.4m: Quartz-chlorite, as big contorted
225.6-225.9m: Veins and blobs.
226.8m: Bedding angle to core axis = 15-20°
Contorted bedding.
226.8-227.6m: Quartz-red jasper-chlorite, as contorted veins and blobs. Some big blobs (10cm long) of phyllitic shale.

227.3-229.6m: Phyllitic shale, bedded, minor contortions and disruptions, bedding angle to core axis = 20-25°.

229.6m - 230.4m: QUartz-CHoRiTE.
As contorted veins and blobs, some big blobs and shale.

230.4m - 231.0m: ChLoRiTIC SHaLe.
Bedding angle to core axis = 10°.
Bedded.

231.0m - 231.6m: QUartz-CHoRiTE.
As contorted veins and blobs.

231.6m - 232.5m: ChLoRiTIC SHaLe.
Bedding not visible, a few 1-2mm quartz veins in places.

232.5m - 237.0m: PhyllITic SHaLe.
With some 1-5mm wide quartzitic siltstone beds,
mainly greyish-purple, partly with many mini-
disruptions and contortions, partly only very
slightly disturbed. Gradational boundary with
footwall.
232.5-234.0m : Many mini-disruptions.
236.3m : Bedding angle to core axis = 25°.

237.0m - 241.8m

**CHLORITIC and SLIGHTLY CHLORITIC SILTSTONE AND
SILT.**

Shale is bedded, rather undisturbed sequence apart
from 237.0-237.1m, 237.9-238.15m; Quartz-chlorite
as big contorted veins and blobs. Very gradational
boundary with footwall.

241.8m - 268.5m

**PHYLITIC SHALE.**

Mainly purplish-grey, bedded (1-5mm quartzitic
siltstone-beds), generally slight contortions and
few to many mini-disruptions. Gradational
boundary with footwall.
243.0m : Bedding angle to core axis = 18°
247.6-247.7m : Quartz-chlorite vein.
248.3m; 253.0m : Bedding angle to core axis = 20°
250.5m; 256.5m): 
259.5m: Bedding angle to core axis = 25°
261.1-261.9m : Core rather broken up along cleavage.
261.9-262.2m : Slightly chloritic shale, bedding
angle to core axis = 20°.
Gradational boundary with footwall
and hangingwall.
262.2-268.5m : Mainly planar bedding, very few
mini-disruptions. Bedding angle to
core axis = 15-20°.

268.5m - 269.0m

**HEMATITIC SLIGHTLY PHYLITIC SHALE.**

Very similar to shale above and below, but with
some distinct hematitic 2-3mm beds, almost planar
bedding. Bedding angle to core axis =15-25°.
269.8m - 272.7m

**PHYLLITIC SHALE.**


270.95-271.0m, 271.85-272.0m: Quartz-chlorite as veins and blobs.

272.7m - 274.1m

**CHLORITIC SHALE.**

Possibly slightly silicified, almost planar bedding in places. Bedding angle to core axis = 25°. Gradational boundary with footwall.

274.1m - 275.2m

**SILICIFIED and CHERTY CHLORITIC and SLIGHTLY CHLORITIC SHALE.**

Minor SILTSTONE, bedded, hematitic joints. Bedding angle to core axis = 25°.

276.6-277.15m: Several 1-3cm wide interbeddings of fine-grained chloritic greywacke.

275.2m - 280.0m

280.0m - 292.0m

**CHLORITIC and SLIGHTLY CHLORITIC SHALE and SILTSTONE.**

No bedding visible, core very broken up to 0.5-5cm pieces, hematitic joints.

282.1-282.6m; 283.9-289.0m; 289.9-290.5m: Quartz-chlorite.

292.0m - 325.9m

**PARTLY SILICIFIED CHLORITIC, MINOR SLIGHTLY CHLORITIC SHALE and SILTSTONE.**

Bedding indicated in a few places, hematitic #bhs. 292.1m: Bedding angle to core axis = 25° 295.5m: Bedding angle to core axis = 15° 301.0-302.2m: Joints sub-parallel to core axis.
302.7-303.6m: Abundant quartz-chlorite, as contorted veins and blobs, prevail chloritic siltstone.
306.0-306.9m: Chloritic shale, bedded, bedding angle to core axis = 20-25°
309.6m, 309.8m: Bedding angle to core axis = 17° Pyrite coatings on joint.
310.5-311.0m: Extremely fine disseminated pyrite in slightly chloritic siltstone.
312.8-313.8m: Quartz-chlorite, as contorted veins and blobs.
322.0m: No more hematitic joints below 322.0m.
319.75-320.4m: Quartz-chlorite
322.95-323.1m: Quartz-chlorite
325.9-326.2m: Quartz-chlorite
324.8m: Bedding angle to core axis = 20°
325.5m: Cherty shale fragment, disrupted parallel cleavage?

326.2m - 331.8m

HEMATITIC SHALE.

Dark purplish-grey, well bedded (planar bedding). Bedding angle to core axis = 20-25°.

N.B: This rock is very similar to PHYLLITIC SHALE 241.8-268.5m, but has neither shiny surfaces nor mini-disruptions, pale oxidisation colours along joints.

326.4-326.5m: 5cm wide veins of quartz-hematitic
327.9-328.4m: red calcite-chlorite. Parallel bedding
328.6m: 2cm wide bed of siltstone with cross-bedding younging up the hole.

331.8m - 334.8m

CHLORITIC and SLIGHTLY CHLORITIC SHALE.

Bedded with a few siltstone and gritbeds, a few slight flexures and disruptions.
gradational boundary with footwall and hangingwall. Bedding angle to core axis = 20-25°.
333.0m; 334.6m: 3cm wide gritbed with graded bedding younging up the hole. At 330.0m disrupted cherty shale fragments in the gritbed and at 334.6m gritbed is disrupted itself.

334.8m - 336.5m

HEMATITIC SHALE; MINOR HEMATITE SHALE.
Fine bedded to laminated (planar bedding). Bedding angle to core axis = 25°.
335.8m: Two quartz-dolomite-chlorite layers parallel bedding, 3 and 5mm wide.

336.5m - 342.9m

NON & VERY SLIGHTLY CHLORITIC SHALE.
Grey to greenish grey, well bedded (planar bedding). Bedding angle to core axis = 30°.
336.6-337.3m: Disruptions and slight contortions.
338.6-339.2m: Disruptions and minor contortions.
340.5m: 2cm wide quartz-chlorite veinings, slightly contorted, parallel bedding.

342.9m - 343.8m

HEMATITIC and HEMATITE SHALE.
Laminated, some minor disruptions, faulted footwall contact. Bedding angle to core axis = 30°.

342.8m - 346.1m

VERY SLIGHTLY CHLORITIC SHALE.
343.8-344.5m: Laminated shale, heavily fractured to brecciated.
344.5-345.0m: Some healed fractures and disruptions small quartz infillins in places.

346.1m - 349.0m

HEMATITE SHALE.
Planar bedding, a few minor disruptions, bedding angle to core axis = 30°.
346.85m: 2cm wide quartz vein parallel bedding.
347.1-347.5m: Quartzitic siltstone.
348.6-348.9m: Quartzitic siltstone.
SHALE and MINOR SILTSTONE.

Grey and brown shades, bedded, some disruptions in places.

Bedding angle to core axis = 25°-35°.

350.6m: 2cm wide bed with 0.5-5cm long lenticular cherty shale fragments in chloritic matrix, probably disrupted bed.

351.9-352.1m: Quartz-chlorite.

351.7-353.9m: 1cm and 0.5cm wide quartz-chlorite layer, parallel bedding.

354.6-354.7m: Contorted quartz-chlorite veins and blobs.

355.5-356.0m: Many small cherty shale fragments (0.5-1cm long, 1-3mm wide) aligned along bedding in fine grained quartzitic siltstone.

356.2m: Bedding angle to core axis = 40°

356.4-357.0m: Several small to large quartz-chlorite veins mainly parallel bedding.

357.5-358.8m: Several 1-5cm wide chloritic cherty shale beds interbedded.

Bedding angle to core axis = 35°.

358.9m: Some very thin lenticular cherty shale fragments along bedding.

359.6m: 5cm wide laminated bed of silicified hematite shale. Bedding angle to core axis = 35°.

361.5-362.0m: Quartz-chlorite-calcite as contorted 2-20mm wide veins interbedded in hematitic shale. Bedding angle to core axis = 35°.

362.2m: Bedding angle to core axis = 35°

363.0-366.0m: Core rather broken up (1-5cm pieces).

363.5m: 2cm wide grit bed.
366.0-366.3m: Hematitic red 1-2mm wide beds, folded, 2-3mm long curved pattern (stress?) on core surface.

367.5m: 5mm quartz-chlorite layer parallel bedding. Bedding angle to core axis = 40°.

368.2m - 370.0m

**HEMATITE SHALE.**

Fine bedded, almost undisturbed sequence, a few quartz-calcite-veinlets in places. Bedding angle to core axis = 35-40°.

370.0m - 371.2m

**NON and VERY SLIGHTLY CHLORITIC SHALE.**

Bedded, a few quartz-calcite-veinlets in places, gradational boundary with footwall. Bedding angle to core axis = 35°.

371.2m - 373.2m

**HEMATITIC SHALE.**

Bedded, some flexures and disruptions, some calcite veinlets. Bedding angle to core axis = 35°.

371.6m: Isoclinally folded red-brown 2mm wide siltstone bed.

372.8m: 5mm wide quartz-chlorite-calcite layer parallel bedding with internal faulting and micro-layering 10° different from bedding.

373.2m - 374.2m

**SHALE WITH MANY 1-3mm WIDE GRIT BEDS.**

Bedding is rather disturbed by grit beds, cross-cutting dykes, apophyses and contortions. Grit consists of 1mm grains of red feldspar and quartz.

374.2m - 377.5m

**HEMATITE SHALE.**

Bedded, bedding rather disturbed almost throughout, some disruptions.

377.2m: 5mm wide gritty dyke, crosscutting and aligned parallel bedding? = cleavage.
INTERBEDDED SEQUENCE OF CHERTY CHLORITIC SHALE, SHALE and SILTSTONE.

Many disruptions (mainly the cherty shale is heavily disrupted), and contortions. Cherty shale fragments often adjacent to disrupted beds and aligned parallel bedding=cleavage. Core broken up to 2-10cm pieces.

QUARTZITIC SILTSTONE.

Pinkish, bedding not visible, with interbedding of cherty chloritic shale (383.5-383.65m), a few quartz-calcite veinlets. Bedding angle to core axis = 45°

SHALE and SILTSTONE.

Bedded, relatively undisturbed sequence, some 1-3cm beds of cherty chloritic shale. A few quartz-calcite veinlets almost throughout.

Bedding angle to core axis = 50°

Many contorted quartz-calcite veins and blobs.

Hematitic shale, bedding angle to core axis = 45°

Quartz-chlorite as veins and blobs.

CHERTY SHALE and CHERT.

Bedding indicated, disrupted beds at 388.7-389.0m, a few quartz-calcite veinlets.

HEMATITE SHALE.

Fine bedded, almost undisturbed sequence except 389.0-389.3m. Abundant quartz-chlorite-calcite veining. Gradational boundary with footwall. Bedding angle to core axis = 30-45°
390.0m - 395.0m  MAINLY QUARTZITIC SILTSTONE, MINOR CHERTY CHLORITIC SHALE and SHALE.
Siltstone pinkish-brown, bedding mostly not visible. Sequence appears relatively undisturbed, disruptions mainly in cherty shale.
392.5m : 10cm long cherty shale fragment in quartritic siltstone.

395.0m - 402.0m  MAINLY SILICIFIED SHALE, MINOR CHERTY SHALE AND SILTSTONE.
Mostly bedded, only minor contortions and disruptions, but core rather broken up in some sections. Bedding angle to core axis = 30-40º.
396.0-397.0m : Slightly chloritic shale, not silicified, many healed microfractures.

402.0m - 403.0m  QUARTZITIC SILTSTONE.
Brownish, bedding not visible.

403.0m - 403.9m  SHALE and SILTSTONE.
Bedded in places.

403.9m - 414.5m  SLIGHTLY HEMATITIC SHALE.
Light greyish-purple, bedding visible in places, sequence appears rather undisturbed, very gradational boundary with footwall.
403.9-404.3m : Hematitic shale with some thin sheared chlorite layers around 404.3m. Bedding angle to core axis = 30º.
405.9-406.25m : Shale, with quartz-chlorite at 406.15-406.20m.
406.9-407.4m : Slightly hematitic shale, half core with pale oxidation colours, some big quartz chlorite veins and blobs.

409.3-409.7m :
414.5m - 416.4m **HEMATITIC SHALE.**
Bedded, with several 3-5mm wide grey limestone interbeds, sequence appears almost undisturbed. Bedding angle to core axis = 70-75°.

416.4m - 418.6m **SHALE.**
Partly silicified and slightly chloritic, bedded, appears undisturbed apart from disruptions of cherty shale bed at 416.7m. Bedding angle to core axis = 70°.

417.3m :3cm wide white limestone-bed, regular disintegration into small blobs. Bedding angle to core axis=45°.

418.6m - 420.8m **HEMATITE SHALE.**
Fine bedded (planar bedding) with some 1-3mm wide light grey limestone beds sequence almost undisturbed. Bedding angle to core axis = 70°.

419.5m :2cm wide bed with calcite infillings.

420.8m - 424.0m **QUARTZITIC Siltstone.**
Bedding angle to core axis = 70°
Bedded in places.

424.0m - 426.0m **HEMATITE SHALE.**
Fine bedded (planar bedding) almost undisturbed. Bedding angle to core axis = 60-65°.

426.0m - 434.9m **INTERBEDDED SEQUENCE OF SHALE, SLIGHTLY CHLORITIC and HEMATITIC SHALE and MINOR Siltstone.**
Many disruptions and minor contortions.

426.3-428.3m :Very broken up core, many chloritic shale with quartz veinlets and infillings.

429.5-429.55m :Quartz-chlorite as contorted and disrupted, with some contorted quartz veins.
434.9m - 435.7m  **HEMATITIC SHALE.**
Bedded, slight contortions. Bedding angle to core axis = 55-65°.

435.7m - 445.1m  **INTERBEDDED SEQUENCE OF SHALE AND QUARTZITIC SILTSTONE.**
A few minor dislocations. Bedding angle to core axis = 50-65°.
436.0-436.8m :Some contorted 2-20mm wide quartz veins.
439.9-440.9m :Some contorted bleb-like quartz veins.

445.1m - 446.05m  **CHERTY CHLORITIC SHALE INTERBEDDED WITH SHALE.**
Some medium quartz veins and blobs in places. Bedding angle to core axis = 70°.

446.05m - 447.6m  **INTERBEDDED SEQUENCE OF SHALE AND SLIGHTLY HEMATITIC SHALE.**
Planar bedding, a few minor dislocations. Bedding angle to core axis = 70-75°

447.6m - 449.0m  **QUARTZ-DIRTY RED JASPER-MINOR CHLORITE.**
Jasper is the country rock, which is cut by small to big (max. 10cm wide) quartz-chlorite veins. Many cracks sub-parallel to core axis with quartz-chlorite infillings.

449.0m - 449.6m  **HEMATITIC SHALE.**
Bedded. Bedding angle to core axis = 75°.

449.6m - 452.0m  **CHERTY SHALE and CHERT.**
Some quartz veining in places.

452.0m - 459.6m  **HEMATITIC and CHLORITE SHALE.**
Bedding indicated in places. Very fractured section with some quartz veinlets almost throughout, some joints with hematitic coating. Core broken up to 1-5cm pieces.
459.8m - 465.8m

**CHLORITE TO CHLORITE SHALE.**

Neither bedding nor cleavage visible.

455.0 - 455.05m: Some quartz-blobs and infillings.

456.3 - 458.6m: Slightly hematitic chlorite, dirty grey-purple, with some contorted quartz veinlets.

458.1 - 458.2m: Quartz-chlorite as contorted veins and blobs.

462.5 - 464.7m: Very contorted bedding is apparent by presence of 1-5mm wide hematitic beds.

465.0 - 465.8m: Chlorite shale with various amounts of grit fraction, increasing towards footwall. Grit fraction appears in crosscutting pockets. Gradational boundary with footwall.

465.8m - 466.4m

**FINE GRAINED CHLORITIC GREYWACKE.**

No bedding visible, quartz and feldspar grains 1mm diameter, many big (5cm long, 1cm wide) angular chlorite fragments in unoriented distribution, slightly contorted footwall contact. Bedding angle to core axis = 10°.

466.4m - 469.0m

**INTERBEDDED SEQUENCE OF CHLORITIC SHALE and CHERTY SHALE.**

Bedded, medium contortions and disruptions in places.

476.1m: Bedding angle to core axis = 40°

469.0m - 475.4m

**SLIGHTLY HEMATITIC and HEMATITIC SHALE.**

Bedding visible in a few places, slight contortions in places.

Bedding angle to core axis = 35-55°.

469.1 - 469.2m: Hematitic phyllitic shale, with many mini-disruptions.

470.5 - 471.2m: Some contorted 1-2mm quartz veins, tapering out towards hangingwall.
475.4m - 478.3m  **RED JASPER, MINOR ChERT.**
Relatively little fractures and no brecciation, medium quartz-chlorite veins in places.
476.8-477.5m  Chlorite shale with 2cm wide quartz-chlorite vein at 477.0m.
477.1-477.9m  Chert, banded =7 bedded in places, =7 bedding angle to core axis = 45°.
478.3m - 490.5m  **SLIGHTLY CHLORITIC and CHLORITIC SHALE.**
Bedded, minor disruptions in places.
478.9-479.1m  A few quartz-chlorite layers parallel bedding.
479.2-479.5m  Brown and dirty purple shale.
     Bedding angle to core axis = 60°
480.75-480.95m  Charty quartz reddish, with some 1-2mm quartz veins.
     Bedding angle to core axis = 70°
483.2m  Bedding angle to core axis = 50°
483.9-483.95m  Zone of very contorted and disrupted 1-5mm quartz veins.
485.05m  2cm quartz vein.
485.5-486.5m  Very slightly chloritic shale, top half well bedded (planar bedding) and showing cleavage.
     Bedding angle to core axis = 50°
     Cleavage angle to core axis = 23°
     Strike angle between bedding and cleavage = 50°.
488.3-488.5m  Shale breccia with quartz blobs, probably intrasedimentary breccia.
     Bedding angle to core axis = 55°.
490.5m - 491.9m  **CHLORITE SHALE.**
Dark green, bedding mostly indicated, minor pyrite as 0.5-2mm grains, parallel bedding in places.
     Bedding angle to core axis = 50-60°.
491.9m - 492.85m  **HEMATITIC SHALE.**
Partly chloritic, well bedded (planar Bedding), sequence appears undisturbed, little pyrite and
and chalcopyrite as blobs and veinlets in places. Bedding angle to core axis = 50-55°.

**MINERALISED CHLORITE SHALE.**

Mostly well bedded (planar bedding) sequence appears almost undisturbed. Main mineralisation is hematite, which appears as hematitic beds and as almost pure hematite beds from 494.0-494.4m, little - medium chalcopyrite as veinlets. Parallel bedding, medium rich pyrite in max., 5mm crystals aligned parallel bedding at 494.8m. 492.85-493.05m: Many 3-10mm wide layers of magnetite parallel bedding with quartz infillings pattern subnormal to bedding. 493.2m: Bedding angle to core axis = 55°. 494.06-494.16m: Quartz-chlorite-magnetite-minor pyrite. Illdefined veins and blobs.

**IRONSTONE**

**LODE 494.4m - 545.65m**

**494.4m - 495.8m**

**QUARTZ (20%) - CALCITE (15%) - HEMATITE (50%) - PYRITE (15%).**

Complect. replacement texture. Both very illdefined veins and blobs with one prevailing mineral and also rather evenly distributed mineralisation, very little chalcopyrite.

**495.8m - 497.1m**

**CALCITE (30%) - QUARTZ (10%) MAGNETITE (25%) - HEMATITE (10%) - PYRITE (15%).**

Texture as above, very little chalcopyrite, pyrite as 1-5mm crystals which usually form clusters or are enriched in illdefined zones.

**497.1m - 499.3m**

**QUARTZ (15%) - CALCITE (30%) - MAGNETITE (45%) - HEMATITE (5%) - CHALCOPYRITE (2%) - PYRITE (3%).**

Texture similar to above, but magnetite occurs as massive veinlike blobs. Chalcopyrite as small veinlet like infilling in clusters.
499.3m - 499.65m QUARTZ-RED JASPER:
5cm wide zone of quartz-magnetite-hematite-blobs.

499.6m - 499.75m QUARTZ VEIN:
6cm wide, with calcite and a medium chalcopyrite blob. Sharp contacts.
Contact angle to core axis = 35°.

499.75m - 503.8m CALCITE (20%)-MAGNETITE (70%)-HEMATITE (5%)-QUARTZ and SULPHIDES
Complete replacement texture, veins and blobs of varying shape and size. Magnetite occurs mostly in massive veins and blobs, minor as small aggregates and veinlets; little-medium pyrite (usually aggregates in clusters), little chalcopyrite (veinlets).

503.6m - 504.05m HEMATITE (50%)-MAGNETITE (30%)-CHLORITE (10%)-PYRITE (10%).
Hematite occurs as flaky specular variety and as massive fine crystalline masses.

504.05m - 510.1m CALCITE (10%)-MAGNETITE (80%)-HEMATITE (5%)-PYRITE (50%):
Texture basically as above, magnetite content increases towards footwall, hematite decreases; hematite usually occurs as specular hematite as infillings, or veinlets in magnetite. From 506.9m on, several 20-40cm sections of almost massive pure magnetite. 507.26m - 2cm wide quartz vein with sharp contacts withing magnetite. Medium-rich pyrite (rich in places), little chalcopyrite.

510.1m - 510.6m QUARTZ (20%)-CALCITE (70%)-HEMATITE AND MAGNETITE (10%).
Calcite filled vughs at 510.5m.

510.6m - 511.8m QUARTZ (30%)-CALCITE (10%)-RED JASPER (30%)-MAGNETITE (30%)
Jasper as big blobs (5cm diameter) or medium blobs (0.5-2cm diameter) with corroded outlines or as little fragments (1-5mm long). Little pyrite and chalcopyrite.
511.8m - 517.5m

QUARTZ (10%) - CALCITE (10%) - HEMATITE (40%) - MAGNETITE (40%).

Calcite and quartz occurs apart from illdefined blobs and veins also as big (up to 10cm wide) veins with relatively sharp contacts. Magnetite and hematite occur mostly intermingled, sometimes either prevailing. Medium-rich pyrite, very little chalcopyrite.

517.5m - 532.2m

QUARTZ (5%) - CALCITE (25%) - MAGNETITE (60%) - HEMATITE (10%).

Texture basically as above. Little-medium pyrite and chalcopyrite (medium-rich in places).

532.2m - 538.0m

QUARTZ (5%) - CALCITE (5%) - MAGNETITE (75%) - HEMATITE (15%).

Basically long sections of almost pure magnetite with various amounts of hematite, some short sections of prevailing quartz-calcite-magnetite. Little-medium pyrite (rich-very rich in places), and medium chalcopyrite (rich in places). 538.27-538.42m: Calcite-chlorite-pyrite as blob-like veins.

538.0m - 541.6m

MAGNETITE (40%) - HEMATITE (10%) - PYRITE (40%) - CHALCOPYRITE (10%).

Extremely rich sulphide mineralisation. Pyrite rather evenly dispersed as small veinlike blobs or accumulated to bigger veins and blobs. Chalcopyrite mainly as veinlets (=orientated fractures infillings) and sometimes as medium massive blobs.

539.0-539.05m: 3cm wide calcite vein and 0.5cm wide hematite vein with relatively sharp contacts. Angle to core axis = 45°
541.6m - 544.8m

**MAGNETITE (80%)-HEMATITE (20%).**

Almost pure massive magnetite in short sections. Hematite well intermingled with magnetite, hematite prevailing magnetite in short sections. Little pyrite, medium-rich chalcopyrite (rich-very rich in places), as veinlets and small blobs.

543.15m : 3 cm wide zone of calcite (30%)-chalcopyrite (50%)-hematite (20%).

Chalcopyrite as veinlike blobs.

543.6m-543.8m : Quartz-calcite-hematite vein 12cm wide.

544.8m - 545.1m

**MAGNETITE (40%)-HEMATITE (20%)-PYRITE (40%).**

545.1m : 1cm wide chalcopyrite vein.

545.1m - 545.65m

**CHLORITE (50%)-PYRITE (50%).**

Illdefined layering of chlorite and pyrite indicated. Medium rich chalcopyrite.

545.56m - 551.38m

**HIGHLY SILICIFIED AND CHERTY-SLIGHTLY CHLORITIC SHALE.**

Heavily fractured, disrupted and contorted, but solid core. Bedding indicated in a few places, intensive chlorite dykes with rich pyrite and chalcopyrite mineralisation in places.

545.7m : \( \text{Bedding angle to core axis} = 40^\circ \)
545.90m-546.02m: Chlorite with contorted and disrupted pyrite band. (3mm wide).
546.02-546.18m : Heavily disrupted chert with quartz-pyrite-chalcopyrite and rich bismuthinite as fracture fillings.

546.35m: Big chlorite intrusion with rich pyrite and chalcopyrite.
546.4-546.7m : Several almost planar chlorite-quartz veins 2-10mm wide.
547.80-547.97m : Chlorite with small jasper blobs and rich pyrite.
548.5-549.0m : Mainly chlorite-jasper and big relic blobs of chert, vermiculated texture of pinkish quartz at 548.95-549.0m.
549.0-549.05m : 5cm wide zone of magnetite-chlorite-jasper-pyrite-chalcopyrite.
551.25-551.32m : 5cm wide breccia zone; 1-5mm angular chert and jasper fragments, faulted footwall and hangingwall contact, mineralised with hematite, quartz-calcite, little chalcopyrite.

551.38m - 551.9m **MINSED: QUARTZ (56%) - CHLORITE (30%) - PYRITE (3%) - CHALCOPYRITE (7%) - CHERT FRAGMENTS (10%).**

i.e. very far advanced stage of replacement of sediment; partly breccia type, partly irregular vein and blob type. Medium rich pyrite as 1mm crystals in 5cm wide zone at hangingwall. Very high chalcopyrite as massive blob as footwall, little-medium chalcopyrite as veinlets throughout.

551.9m - 553.5m **HIGHLY SILICIFIED and CHERTY SLIGHTLY CHLORITIC SHALE.**

Heavily fractured and disrupted, brecciated in places, rich quartz-chlorite veining almost throughout. Little pyrite (rich in places). Medium chalcopyrite.

551.9-552.3m : Heavily fractured to brecciated chert, abundant quartz-chlorite as fracture filling.

552.3m-552.45m : Quartz-chlorite, as big blob, with extensions into footwall and hangingwall.
553.85-553.80m: Chlorite (75%) - pyrite (15%) - chalcopyrite (10%), pyrite in illdefined zones, chalcopyrite as medium veinlike blobs.

IRONSTONE LODE.

553.5m - 571.15m

553.5m - 553.8m

CHLORITE (10%) - PYRITE (90%).

A few relics of chert. Pyrite occurs as <3mm crystals in clusters with chlorite as interstitial matrix. Little chalcopyrite.

553.8m - 554.65m

MAGNETITE (15%) - HEMATITE (15%) - PYRITE (70%).

Complete replacement texture, minerals rather evenly distributed.

554.4-554.65m: 1cm wide calcite vein, rich chalcopyrite as blobs and veins.

554.65 - 556.0m

MAGNETITE (60%) - HEMATITE (40%).

Complete replacement texture, hematite occurs as illdefined veins and blobs and intermingled in magnetite. Gradational boundary with footwall. Little pyrite, little-medium chalcopyrite.

556.0m - 559.6m

HEMATITE (70%) - MAGNETITE (30%).

Magnetite occurs as isolated 0.5-2cm long blobs in the specular hematite; texture strongly suggests replacement of magnetite by hematite. Little pyrite, little-medium chalcopyrite (medium-rich chalcopyrite at 556.0-556.6m).

557.5m: 10cm long veinlike blob of calcite, chlorite, chalcopyrite, hematite and a few hematite needles in calcite.

559.6m - 560.9m

MAGNETITE (90%) - HEMATITE (10%).

With a calcite section (560.3-560.65m), little pyrite, little-medium chalcopyrite.
560.9m - 561.5m  QUARTZ (20%) - JASPER (20%) - MAGNETITE (50%) - HEMATITE (10%).

Quartz and jasper occur as small (1-5mm diameter) blobs and fragments mainly rather evenly distributed in the magnetite. A few distinct 1-2mm wide quartz-calcite veinlets. Little-medium pyrite and chalcopyrite.

561.5m - 563.8m  QUARTZ (5%) - MAGNETITE (70%) - HEMATITE (25%).

Little-medium pyrite (very rich in places) and medium-rich chalcopyrite (rich in places).
561.9-562.05m : Quartz (40%) - Jasper (20%) - Hematite (20%) - Magnetite (20%).
562.2m-562.7m : Rich chalcopyrite, rich pyrite at 562.6m.

563.8m - 568.4m  ALMOST PURE MASSIVE MAGNETITE

With several 5-20cm long sections of almost pure pyrite. Some veinlets of hematite and chalcopyrite throughout, medium-rich chalcopyrite (very rich in places) big veins and blobs.
564.4-564.55m : 
565.20-565.27m : Sections with >50% pyrite,
565.4-565.55m : up to 95% pyrite in some
566.0-566.25m : sections.
566.9-567.15m :
564.65-565.0m :
565.7-565.9m : Very rich chalcopyrite.
566.15-566.2m :

568.4m - 568.8m  PYRITE (95%) - HEMATITE (5%).

Almost pure massive pyrite, very little chalcopyrite.

568.8m - 571.15m  MAGNETITE (60%) - PYRITE (40%).

Magnetite and pyrite both occur as relatively 5-20cm long sections. Magnetite has many some hematite, medium-rich chalcopyrite/ chalcopyrite as big blobs at 570.65-5' some chlorite in places, faulted sharp contact.
571.15m - 572.8m  HIGHLY SILICIFIED and CHERTY CHLORITIC SHALE.

Bedding indicated, several disruptions with quartz-pyrite-chalcopyrite-magnetite mineralisation as fracture fillings.
Little pyrite and chalcopyrite.
570.0m  : Bedding angle to core axis = 60°
572.3m  : Bedding angle to core axis = 65°

572.8m - 573.7m  CHLORITE AND CHLORITE SHALE.

?Bedding indicated by parallel layers (? beds) of pyrite; 573.1m  Bedding angle to core axis = 65°
Very little chalcopyrite.

573.7m - 575.7m  VERY SLIGHTLY CHLORITIC QUARTZITIC SILTSTONE.

Bedded in places, heavily fractured to brecciated almost throughout. Fractures filled with quartz and medium chalcopyrite. Medium pyrite in places (appears to replace chloritic beds).
574.7-574.75m  : Chlorite with many 1-3mm aggregates of pyrite.

575.7m - 577.0m  CHLORITE SHALE.

Core broken up to 0.5-2cm pieces, some disruptions and quartz-chlorite veining in places. No sulphides visible.
Core Recovery = 50%.

577.0m - 582.8m  CHLORITIC SHALE.

Bedding visible in places, a few disruptions and quartz veins in places, very little pyrite, no chalcopyrite.
Core Recovery = 80% (577.0-581.0m)
582.5-582.8m  : A few hematitic beds.
581.0m  : Bedding angle to core axis = 50°
582.6m  : Bedding angle to core axis = 60°

582.8m - 584.0m  JASPER-HEMATITE.

Both jasper and hematite occur as 3-15cm long layers.
Some big disruptions and contortions, hematite is highly silicified. Medium pyrite as blobs and veins. Very little chalcopyrite.

**JASPER (30%) - PYRITE (70%).**

Jasper occurs as big blobs with healed fractures and mineralised veins (pyrite-hematite). Pyrite occurs as 2-30cm wide sections with >90% pyrite and some fine dispersed hematite. Pyrite sections often display contorted banding. Very little chalcopyrite.

**SILICIFIED CHLORITE and CHLORITE SHALE.**

Bedding visible in places. A few disruptions in places, very little pyrite and chalcopyrite.

- **585.4-585.5m**: Rich pyrite in 0.5-1cm wide ill-defined bands.
- **587.3-587.9m**: Jasper-hematite, little pyrite.
- **587.15m**: 2cm wide band of jasper-hematite, mottled texture.

  Angle to core axis = 40°

- **586.0m**: Bedding angle to core axis = 60-65°
- **587.0m**: Bedding angle to core axis = 55°

**SILICIFIED HEMATITIC SHALE.**

Bedding visible in places, some disruptions and contortions. Very little pyrite and chalcopyrite.

**CHLORITIC SHALE.**

Bedding in places, interbedding of jasper-hematite at 598.9-599.0, very little pyrite and chalcopyrite.

- **600.0; 600.1m**: 2x2cm beds, mottled texture, hematite and chlorite.

  Bedding angle to core axis = 60°
602.1m - 603.6m  

**JASPER-HEMATITE-PYRITE.**

Pyrite in massive bloblike veins and concentrated in ill-defined zones. Very little chalcopyrite.

603.3-603.6m  

*Banded (?bedding) hematite shale,* almost pure hematite, slightly contorted.

?Bedding angle to core axis = 20-30°

603.6m - 606.5m  

**CHLORITIC SHALE and SILTSTONE.**

Bedded, gradational boundary with footwall and hangingwall. Very little pyrite and chalcopyrite.

605.2m  

*Bedding angle to core axis = 45°*

606.5m - 611.0m  

**SLIGHTLY CHLORITIC and NON CHLORITIC SHALE and SILTSTONE.**

Bedding visible in places. No visible pyrite or chalcopyrite.

607.3m  

*Bedding angle to core axis = 70°.*

611.0m E.O.K.

Wm. am
APPENDIX 3.

CORE LOG OF ROVER 1 DDH 5
PROSPECT/MINE: ROVER 1.

Log of Hole: 5 Parent

Location: E.L. 228 South West of Tennant Creek.

Purpose of Hole: To test R20 body on 1200m cross-section at 390mRL.

Proposed By: P.L.Kitto. Date: 25/11/1974


Hole Planned By: R.Maher Date: 26/11/1974 Checked:

Hole Approved By: P.Le Messurier

Hole Logged By: W.Mayer

Collar Co-Ordinates:


Actual: E: N: R.L. Picked up By: Date:

Collar Bearing:

Proposed: 10° Grid: 55° Magnetic:

Surveyed: 10° Grid: 55° Magnetic: Surveyed in By: Harding/Mayer

Actual: 10° Grid: 55° Magnetic: Picked up By:

Collar Inclination:

Proposed: -75°

Surveyed: -75° 

Actual: -75° 

Target Depth: 485 m.

Proposed Final Depth: 550 m.

Actual Final Depth: 130 m. Hole Terminated By: P.L.Kitto.

Reason for Termination:

Drilling:- Date Commenced: 29/11/1974 Date Completed: 19/12/1974

Drilled By: Geopeko Limited Division

Wedges Placed At: Nil

Remarks: Abandoned at 130m:

Economic Summary Result:
### ROVER 1, 5 PARENT.

#### SURVEYS.

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ROVER 1/5 PARENT.

GEOLOGICAL LOG

By W. Mayer

NQ Core from Start at 44.0m to 130.0m (E.O.H).

44.0 - 49.5m

SILTY CLAY.

Whitish (extremely decomposed mud-siltstone) core pieces maximum 30 cm, but in places decomposed to 0.5 cm clay fragments.

44.0 - 45.5m Maximum 50% quartz grains averaging 1 mm diameter.

49.5 - 54.5m

SILTY CLAY.

Light ochre, (extremely decomposed mud-siltstone) core preservation as above.

Core Recovery:

44.0 - 46.75m = 2.0
46.75 - 49.75m = 1.3
49.75 - 52.75m = 2.2
52.75 - 54.5m = 1.1

54.5 - 63.0m

SILTY CLAY - CLAYRICH SILT.

Light ochre, less decomposed than above, core pieces average 5-10 cm (max. 40 cm), only a few short sections very broken; bedding indicated in places, some big leached vugs at 59.0m.

Core Recovery:

54.5 - 55.75m = 1.2
55.75 - 58.75m = 3.0
58.75 - 61.75m = 1.7
61.75 - 62.0m = 0.75

63.0 - 71.3m

DOLOMITIC SILTSTONE.

Mainly light brown (slightly oxidised) minor grey (almost unoxidised), planar bedding almost throughout, gradational boundary (oxidation boundary) with footwall.

Bedding angle to core axis = 80°
ROVER 1/5 PARENT

Core recovery: 62.0 - 64.75m = 1.5
64.75 - 67.75m = 2.3
67.75 - 70.35m = 2.6

From 70.35 on 95-100% Core Recovery unless otherwise stated.

71.3 - 79.2m

INTERBEDDED SEQUENCE OF DOLOMitic SILTSTONE
(Whitish-grey) WITH SILTY MUDSTONE (Grey).

Planar bedding, beds average 0.5-2cm; rock unweathered - fresh except a few joints (ochre stains); sequence gets more dolomite towards footwall.

Bedding angle to core axis = 75-80°

From 71.30-77.0, 78.0-79.2. 10 bedding joints/metre 1 fracture/metre
From 77.0-78.0, 30 bedding joints/metre, 3 fracture 3 fractures/metre.

69.2 - 79.65m

DOLOMITE

Massive-unbedded, leached, many small-large vughs.

79.65 - 80.7m

DOLOMitic MUD AND SILTSTONE.

Ill-defined bedding in places.

80.7 - 82.0m

DOLOMITE.

Massive-unbedded, small-medium vughs throughout, abundant joints with lightochre coating.

82.0 - 86.0m

DOLOMitic SILTSTONE.

No bedding visible or very disturbed bedding (contoured bedding, pockets and ill-defined lenticular fragments) caused by varying silt-clay-dolomite-ratio.

82.0 - 82.9m Grey, with some ochre joints
82.8 - 84.5m Shades of red-brown
84.5 - 86.0m Light grey
ROVER 1/5 PARENT.

86.0 - 92.0m 1.5m Core Recovery (25%)

**DOLOMITE.**

Mainly massive-unbedded, with small-large vughs, minor silicification, dark brown in colour, core heavily broken throughout interval, joints and fractures partly with ochre stains.

Bedding joints and Fractures/metre 7.50.

92.0 - 106.0m

**DOLOMITE**

Different types:-

92.0 - 93.0m  Dolomite, massive, irregular bedding, silicified in places, liesegang pattern at 92.2m; joints with ochre staining, 20 bedding joints/metre, 5 fractures/metre.

93.0 - 99.0m  Fossiliferous dolomite, massive mainly unbedded, fossils, (calcitic cones or cylinders) occurs in beds or pockets, some sub-rounded dolomite pebbles, vughs and early stage stylolites in places; 93.0-93.2m stromatolites.

From 93.0-95.0, 97.0-99.0; 10 bedding joints/metre 1 fracture/metre

From 95.0-97.0; 6 bedding joints/metre 1 fracture/metre.

99.0 - 100.9m  Dolomite, massive, irregular bedding, with a few fossil pockets and subrounded silicified dolomite pebbles, a few vughs. 20 bedding joints/metre, no fracture

100.9 - 101.6m  Dolomite, massive unbedded, fine crystalline, a few vughs. 5 bedding joints/metre, 1 fracture/metre.

101.6 - 104.0m  Nodular dolomite, massive, very few vughs. 12 bedding joints/metre. 0 fractures
ROVER 1/5 PARENT

104.0 - 106.0m 1.5m Recovery (75%), nodular dolomite, as above, but with abundant small-medium vughs and some medium stage stylolites, some ill-defined stromatolites. 10 bedding joints/metre, no fractures.

106.0 - 108.5m 1.5m Recovery (40%)

CLAY

Whitish, core broken up in places to 0.5cm fragments.

108.5 - 111.0m DOLOMITIC SILTSTONE.

Shades of red-brown, bedding indicated. 18 bedding joints/metre, 3 fractures/metre.

110.0 - 116.0m SEQUENCE OF MEDIUM GRAINED AND VERY COARSE SANDSTONE.

Light brownish-grey, minor 5-10cm conglomerate layers, coarse grained sections have very high pore-volume.

110.0 - 112.0m 0.7m Recovery (35%) 7 bedding joints/metre, 2 fractures/metre.

112.0 - 116.0m 4.0m Recovery (100%) 15 bedding joints/metre, 1 fracture/metre.

116.0 - 117.8m DOLOMITIC SILTSTONE

Mainly redbrown, a few greyish zones, bedding indicated in a few places, sand, silt, clay and dolomite content vary, 122.3-122.9m-: medium to coarse grained conglomeratic sandstone.

117.8 - 119.5 12 bedding joints/metre, 2 fractures/metre.

119.5 - 124.3 8 bedding joints/metre, no fractures

124.3 - 126.9 FINE TO MEDIUM GRAINED SANDSTONE

Light pinkish brown, bedded in places; some sections are dolomitic (matrix).

125.9 - 126.5 Silty finegrained sandstone and sandy siltstone, redbrown very disrupted (lenticular) bedded.
12 bedding joints/metre,  
1 fracture/metre.

126.9 - 127.5

CONGLOMERATE AND SANDSTONE.

Conglomerate contains subangular to subrounded 0.5-3cm (average) quartz pebbles in gritty matrix. 6 bedding joints/metre.

128.2 - 130.0m

MEDIUM TO COARSE GRAINED QUARTZ-CONGLOMERATE.

Random distribution of subangular to subrounded 0.3-5cm (average) quartz pebbles, very minor dolerite? pebbles in coarse gritty matrix. 20 bedding joints/metre.

HOLE ABANDONED 130m.

WM; am
APPENDIX 4.

CORE LOG OF ROVER 14 DDH 1.
PROSPECT/MINE: ROVER 14 PROSPECT

Log of Hole: DDH 1

Location: E.L. 228 South West of Tennant Creek.

Purpose of Hole: To test a small magnetic anomaly 14 kms WNW of Rover 1.

Proposed By: L. Farrar  Date: 9/10/1974
Proposed Target: 280m vertically below
930 W  E: 2210  N:  R.L.

Hole Planned By: R. Maher  Date: 11/10/1974
Hole Approved By: P. Le Messurier.
Hole Logged By: W. Mayer

Collar Co-Ordinates:
Proposed: 930 W  E: 2210  N:  R.L.
Surveyed: 925.5 W  E: 2328  N:  R.L.  Surveyed in By: B. Harding  Date: 25/11/74
Actual: 925.5 W  E: 2328  N:  R.L.  Picked up By:

Collar Bearing:
Proposed: 180°  Grid: 180°  Magnetic:
Surveyed: 180°  Grid: 180°  Magnetic:  Surveyed in By: B. Harding
Actual: 180°  Grid: 180°  Magnetic:  Picked up By:

Collar Inclination:
Proposed: -70°
Surveyed: -70°  Surveyed in By: B. Harding
Actual: -70°  Picked up By:

Target Depth: 305 m.
Proposed Final Depth: 350 m.
Actual Final Depth: 82 m.  Hole Terminated By: P. L. Kitto

Reason for Termination: Abandoned at 82m. Core and barrels stuck in hole

Drilling: Date Commenced: 2/12/1974  Date Completed: 20/1/1975
Drilled By: Geopeko Drilling Division.

Wedges Placed At:

Remarks:

Economic Summary Result:
**ROVER 14 DDH 1.**

**SURVEYS.**

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ROVER 14 DEH 1.

GEOLOGICAL LOG. By W. Mayer.

NQ core from 16.0 - 46.0m.

16.0m - 19.0m **SILTY, SANDY CLAY.**
Whitish and ochre shades, core broken up to cm pieces.
Recovery = 90%

19.0m - 22.0m NO CORE RECOVERY

22.0m - 28.0m **SILTY, SANDY CLAY.**
As above.
Recovery = 25%

28.0m - 31.0m **SILTY, SANDY CLAY.**
As above.
Recovery = 20%

31.0m - 32.8m **SILTY, SANDY CLAY.**
As above
Recovery = 25%

32.8m - 36.6m **CEMENTED PEAGRavel (LATERITE).**
Textbook-intersection, good core, broken up only in a few places.
EDGE 34.6m : 0.3-3cm brickred peagravel.
34.6 - 36.6m : 0.5-2cm light ochre and red-brown peagravel.
Fractures/metre 12
Recovery 100%

36.6m - 40.0m **SILTSTONE, MINOR SANDY SILTY CLAY.**
Light ochre and whitish, heavily oxidised and broken up core. Core broken up to 2-5cm pieces.
Fractures/metre = 30
Recovery = 25%
ROVER 14 DDH 1.

40.0m - 43.0m
LIMONITIC SILTSTONE, CLAY.
0.2m : Limonitic siltstone, 3-5cm pieces.
0.5m : Clay, light pinkish grey, 0.5-2cm pieces.
Recovery = 25%

43.0m - 46.0m
LIMONITIC SILTSTONE.
Partly cherty 3-5cm pieces with minor clay.
Recovery =20%

46.0m - 48.4m
LIMONITIC SILTSTONE.
With minor clay 2-3cm pieces.
Recovery 10%

48.4m - 51.4m
CHERT IN SILTY CLAY.
A few 1-2cm pieces of chert in silty clay.
Recovery 7%

51.4m - 54.8m
SILTY MUDSTONE, CHERT.
90% Silty mudstone, light ochre, heavily oxidised
1-3cm pieces. 10% Chert, grey, 1-2cm pieces.

54.8m - 58.0m
NO CORE RECOVERY.

58.0m - 59.5m
DOLOMITE SILTSTONE.
Light ochre, bedding indicated, slightly oxidised.
Fractures/metre = 10
Recovery = 70%

From 61.0m downwards 95-100% Core Recovery unless otherwise stated.

59.5m - 65.8m
INTERBEDDED SEQUENCE OF (SILTY) DOLOMITE (Whitish)
WITH SILTSTONE (Grey)

Beds average 0.5-2cm, bedding slightly disturbed
in places. Almost fresh rock, light ochre
oxidised only over short sections.
Bedding angle to core axis = 70°-75°
Fractures/metre = 15
ROVER 14 DDH 1.

65.8m

OXIDATION BOUNDARY.

65.8m - 68.3m

SLIGHTLY DOLOMITIC SILTY MUDSTONE.
Mouse-grey, fresh, bedding indicated in places.
Fractures/metre  20

68.3m - 79.0m

INTERBEDDED SEQUENCE OF 60% (SILTY) DOLOMITE (WHITISH) & 40% NON OR SLIGHTLY DOLOMITIC SILTSTONE (GREY).
Fresh, slightly disturbed (lenticular) in places,
Bedding angle to core axis = 70° - 75°
Fractures/metre = 25

79.0m - 82.0m

F.O.H. Core and barrel stuck in hole.
Abandoned at 82 metres.

WM: am
APPENDIX 5.

CORE LOG OF ROVER 14 DDH 2.
PROSPECT/MINE: ROVER 14

Log of Hole: R14/2

Location: 14 km WNW of Rover 1

Purpose of Hole: To test a small magnetic anomaly

Proposed By: L. Farrar Date: 9.10.74
Proposed Target: E: 930m W: 2210m N: -280m R.L.
Hole Planned By: R. Maher Date: 25.11.74
Hole Approved By: J. Ackland
Hole Logged By: P. Le Mussurier
Collar Co-Ordinates:
Proposed: 925.5m W: 2328m N: - R.L.
Surveyed: 925.5m W: 2325m N: - R.L.
Actual: 925.52m W: 2323.58m N: - R.L.

Collar Bearing:
Proposed: 180° Grid: 180° Magnetic:
Surveyed: 180° Grid: 180° Magnetic:
Actual: 180° Grid: 180° Magnetic:
Surveyed in By: B. Harding Date: 25.11.74
Picked up By: W. Mayer Date: 7.3.75

Collar Inclination:
Proposed: 70° Surveyed in By: J. Ackland
Surveyed: 70° Picked up By: B. Harding
Actual: 70°

Target Depth: 305 m.
Proposed Final Depth: 350 m.
Actual Final Depth: 375 m.
Hole Terminated By: W. Mayer

Reason for Termination: Lode appeared to be completely intersected - no indications for another lode intersection as originally expected.

Drilling: Date Commenced: 22.1.75
Drilled By: Geopeko Drilling Division
Wedges Placed At:
1) R14/2 replaces R14/1 which was abandoned at 82m
2) Centrepoint of Lode-intersection lies about 22m N of and 53m above target. It appears as if the top of the lode has been intersected.

Remarks:
Economic Summary Result: The Lode-intersection is devoid of any economic Au or Cu values. Highest Au value: 1.5 g/t (226-227m)
Highest Cu value: 0.28% (246-247m)
only traces of Bi, Pb, Zn, Co and Ag occur; baryte (BaSO₄) is a major component in the ironstone lode.
**DRILLING PARTICULARS**

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**CASING PLACED**

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Drilling Fluids used: ROMUD, SHELLDRILL UNIVERSAL, DROMUS B OIL.

**REMARKS:**

1) To avoid caving in in the Mid Cambrian Section, the hole was drilled, reamed and NW0Casing placed every 3m from 33 - 55m.
2) No wedges were placed.
3) The hole was not plugged by cement.
**ROVER 14 DDH 2**

**SURVEYS:**

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**S.O.H.**
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ROVER 14 DDH 2

GEOLOGICAL LOG

by W. Mayer.

6.0 - 12.0
SANDY SILTSTONE TO SILTY SILTSTONE, DOLOMITE:
Light red-brown and whitish oxidation colours, whitish dolomitic 1cm layers in places; At 121m joints
subnormal to core axis.
Recovery 1.5m (=25%)

12.0 - 18.0
CLAY
Whitish, broken up to 1cm pieces.
Recovery 0.3m (=5%)

18.0 - 36.6
NO CORE RECOVERY

36.6 - 39.65
1.0m Recovery (=30%)
0.9m SILTSTONE, CLAY RICH, Whitish and SILTY CLAY
as breccia in places; leached vughs in places 15
irregular breakages/m.
0.1m LIMONITIC SILTSTONE, dark red brown; 30 fracture
/m subnormal to core axis.

39.65 - 42.7
0.9m Recovery (=30%)
0.9m CLAY, Talc, pinkish, broken up to 0.5cm pieces
0.1m LIMONITIC SILTSTONE, broken up to 1-5cm pieces.

42.7 - 45.75
1.0m Recovery (=30%)
0.3m CLAYSTONE, WHITISH, broken up to 0.5-3cm pieces
0.7m LIMONITIC SILTSTONE, broken up to 1-5cm pieces.

45.75 - 51.0
NO CORE RECOVERY

51.0 - 55.0
0.2m Recovery (=5%)
0.1m LIMONITIC SILTSTONE
0.1m 50% CHERT, fresh grey, 2cm pieces
50% SILTY MUDSTONE, light ochre, oxidised.

55.0 - 58.0
0.3m Recovery (=10%)
70% SILTY MUDSTONE, light ochre
30% CHERT, fresh, grey, 1cm pieces.
GEOLOGICAL LOG...contd.

From 53.0m onwards 95-100% CORE RECOVERY unless otherwise stated.

58.0 - 60.3  
**DOLOMITIC SILTSTONE:**
Bedded, light ochre, oxidised. Bedding angle to core axis = 70-80°.
25 bedding joints/m.

60.3 - 65.9  
**INTERBEDDED SEQUENCE OF (SILTY) whitish DOLOMITE WITH grey SILTSTONE**
Slightly oxidised beds average 0.5-2cm. A few massive dolomite beds up to 15cm, bedding appears slightly disturbed and lenticular in places.
Bedding angle to core axis - 65-70°
15 bedding joints/m

65.9  
**OXIDATION BOUNDARY**

65.9 - 68.9  
**SILTSTONE**
Grey, fresh apart from a few limonitic 2-3mm wide bedding joints. Bedding indicated by a few dolomite beds.
Bedding angle to core axis - 65-70°
9 bedding joints/metre.

68.9 - 71.0  
**INTERBEDDED SEQUENCE OF 70% DOLOMITE (whitish) WITH 30% grey DOLOMITIC SILTSTONE**;
mainly slightly disturbed and lenticular bedding; pockets with fossil-detritus in places; early stages stylolites in places; some bedding joints with limonitic coating; gradational boundary with Footwall.
bedding angle to core axis: 70°
10 bedding joints/m

71.0 - 88.6  
**INTERBEDDED SEQUENCE OF 50% whitish SILTY DOLOMITE WITH 50% DOLOMITIC AND greyish SLIGHTLY DOLOMITIC SILTSTONE,**
mainly planar bedding often laminated; all bedding joints fresh (unoxidised);
76.80-76.87 typical bed with fossil-detritus and dolomite-mudpebbles, aligned parallel bedding.
GEOLOGICAL LOG...contd.

Bedding angle to core axis = 70°
10 bedding joints/m

88.6 - 89.1

DOLOMITE
Light brown, unbedded, fine grained, some medium stage stylolites; very sharp lithological footwall contact, 6 bedding joints/m.

89.1 - 90.3

MAINLY SILTY DOLOMITE, minor DOLOMITIC SILTSTONE.
Bedding rather disturbed (lenticular) in places.
12 bedding joints/m.

90.3 - 92.0

DOLOMITE.
Light brown, bedding indicated, many small-medium vughs throughout (looks like boxwork in places), partly filled with tiny calcite-crystals; ochre coatings on some joints.
12 bedding joints/m, 42 fractures/m; core broken up to 1-3cm pieces over short sections.

92.0 - 95.9

DOLOMITIC SILTSTONE.
Bedding disturbed.
92.0-92.4 whitish
92.4-94.9 redbrown
94.9-95.9 whitish
8 bedding joints/m, 2 short sections broken up to 2cm pieces

95.9 - 97.3

DOLOMITE
Light brown, bedding indicated in places, core very broken up (2-5cm pieces)
40 bedding joints/m; many fractures parallel to core axis

97.3 - 98.0

SILTY DOLOMITE
Brownish, bedded, faulted footwall contact.
30 bedding joints/m, 4 joints/m

98.0 - 100.9

DOLOMITIC SILTSTONE
Bedded in places.
GEOLOGICAL LOG...contd.

98.0-99.0 grey
99.0-99.8 redbrown
99.8-100.9 light brown;
100.6-100.9 dolomitic clay, broken up
15 bedding joints/m, 1 fracture/m, a few short sections very clayrich and broken up.

100.9 - 132.1

DOLOMITE

Different types, but mainly massive and rather pure
100.9-102.2 light brown, bedded. 5 bedding joint
/m.
102.2-103.8 light brown, bedded, with typical
pebble-like to amoeboid silicified
blobs (white rims, brown centre, 1-10
cm long), aligned parallel bedding
12 bedding joints/m
103.3-104.2 dolomite with illdefined stromatolite
3 bedding joints/m
104.2-105.3 as 102.2-103.8
105.3-109.6 different types of nodular dolomite
with pockets and layers of fossil
detritus, from 105.3-105.6 many calcite-filled vughs.
5 bedding joints/m
109.6-113.5 nodular dolomite
4 bedding joints/m
113.5-115.6 dolomite with illdefined stromatolite:
many medium vughs with calcite-crystals
7 bedding joints/m
115.6-116.7 silty dolomite, bedding indicated,
6 bedding joints/m
116.7-119.0 dolomite, greybrown, bedding indicated:
abundant small-medium vughs
12 bedding joints/m
119.0-121.5 dolomite, white, pure, dense, bedded;
very thin (<1mm) undulating clayrich
layers
121.3-121.5 dolomite-breccia; maximum
3cm long dolomite fragments in very
dolomitic matrix.
GEOLOGICAL LOG...contd.

121.5-126.0  dolomite, white, bedded, many 3-10cm beds of high porosity and leached sandstone appearance; several 3-10cm zones with disturbed bedding to brecciation; some medium to large vughs with calcite-crystals mainly 124.0-125.0

125.0-125.3  dolomite siltstone, grey. bedding angle to core axis 70°

126.0-127.0  Dolomite, nodular bedding, many small to medium vughs.

127.0-128.1  dolomite, bedding indicated, a few well developed stylolites, a very few vughs.

128.1-130.1  dolomite, mainly unbedded, many small to medium vughs throughout.

130.1-132.1  dolomite, bedded (slightly undulating bedding planes), many small-medium vughs.

132.1 - 136.2  SLIGHTLY DOLOMITIC SILTSTONE
Bedding indicated in a few places,

132.1-133.5  grey, a few small pyrite pockets in places.

133.5-136.2  redbrown

8 bedding joints/m

136.2 - 137.6  SLIGHTLY DOLOMITIC SILTY AND GRITTY SANDSTONE
Redbrown to grey, bedding indicated; several short sections have small hematite, quartz and chert fragments (maximum 2cm diameter)
GEOLOGICAL LOG...contd.

137.4-137.6  gritty greywacke with substantial amount of hematite fragments
  6 bedding joints/m

137.6 - 137.7  DOLOMITE
  Whitish, bedding indicated.

137.7 - 138.0  MUD AND SILTSTONE WITH WARRAMUNGA-SHALE-FRAGMENTS
  Whitish, bedding just indicated, but strongly disturbed; rather clay rich;
  More than 20 fractures/m; core broken up to 3-5cm pieces.

138.0  UNCONFORMITY BETWEEN MID-CAMBRIAN AND WARRAMUNGA GROUP ROCKS
  Well defined (within 0.1m)

138.0 - 141.0  PHYLITIC SHALE
  Bedded, mainly greyish green, cleavage is parallel to bedding.
  More than 30 cleavage joints/m, core broken up to 3-5cm pieces.

141.0 - 161.1  PHYLITIC SHALE
  Dirty-greenish-grey, well bedded, rather undisturbed a few disruptions, minifaults and minor quartz and calcite veining in places.
  Bedding angle = core angle to core axis; 25° (20-30°)
  4% cleavage joints/m, 4 fractures/m
  141.0-145.0  bedding and cleavage angle at 20-30° to core axis
  145.0-150.0  bedding and cleavage angle at 25° to core axis
  150.0-155.0  bedding angle to core axis 30-40°,
                cleavage angle to core axis 25°
  155.0-161.0  bedding angle to core axis 35-40°
  154.5-154.8  core broken up to 3-5cm pieces
  153.5-153.8  5 cm banded zone of quartz-calcite-chlorite veins, subparallel to core axis.
GEOLOGICAL LOG...contd.

156.5-158.5 2-3cm banded zone of parallel quartz, calcite chlorite bedding.

161.1 - 161.8 QUARTZ (60%)-CALCITE (10%)-CHLORITE (30%). Occurs as blobs and veins, 8 fractures/m

161.8 - 162.3 SILICIFIED-CHERTY CHLORITIC SHALE
Light-olive and dark-green beds; 3cm zone of banded quartz, calcite, chlorite bedding at 162.3
?bedding angle to core axis; 20-23°
6 bedding joints/m, 8 fractures/m

162.3 - 164.0 PHYLLITIC SHALE as above
Very fractured footwall-boundary (1-3cm pieces)
163.4 5cm banded zone of quartz, calcite, chlorite veins parallel to bedding
bedding angle to core axis 40-55°
cleavage angle to core axis 25°
8 bedding joints/m, 4 fractures/m

164.8 - 166.3 PHYLLITIC SHALE, as above
Gradational boundary with footwall;
bedding angle to core axis, 30-35°
10 bedding joints/m, 4 fractures/m

166.3 - 177.1 SLIGHTLY CHLORITIC TO CHLORITIC SHALE
Bedding visible in places; sequence appears mostly undisturbed.
166.7 5 cm zone of highly disrupted inter-bedding of chloritic chert with pink limestone;
?bedding angle or shearing angle to core axis=10°

168.6 3cm zone of quartz, calcite, chlorite blobs

169.6 3cm zone of disrupted to brecciated shale bed with quartz, darkgreen chlorite veins,
cleavage angle to core axis, 20°
GEOLOGICAL LOG...contd.

166.3-170.0  
bedding angle to core axis 50°,  
cleavage angle to core axis 25°,  
5 cleavage joints/m, 4 fractures/m

170.0-175.0  
bedding angle to core axis 0-10°,  
cleavage angle to core axis 15-20°  
8 cleavage joints/m, 4 fractures/m

175.0-177.1  
?bedding and cleavage angle to core axis 15°, 10 cleavage joints/m,  
4 fractures/m.

177.1 - 180.0  
JASPER (70%) dirty pink and with abundant small to large QUARTZ VEINS (30%)  
Short sections of chloritic chert; 6 joints/m

180.00 - 184.0  
SLIGHTLY CHLORITIC SILICIFIED TO CHERTY SHALE.  
Bedded, sequence appears almost undisturbed, a few disruptions; gradational boundary with footwall  
bedding and cleavage angle to core axis 15°  
6 bedding joints/m, 5 fractures/m

184.0 - 220.0  
PHYLLITIC SLIGHTLY CHLORITIC SHALE.  
Grey, bedded in places, sequence is disturbed, many small scale flexures and minor disruptions; extremely gradational boundary with footwall.

184.0-190.0  
bedding angle and cleavage angle to core axis 15°, 10 cleavage joints/m  
5 fractures/m.

190.0-195.0  
cleavage angle to core axis 15°  
6 cleavage joints/m, 2 fractures/m

195.0-200.0  
bedding angle and cleavage angle 15°  
6 cleavage joints/m, 1 fracture/m

200.0-205.0  
?bedding angle and cleavage angle to core axis 20-25°, 3 cleavage joints/m  
2 fractures/m

205.0-210.0  
cleavage angle to core axis 25°, 5 cleavage joints/m, 1 fracture/m

210.0-215.0  
bedding angle to core axis 30-70°  
(increase towards footwall), cleavage angle to core axis 25°, 5 cleavage joints/m, 1 fracture/m
215.0-220.0 bedding angle to core axis 25°, at 219.9 bedding dipping opposite to cleavage, cleavage angle to core axis 25°, 2 cleavage joints/m 2 fractures/m

220.0 - 229.8 SLIGHTLY CHLORITIC SHALE WITH SOME DISTINCT CONTORTED BEDS.
Shale appears unbedded and undisturbed apart from the 1-5cm thick contorted beds
220.0-224.0 bedding angle to core axis; mainly 50-70°, often angle between strike of bedding and cleavage, cleavage angle to core axis 20-25° 3 cleavage joints/m, 1 fractures/m
224.0-226.0 bedding angle to core axis 40-60° cleavage angle to core axis 25° 4 cleavage joints/m
226.0-229.8 bedding angle to core axis 25-40° cleavage angle to core axis 25-30° From 226.0-228.0 5 cleavage joints/m, 1 fracture/m From 228.0-229.8 15 cleavage joints/m, 3 fractures/m

229.8 - 230.1 QUARTZ-CHLORITE-VEINS AND BLOBS WITH RELICS OF CHLORITE SHALE.
230.0-230.1 hematite shale, conformable boundary with footwall, angle to core axis 40°, a few small pockets of chalcopyrite.

230.1 - 230.7 BARYTE (80%)-JASPER (10%)-HEMATITE (10%)
Banded (1-3mm hematite bands, slightly contorted); some pyrite at footwall and hangingwall boundary; conformable footwall boundary angle to core axis 20°, 8 fractures/m

230.7 - 235.3 MINERALISED SEDIMENT; CHLORITE SHALE AND CHLORITE WITH MAGNETITE (10%) AND MINOR PYRITE.
Magnetite occurs as almost pure magnetite beds in the chlorite-shale (230.7-232.7) and as bedlike
stringers, minor hematite as fillings in the chlorit: little pyrite in places, mostly together with quartz veins.
231.7-232.7 bedding angle to core axis 20-25°
4 cleavage joints/m, 3 fractures/m
232.7-235.3 3 cleavage joints/m, 5 fractures/m

235.3 - 237.0 MINERALISED SEDIMENT: SILIFIFIED TO CHERTY SLIGHTLY CHLORITIC SHALE (40%)-BARYTE (20%)-QUARTZ (20%)-MAGNETITE (20%);
Mainly banded; magnetite occurs as parallel lensoid-al bands subparallel to core axis; some pyrite, litt. little chalcopyrite (in small pockets); gradational boundary with footwall; 8 fractures/m

237.0 - 253.5 IRONSTONE LODE

237.0 - 240.5 QUARTZ (10%)-BARYTE (20%)-CALCITE (5%)-CHLORITE (5%)-HEMATITE (50%)-MAGNETITE (10%)
Occurs mainly as blobs; white minerals prevail in top half hematite in bottom half; little pyrite, medium chalcopyrite at 238.05-238.2
4 fractures/m

240.5 - 242.9 QUARTZ (20%)-BARYTE (30%)-MAGNETITE (60%);
Several 0.2-0.5m sections of either quartz-baryte or magnetite-hematite;
8 fractures/m

242.9 - 250.9 QUARTZ (10%)-BARYTE (30%)-MAGNETITE (60%)
Apart from 2 x 0.4m quartz-baryte sections mineral content fairly evenly distributed. Magnetite appears to be brecciated in situ (shrinkagecracks?) with countless <1mm baryte veinlets infilling these cracks. Interval has banded character in places, angle to core axis; 20-25°; very little pyrite, no chalcopyrite a few siderite? veins; gradational boundary with footwall.
4 fractures/m
GEOLOGICAL LOG...contd.

250.9 - 253.5  QUARTZ (20%)-BARYTE (50%)-MAGNETITE (30%).
Ill-defined banding, angle to core axis 25-35°; magnetite has appearance as above, mainly sections with either baryte or quartz or magnetite prevailing
250.8-251.0  big blobs of chlorite partly altered to sericite. 5 fractures/m

253.5 - 260.1  MINERALISED SEDIMENTS: CHLORITE-SHALE WITH MAGNETITE RICH BEDS, EXTENSIVE QUARTZ-CHLORITE-BARYTE-VEINING.
Chlorite-shale is well bedded and apart from the many disruptions by extensive veining almost undisturbed; quartz-chlorite occurs as 2-30cm sections quartz, red baryte as 3-5cm sections; little pyrite and chalcopyrite in places.
253.5-257.0  bedding angle to core axis 20°; 4 fractures/m. 253.5-253.9 fine banding of shale-beds with baryte quartz veins, angle to core axis 30-45°
257.0-260.1  bedding angle to core axis 25-40°; 3 bedding joints/m, 3 fractures/m

260.1 - 343.0  SLIGHTLY PHYLLITIC, SLIGHTLY CHLORITIC, SLIGHTLY HEMATITIC-CHLORITIC SHALE
Well bedded to laminated; sequence appears mainly undisturbed, only slight to medium kinkfolding in places, core is broken up along bedding and cleavage to 0.5-5cm pieces
261.5;  5cm quartz-pink calcite-vein conformable with bedding.
264.25-264.4  contortions and minifaults
260.1-265.0  bedding and cleavage angle 27-35°
20 cleavage joints/m; 1 fracture/m
265.0-266.1  cherty chloritic shale prevailing, gradational boundary with footwall brecciation in situ
266.8-269.9  1mm wide hematitic minifault, several mm displacement, subparallel to core axis.
269.3-270.0  bedding and cleavage angle to core axis 27-30°
265.0-270.0
15 cleavage joints/m; 1 fracture/m at 271.05, 273.6-274.8 slight kinkfolding
270.0-275.0 bedding and cleavage angle to core axis 25-35°
275.9-276.4 15 cleavage joints/m; 1 fracture/m
276.8-277.4 heavy kinkfolding
275.0-280.0 slight kinkfolding
277.4 bedding and cleavage angle to core axis 27-30°
281.4-281.6 15 cleavage joints/m; 1 fracture/m
contortions and disruptions
281.3 3mm quartz-veins, isoclinally folded, disrupted and aligned parallel bedding
280.0-285.0 bedding angle = cleavage angle to core axis 30-35°
280.0-283.0 20 cleavage joints/m;
283.0-285.0 30 cleavage joints/m
285.4-285.5 bedding subparallel to core axis
286.2-286.4 bedding subparallel to, then kinked subnormal to core axis, core broken up to 3mm rolls
288.9-289.1 slight kinkfolding
285.0-290.0 bedding and cleavage angle to core axis 35°
290.5, 291.4, 292.0, 293.8, 294.1, 294.8; slight kinkfolding
290.0-295.0 bedding and cleavage angle to core axis; 25-35°, 50° in places, 30 cleavage joints/m; 1 fracture/m
295.0-298.0 slight to medium kinkfolding in many places
295.0-300.0 bedding and cleavage angle to core axis 30-35°
295.0-296.5 30 cleavage joints/m
296.5-300.0 20 cleavage joints/m
296.9-297.0 kinkfolding plane subparallel to core axis; beds display different degrees of hematisation on both sides of fold-plane.
GEOLOGICAL LOG...contd.

300.0-305.0  almost undisturbed sequence, bedding and cleavage angle to core axis 25-35°, 15 cleavage joints/m; 1 fracture/m

305.0-310.0  almost undisturbed sequence

305.6  slight kinkfolding and 3mm calcite vein parallel to bedding.

306.4  2cm pink limestone-bed

309.3-309.5  quartz-calcite-chlorite-veining

305.0-310.0  bedding and cleavage angle to core axis; 35-40°

305.0-307.0  15 cleavage joints/m; 1 fracture/m

307.0-310.0  25 cleavage joints/m; 1 fracture/m

310.0-315.0  almost undisturbed sequence bedding and cleavage angle to core axis 40-50°. 15 cleavage joints/m; 1 fracture/m

315.0-320.0  mainly undisturbed, minor small scale folding in places; 319.1-319.25 bed of quartzitic siltstone with calcite-veining

bedding and cleavage angle to core axis 40-55°

15 cleavage joints/m; 1 fracture/m

320.0-325.0  mainly undisturbed, minor small scale folding in places;

323.15-323.25 Zone of massive quartz chlorite vein

bedding and cleavage angle to core axis 40-55°

15 cleavage joints/m; 1 fracture/m

325.0-330.0  mainly undisturbed, minor small scale folding and disruptions in places.

326.15, 328.1 carbonate-rich 1cm siltstone bed

bedding and cleavage angle to core axis 45-50°

15 cleavage joints/m; 1 fracture/m

330.0-335.0  apart from 333.0-334.5 only slightly disturbed
GEOLOGICAL LOG...contd/

333.0-333.3 in situ breccia of quartzitic siltstone, quartz and chlorite
333.3-334.5 extensive quartz-chlorite veining, in places crosscutting the
bedding; specular hematite in vugs.
bedding and cleavage angle to core
axis 40-50°
20 cleavage joints/m; 2 fractures/m

335.0-340.0
almost undisturbed sequence
338.5-339.5 slightly hematitic shale
bedding and cleavage angle to core
axis 45-55°
15 cleavage joints/m

340.0-343.0
almost undisturbed sequence; a few
pink limestone beds, lenses in places;
some isoclinal folding;
bedding and cleavage angle to core
axis 45-55°
3 cleavage joints/m

343.0 - 375.0

VERY SLIGHTLY TO SLIGHTLY HEMATITIC SHALE

Well bedded mostly undisturbed sequence, very gradational boundary with hangingwall.

343.0-350.0
some kinkfolding in places
348.1-348.2 quartz-calcite-chlorite
vein subnormal to core axis bedding
and cleavage angle to core axis 40-
55°
30 cleavage joints/m

353.8-354.0
small fault subparallel to core axis
with disrupted beds on 1 side.
bedding angle and cleavage angle to
core axis 40-45° 20 cleavage joints/m

355.8-356.0
quartz-calcite-chlorite veining with
relics of slightly hematitic shale
bedding and cleavage angle to core
axis 45-55°
20 cleavage joints/m

363.0-363.4
3mm wide pink calcite vein subparallel
to core axis, sheared into cleavage
GEOLOGICAL LOG...contd.

planes
bedding and cleavage angle to core
axis 45-55°
20 cleavage joints/m

365.0-370.0
kinkfolding and minor faults in
places 367.0, 369.2; 5cm wide quartz-
calcite and chlorite veins.
bedding and cleavage angle to core
axis 50-65°
30 cleavage joints/m, 1 joints/m

371.6-372.1
substantial quartz-calcite-chlorite
veining
bedding and cleavage angle to core
axis 60-70°
40-50 cleavage joints/m, 1 fracture/m

E.O.H.
APPENDIX 6.

CORE LOG OF ROVER 14 DDH 3.
PROSPECT/MINE: ROVER 14
Log of Hole: DDH 3
Location: E.L. 220, Southwest of Tennant Creek.
Purpose of Hole: To test lode 90m below lode intersection in R14 DDH2
Proposed By: L. Farrar Date: 6.3.75
Proposed Target: 930 W E: 2200 N: -315m R.L.
Hole Planned By: W. Mayer Date: 6.3.75 Checked: P.L. Kitto
Hole Approved By: P. Le Messurier, P.L. Kitto
Hole Logged By: W. Mayer and R.G. Colville
Collar Co-Ordinates:
Proposed: 915.5 W E: 2363 N: R.L.
Surveyed: 915.5 W E: 2363 N: R.L. Surveyed in By: W. Mayer Date: 7.3.75
Actual: E: N: R.L. Picked up By:
Collar Bearing:
Proposed: 180° Grid: 180° Magnetic:
Surveyed: 180° Grid: 180° Magnetic:
Actual: Grid: Magnetic:
Collar Inclination:
Proposed: -70° Surveyed: -70° Picked up By: W. Mayer
Actual: Surveyed in By:
Target Depth: 364 m. Proposed Final Depth: m.
Actual Final Depth: 349.90 m. Hole Terminated By: R.G. Colville
Reason for Termination: Lode zone completely intersected.
Drilling: Date Commenced: 11.3.75 Date Completed: 14.5.75
Drilled By: Geopeko Drilling Division
Wedges Placed At: None
Remarks:
Lode zone, 312m - 318m: 6m @ 0.14 g/mt Au; 0.07% Cu, 0.01% Bi.
Overall: 304 - 324m: 20m @ 0.17 g/mt; 0.05% Cu, 0.01% Bi.

Economic Summary Result:
S.McD. 11937/72
ROVER 14 DDH 3

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ROVER 14 DDH 3

GEOLOGICAL LOG

by W. Mayer (to 203.7) and R.G. Colville (to E.O.H)

6.00 - 15.00
SILTY, SANDY LIMESTONE WITH VUGHS;
10% recovery. Vughs are 3-50mm long and mostly filled with limonitic silt and sand. Uncertain whether it is cemented soil or weathered sediment.

15.00 - 21.00
SILTY CLAY;
5% recovery.

21.00 - 33.00
SILTY SANDY LATERITIC SOIL;
1% recovery.

33.00 - 48.00
LIMONITIC SILTSTONE;
<1% recovery

48.00 - 57.00
SILTY CLAY;
10% recovery, light ochre, extremely weathered sediment.

57.00 - 58.00
CLAY RICH SILTSTONE;
30% recovery, light ochre, bedded, very weathered. From 58.00 core recovery is 95%-100% unless otherwise stated.

58.00 - 64.70
Interbedded sequence of whitish (SILTY) DOLOMITE with grey (DOLOMITIC) SILTSTONE.
Beds average 0.5cm to 2 cm thickness, are often lensoid or slightly disturbed. Bedding at 70° to lca, 10 bedding joints/m.

58.00-60.50 siltstone prevails, is light grey and weathered.

60.50-64.70 mainly bluish-grey unweathered, some dolomite bands vughy.

64.70 - 87.60
SILTSTONE,
Bedding in a few places, a few bedding joints are 3mm wide and oxidised. Bedding at 70° to lca, 6 bedding joints/m.
Oxidation Boundary at 65.0.

**67.60 - 87.60**

**Interbedded sequence of whitish (SILTY) DOLOMITE and grey (DOLOMITIC) SILTSTONE.**

Overall ratio of dolomite to siltstone is 1:1.
Sequence mostly well bedded, minor disturbance in places. Bedding at 65-70° to lca. 6 bedding joints/m.

- **67.60-69.60** 80% dolomite, 20% siltstone, bedding disturbed dolomite nodules developed.
- **71.30-71.40,** zone of silty dolomite pebbles in dolomite and silt matrix; pebbles appear to originate from a basal bed at 71.4.
- **75.10-75.20** bed of fossil detritus, 2 siltstone pockets protrude into hangingwall.
- **86.20-86.70** well bedded sequence with set of small faults.
- **87.00-87.60** dolomite lensoids and nodules in siltstone matrix.

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**87.60 - 88.00**

**DOLOMITE;**
light brown, unbedded, consists mainly of fossil detritus, some early stage stylolites, sharp footwall boundary, 6 bedding joints/m.

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**88.00 - 89.10**

**SILTY DOLOMITE;**
very ill defined bedding, a few dolomite beds and lenses, gradational footwall boundary.
8 bedding joints/m, 1 fracture/m.

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**89.10 - 91.00**

**DOLOMITE;**
light brown, bedding indicated, small vughs in places, early stage stylolites.
8 bedding joints/m, 4 fractures/m.

---

**91.00 - 95.00**

**DOLOMITIC SILTSTONE, minor SILTY DOLOMITE;**
very ill defined lensoid bedding, 8 bedding joints/m.

- **91.00-91.60** light grey
- **91.6-94.00** red-brown
GEOLOGICAL LOG...contd.

94.00-95.00  light grey;
94.00-94.10  vughy dolomite, very contorted.

95.00 - 96.30  DOLOMITE;
light brown, mostly unbedded, many small/medium
vughs.  25 bedding joints/m, 4 fractures/m.

96.30 - 97.40  SILTY DOLOMITE;
96.30-96.70  well bedded at 65° to lca, brownish,
sharp footwall contact, 40 bedding
joints/m.
96.70-97.40  unbedded grey, gradational footwall
contact, 15 bedding joints/m.
95.70-96.80  many dolomite fragments in dolomite
matrix.

97.40 - 99.0  DOLOMITIC SNADSTONE;
grey to reddish brown, very illdefined bedding
12 bedding joints/m, 2 fractures/m.

99.00 - 131.16  DOLOMITIC SEQUENCE;
consists of different types of dolomite. Dolomite
with illdefined or no bedding predominates.
99.00-101.30  lightbrown, bedded, early stage
stylolites. Within this section from
99.00-99.20 many small vughs, from
99.60-100.00 dolomitic siltstone,
from 99.00-100.30 20 bedding joints/m
2 joints/m, from 100.30-101.30 3
bedding joints/m.
101.30-102.70 Light brown, bedded at 65° to lca
with pebble shaped cherty blobs.  8
bedding joints/m.
102.70-112.50  general nodular, lensoid and disturb-
bed bedding, early stage stylolites,
a few medium/large calcite filled
vughs, fossil pockets at 106.60 to
107.80, very gradational footwall
contact. From 102.50-109.50 6 bedd-
ing joints/m, from 109.50-112.50 4
bedding joints/m.
GEOLOGICAL LOG...contd.

112.50-114.80 dolomite with many stromatolites, many small/large vughs, most filled with calcite. Some medium stage stylolites, sharp footwall contact. 6 bedding joints/m.

114.80-116.00 dolomitic siltstone, minor dolomite, bedding indicated in places, 10 bedding joints/m.

116.00-118.40 light grey dolomite, illdefined and disturbed bedding, many small vughs partly calcite filled, gradational footwall contact, 12 bedding joints/m.

118.40-121.10 white dolomite, densely bedded at 65° -75° to lca, 1-3m wide silty beds occur every 5-10cm, no vughs, gradational footwall contact, 12 bedding joints/m.

121.10-127.90 very light brown dolomite, fairly well bedded at 70° to 75° to lca, small/medium vughs in places, 12 bedding joints/m. At 122.40 a 5cm zone with in situ brecciation of siltstone beds, calcite forms matrix. From 124.00-124.20 contorted and disrupted dolomite beds. From 124.5 -125.0 dolomitic siltstone with insitu brecciation at 124.5 and dolomite fragments at 124.90.

127.90-130.20 dolomite, not bedded, some early stage stylolites and some small/large vughs with limonitic staining. 12 bedding joints/m, 4 fractures/m.

130.20-131.60 dolomite bedded, some early stage stylolites ans some small/large vughs sharp footwall contact. 15 bedding joints/m, 2 fractures/m.
GEOLOGICAL LOG...contd.

131.60 - 134.80  
SLIGHTLY DOLOMITIC SILTSTONE:
not bedding, gradational footwall contact 4 bedding joints/m.
131.60-133.30  bluish grey, a few small pyrite blobs
133.30-134.80  red-brown, sand content increases towards footwall.

134.80 - 137.40  
SLIGHTLY DOLOMITIC SANDSTONE:
reddish brown, fine to medium grained, bedding indicated.
135.90-136.00 and 136.20-136.40, two zones with small shale fragments. 6 bedding joints/m.

137.40 - 139.00  
QUARTZ GREYWACKE:
abundant angular and subangular long greenish shale fragments in gritty sandstone matrix. Bedding vague
no graded bedding in fragments but quartz grains in matrix get coarser towards footwall, gradational
footwall contact. 10 bedding joints/m.

139.00 - 140.00  
Coarsegrained SANDSTONE with shale flakes;
poorly cemented, shale content less in hangingwall, a few big silicified shale and quartz fragments at
139.50. 20 bedding joints/m.

140.00  
UNCONFORMITY  very well defined

140.00 - 150.5  
SLIGHTLY CHLORITIC SHALE:
contains several 0.3-1cm interbeds of slightly hematicite shale and siltstone beds. Sequence is well bedded, undisturbed. Cleavage indicated by
elongated chlorite blobs in some beds. Footwall contact is gradational.
140.00-143.00  core badly broken 50 bedding joints/m. 20 fractures/m.
143.00-147.00  bedding at 20°-25° to lca, cleavage at
15° to lca, 15 bedding joints/m, 4 fractures/m.
147.00-143.00  bedding at 23° to lca, cleavage at 18
degrees to lca, 6 bedding joints/m, 1 fracture
/m.
At 152.00 4cm wide cherty shale bed with elongated chlorite spots aligned parallel to cleavage at 10° to lca.

153.00-158.50 bedding at 20°-30° to lca, slight contortions in places, 15 bedding joints/m, 2 fractures/m.

158.50 - 172.20 Interbedded sequence of CHLORITIC CHERTY SHALE with SILICIFIED CHLORITIC SHALE;
beds average 0.05-3cm and are undisturbed. Cleavage indicated by elongated chlorite spots in cherty beds.

158.5-165.0 bedding at 25-30° to lca, cleavage at 15-20° to lca, 10 bedding joints/m, 1 fracture/m. From 161.00-161.20 3cm wide quartz-calcite-chlorite vein subparallel to cleavage.
At 163.13 2cm wide limestone bed.
At 164.10 1cm wide calcite-chlorite vein parallel with bedding.

165.00-172.20 bedding at 25-30° to lca. 6 bedding joints/m, 4 fractures/m. From 168.40-168.70 chert bed with illdefined relic bedding and pink chert blobs (fragments). At 171.90 disrupted 3cm wide chert bed.

172.20 - 195.00 SHALE;
dark greyish, well bedded has gradational contact with footwall. From 172.20-175.00 undisturbed bedding at 25° to lca, 12 bedding joints/m, 2 fractures/m.

175.00-180.00 bedding tightly folded in places and parallels cleavage at 15-30° to lca. 15 bedding joints/m, 2 fractures/m.

180.00-187.00 no definite bedding, minor disruption mostly parallel to cleavage at 30° to lca. 15 cleavage joints/m, 1 fracture/m.
GEOLOGICAL LOG...contd.

187.00-190.00 no bedding, cleavage at 30-40° to lca. 8 cleavage joints/m, 1 fracture/m.

190.00-195.00 slightly chloritic shale, very disturbed, many small to large quartz-dolomite-chlorite veins mostly parallel to cleavage. Cleavage at 15-25° to lca, 8 cleavage joints/m, 2 fractures/m.

From 194.60-194.80 contorted quartz-chlorite stringers.

195.00 - 200.60 CHLORITIC SHALE;

bedding evident in places, some disruptions present. At 195.10 bedding at 25° to lca. Cleavage at 10-20° to lca, 15 cleavage joints/m, 4 fractures/m.

200.60 - 203.70 SHALE AND SLIGHTLY CHLORITIC SHALE.

Core badly broken, surfaces smeared with talc. >50 cleavage joints/m, >10 fractures/m, interval could be fault zone. From 200.80-200.90 shale breccia with hematite clay coating, probably a fault zone.

203.70 - 216.40 PHYLLITIC SHALE;

is fine grained, consists of concordant alternating beds varying from 1 to 3cm width. Colour varies from emerald green depending on chlorite content. Rock has an almost schistose appearance in places due to development of flakey or micaceous chlorite. Cleavage is parallel to bedding at 35-45° to lca and is moderately abundant. Many cleavage planes are coated with hematite, are smooth and have a silky lustre.

Moderately numerous discordant wavy fractures occur throughout the interval, most are infilled with dark green chlorite and milky quartz, chlorite usually forming the outer part, quartz the centre.

30 bedding-cleavage joints/m, 8 fractures/m.
216.40 - 222.70

Fine grained CHLORITIC SILTSTONE:
chlorite content is 30-40%, varies in colour from
dark green to pale apple green. Contact with above
interval is gradational over approximately 20cm.
Several siliceous zones occur and rock approaches
charty shale. Bedding not well defined, where
present is at 35° to lca. Hematite and manganese
staining on fractures and cleavage planes moderately
abundant.

216.60-216.78 zone of contortion, some retexturing
flakey or micaceous chlorite is abundant.
Two siliceous zones occur from 217.64-218.68 and
219.87-221.15
221.08-221.09 discordant milky quartz vein.
221.40-221.75 hackly fracture at 10° to lca.
From 216.20-216.86, 221.00-221.55, 221.65-222.00
(some ferruginous carbonate coats fractures) core
is badly broken.

222.65-222.70 numerous discontinuous concordant
hematitic quartz bands parallel with bedding and
cleavage present.
Cleavage at 30° to lca.
2 large fractures present, 8-10 bedding joints/m.

222.70 - 238.72

Fine dark greenish grey CHLORITIC SHALE:
bedding is fairly prominent at 35-40° to lca.
Fractures are coated with abundant hematite. At
225.69 pyrite smears present on fracture. From
222.70-227.60 11 bedding joints/m, 3 fractures/m
from 226.70 to 238.72 8 bedding joints/m, 2 fracture
1/s/m.

Many wispy discordant stringers of milky quartz
present throughout interval. Several individual
zones of continuous concordant milky quartz contain-
ing numerous hematite flecs and wispy stringers of
dark green chlorite occur. These do not appear to
be intrusive. Several quartz stringers contain
vugs within which poorly developed quartz crystals
occur.
Zones are as follows: 228.34-229.42, 232.61-232.62,
GEOLOGICAL LOG...contd.

232.99-233.02, 233.06-233.07.
From 232.36-232.42, 233.30-233.63 and 233.80-234.02.
Zones of disturbance; kahki coloured chlorite developed, this is transected by numerous stringers of dark green chlorite and quartz. Quartz and chlorite has a more intrusive nature.

238.72 - 239.08
Light pinkish brown SLIGHTLY SILICEOUS SHALE;
consists of 40% pale yellowish green chlorite, 60% fine silica. Bedding is a 40° to lca.
338.79-338.81 small concordant fine to medium grained sandstone bed.
339.00-339.08 concordant milky quartz vein, contains numerous concordant, discontinuous stringers of dark green chlorite.

339.08 - 341.68
CHERTY SHALE/SANDSTONE;
from 340.60-340.65 concordant milky quartz band.
On hangingwall contact large irregular blobs of pinkish carbonate developed, several small vughs present. On footwall concordant discontinuous stringers of light green flakey chlorite and carbonate.
240.66-241.12 pale pinkish to greenish brown chert. Several discontinuous stringers of carbonate developed. Pale green chlorite present both as coatings on fractures and finely dispersed through the chert.
241.12-241.68 fairly equigranular medium grained sandstone to orthoquartzite. Dark green chlorite constitutes 15% of the rock occurs as fine flecks, some fine hematite present.

241.68 - 242.82
CHLORITIC SILTSTONE;
chlorite content 60%, bedding not evident, rock has a vague lineation at 35° to lca. Chlorite is kahki to dark green.
242.43-242.46 zone of small discontinuous concordant quartz stringers, contain 20% finely dispersed hematite, have caused mild disruption to siltstone.

242.82 - 244.67 Fine to medium grained SANDSTONE; texture clearly visible, chlorite content 30-40%, no bedding visible, footwall contact sharp at 45° to lca.

244.67 - 249.00 Predominantly SILTSTONE with interbedded fine grained SANDSTONE; Bedding fairly pronounced at 40° to lca. Sandstone beds vary from a few mm up to 2cm and are less chloritic than the siltstone. Siltstone is textureless, chlorite constitutes 60% of the rock. Many concordant discontinuous milky quartz veinlets present. Some fine discordant stringers also occur. At 247.93 a small quartz veinlet contains small epidotomorphite pyrite crystals.

249.00 - 260.58 Sequence of interbedded, CHERTY SHALE, fine grained SHALE, fine to medium grained SANDSTONE and minor SILTSTONE. Beds are of varying width contacts are generally fairly sharp. Bedding is concordant and throughout the interval is predominantly at 40° to lca. Interval averages 4 bedding joints/m, 1-3 fractures/m Cherty shale - predominantly dark bluish green, contains many hair line fractures, most are infilled with quartz. Chert could possibly represent silicified siltstone. Fine grained shale - is pale yellowish green, has a vauge flakey texture. Flakes are aligned parallel to bedding. Rock consists of 60% chlorite, 40% fine silica. Sandstone - pale kahki to dark green, has equigranular fine grained texture, appears well sorted. Chlorite constitutes 40%, fine granular quartz 60%.
Siltstone is minor, occurs as thin bands. Is dark green textureless, appears to be mainly chlorite. Individual beds are as follows:

- 249.00-249.37 cherty shale
- 249.37-250.58 fine grained shale
- 249.58-251.73 cherty shale
- 251.73-251.93 fine grained shale
- 251.93-252.75 cherty shale
- 252.75-253.90 fine grained sandstone
- 253.90-254.56 cherty shale, concordant milky quartz development from 254.08-254.17
- 254.56-256.40 zone of alternating cherty shale and slightly silicified fine grained shale.
- 256.40-258.37 cherty shale with band of silicified sandstone from 256.55-256.98
- 258.37-258.98 sandstone with minor chert beds present.
- 258.96-259.43 cherty shale
- 259.63-260.21 fine grained sandstone
- 259.63-260.21 cherty shale, bedding at 60° to lca, cleavage at 25-30° to lca
- 260.21-260.46 chloritic medium to coarse grained siltstone, bedding at 60° to lca
- 260.46-260.58 cherty shale, bedding and cleavage 20° to lca.

260.58 - 263.65

Interbedded fine CHLORITIC SILTSTONE and fine to medium SANDSTONE.
Bedding is at 50° to lca. Two silicous zones occur from 262.22-262.30 and 262.54-262.60. Minor quartz veining along fractures. Several bedding planes are coated with hematite.

263.65 - 265.40

Dark green, finely bedded talcose SILTSTONE (possible mudstone).
Pyrite smears and hematite present along some bedding planes. Bedding at 40° to lca. 3 bedding joints/m, 4 fractures/m

265.40 - 274.59

Fine CHLORITIC SHALE
Bedding and cleavage at 30° to lca. Numerous tiny
quartz veins, infill fractures, also form fairly continuous bands concordant with bedding. Rare tiny pyrite specs present, small blob of pyrite at 268.01.

273.07-274.59 several interlayered medium grained sandstone beds present.

274.59 - 279.97

**CHLORITIC SHALE**
Consists of evenly interlayered fine and slightly coarser beds. Cleavage is more pronounced and rock is slightly more chloritic than above. Throughout interval several small (1cm max.) chert bands present.

Bedding and cleavage at 40° to lca. 10 bedding joints/m, 4 fractures/m.

279.97 - 293.29

**Sequence of interbedded fine SILTY SHALE and fine SILICEOUS SHALE in many places approaching cherty shale.**

Bedding and cleavage is at 40° to lca. 2-3 fractures /m, 6 to max. 12 bedding joints/m average =8.

Siliceous zones are as follows:

293.29 - 301.40

**Finely bedded CHLORITIC SILTSTONE**

Bedding and cleavage at 35° to lca, bedding steepens to 15° to lca in places. Minor silicification in places. 4 bedding joints/m.

301.40 - 303.10

**Fine grained CHLORITIC SANDSTONE**

303.10 - 305.35

**CHLORITIC SILTSTONE**

Bedding is undisturbed and prominent at 40° to lca. Interval contains several coarser grained beds with fine equigranular texture. Main bed from 303.46-303.58. 12 bedding joints/m, several minor fractures present, coated with hematite.
From 304.27-304.28 discordant milky quartz vein transects core, contains flecks of dark green chlorite.

305.35 - 307.67

CHLORITIC SILTSTONE,

(min.seds) as above except interval is disturbed Magnetite content of siltstone is high up to 30%-40%. Bedding is not prominent. Magnetite occurs predominantly finely and evenly disseminated through the siltstone. Also occurs as distinct small beds consisting of 60-70% magnetite and as blobs usually associated with intrusive quartz veins.

Several siliceous zones present, consist of 50% silica, 45% magnetite, very little chlorite present.

These are from 306.48-306.57, 306.65-306.98, 307.20-307.24, 307.26-307.60 intruding into and constituting 50% of this interval are numerous veinlets and stringers of barite. The barite has a pinkish tinge due to finely disseminated hematite. Pyrite mineralization is abundant in first 10cm of interval.

Occurs as hypidiomorphic crystals (1mm dia.) within the barite, is restricted to outer edge of barite veins. Barite has a definite intrusive relationship with the country rock, is either remobilised or intruded from outside source. Barite forms medium to coarse intergrowths of hypidiomorphic crystals.

Throughout the interval numerous milky quartz veins occur. All have an intrusive relationship with the country rock and contain pyrite, magnetite and chlorite. Many smaller veins are almost ptymatically folded, (indicating plastic distortion). Main zones of quartz intrusion as follows.

305.45-305.53 Several concordant veins transect core at 60° to lca, high dark green chlorite content no sulphides.

305.58-305.69 Zone of smaller veins, 2mm to 1cm width, minor sulphides, mainly pyrite some chlorite inclusions veins are ptymatically folded.

305.98-306.06 Veins ptymatically folded.
Throughout the interval several clusters of hypidiomorphic to allotriomorphic magnetite, minor pyrite and quartz occur. These appear intrusive. Major zones from 306.45-306.47, some chalcopyrite present at 306.59, 306.70-306.74 and 307.15-307.17.

At 307.18 and from 306.40-306.58 pale green sericatic mica coats fractures.

**SILICEOUS SILTSTONE**

Core is badly broken, fractures are coated with crystalline quartz and these are coated by hematite. Many vugly quartz veins transect the interval, vughs contain poorly developed crystals. Quartz is pitted and appears water worn. Interval possibly represents an aquifer. Minor pyrite occurs on edges of some quartz veins. Some small sericite smears present on a few fractures.

**SILTSTONE**

Bedding not visible, however numerous white to pinkish brown barite and minor quartz stringers transect the core at 45° to 55° to lcs. This gives rock a vauge lineation. Veins are predominantly continuous and all are concordant. All contain idiomorphic pyrite to hypidiomorphic.

Several small quartz magnetite stringers present, intrusive dark green chlorite is associated with these. Magnetite particles approximately 1mm in diameter occur randomly distributed throughout the core.

309.15-309.95 siltstone is highly siliceous.
310.50-310.56 Large milky quartz intrusion, contains no sulphides.

**Resetextured SILTSTONE (min.seds)**

Rock has an extremely high magnetite content (approx. 40%)

311.73-312.29 Magnetite content minor, many large (up to 2cm) milky quartz veins randomly transect the core, most contain magnetite and pyrite.
312.29-313.25 rock has lineation at 40° to lca due to flowage appearance of magnetite and minor pyrite present.

313.25 - 318.60

MAGNETITE-BARITE-JASPER-QUARTZ-HEMATITE LODGE.

313.25-313.72 Magnetite (50%) - barite (40%) lode with minor pyrite and hematite.

313.72-316.72 Magnetite (40%) - barite (20%) - jasper (20%) - quartz (10%) - hematite 10% lode, minor pyrite present. Zone has coarsely mottled appearance. 50% of the barite occurs as thin (1mm-3mm) continuous concordant bands at 40° to lca. This superimposes a vague lineation on the mottled texture. In many places flowage is evident. Chert or jasper occurs as wispy stringers and blobs.

316.72-317.10 hematite (40%) - barite (30%) - magnetite (15%) - quartz (15%) lode.

317.10-318.19 barite (45%) - hematite (35%) - magnetite (35%) lode minor quartz and pyrite. Some fine highly chloritic siltstone present in places.

318.19-318.60 Disturbed chlorotic siltstone interval, contains heavy quartz and barite veining, minor pyrite and magnetite present. Some pale green sericitic mica developed in places.

318.60 - 319.10

Fine CHLORITIC SILTSTONE (min.seds)
Contains minor pyrite (occurs mainly as blobs) and barite veining. Pyrite and barite occur both associated with each other and separate.
GEOLOGICAL LOG...contd.

319.10 - 349.90

Highly cleaved, evenly and finely bedded CHLORITIC SHALE.
Varies from chloritic to slightly chloritic over small section. Both varieties present in equal quantities.
Bedding and cleavage are parallel at 45°-55° to lca. Hematite coats many planes. Bedding and cleavage are wavy in places; is rarely folded. Rare kink planes exist these have a random orientation.
Chlorite content is less from 333.00m. Bedding plane and cleavage fractures/m 50 or more, fractures/m are rare.

E.O.H.
RESIDUAL MAGNETIC INTENSITY

GREEN SWAMP WELL
WITH ADDITIONS FROM OTHER SURVEYS
BILLIATT II

GEOPEKO LIMITED

APPROX SCALE 1:50,000

CONTOUR INTERVAL 10.0 GAMMAS
BANDING ON LOW SIDE 5.0 GAMMAS
DATE AND L.S.: 1985 10th (REPRINTED TO 1974)
FLIGHT LINE SPACING 400 M METRES
FLIGHT ALTITUDE 100 METRES A.M.
FLIGHT AND COMPILED 1973-1974
INSTRUMENT: GEOMETRICS G-103 PROTON MAGNETOMETER

LEGEND

MINERAL LEASE
GRID LINES
VEHICLE MAGNETOMETER TRAVERSE
100 SHOWING DIRECTION OF TRAVERSE
GRADED TRACK
WELL DEFINED VEHICLE TRACK
EXPLORATION LICENCE BOUNDARY

SURVEY AND COMPILATION BY:
geoMetrics

Fig 4
FIG. 12A - ROVER 9
VEHICLE MAGNETOMETER NAVIGATOR TRAVERSES NO. 1.
(From 333576E, 7789063N to 333576E, 7789200N AMS)
FIG. 12b - ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 2
(From 333556E, 7789200N to 333556E, 7788900N AMG)
Sheet 1 of 2
ROVER 9 - VEHICLE NAVIGATOR TRAVERSE NO. 2
Sheet 2 of 2
FIG. 12c  -  ROVER 9  -  VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE No.3
(From 333536E, 7789200N to 333536E, 778850N AMG)
Sheet 1 of 3
ROVER 9 - VEHICLE MAGNETOMETER TRAVERSE NO. 3

Sheet 2 of 3
FIG. 12d - ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 4

(From 333516E, 7789048N to 333516E 7789200N A.M.G.)

Sheet 1 of 3
FIG. 12e - ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 5
(From 333495E 7789200N, 333496E 7788850N AMG)
Sheet 1 of 3
ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 5

Sheet 2 of 3
FIG. 12f - ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 6
(From 333476E, 778850N to 333476E, 7789200N AMG)
Sheet 1 of 3
FIG. 12g — ROVER 9 — VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 7
(From 333456E 7789202N to 333456E 7788877N AMG)
Sheet 1 of 3
FIG. 12h - ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 8
(From: 333436E, 7788877N to 333436E, 7789077 AMG)

Sheet 1 of 2
ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 8
Sheet 2 of 2
FIG. 12j - ROVER 9 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 9

(From 333736E, 7789077N to 333583E 7779076N AMG)
FIG. 15a  -  ROVER 15  -  VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO.1
(From 333800E, 7789469N to 333600E, 7789471N AMG)
Sheet 1 of 2
ROVER 15 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 1

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FIG. 15b - ROVER 15 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 2
(From 337559E 7789550N to 333760E 7789350N AMG)
Sheet 1 of 2
FIG. 15c - ROVER 15 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 3
(From 333730E, 7789350N to 333730E, 7789550N AMG)
Sheet 1 of 2
ROVER 15 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 3

Sheet 2 of 2
FIG. 15d  -  ROVER 15  -  VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 4  
(From 333700E, 7789300N to 333700E 7789600N AMG)  
Sheet 1 of 2
FIG. 15e - ROVER 15 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 5
(From 333670E 7789630N to 333670E, 7789350N AMG)
Sheet 1 of 2
FIG. 15f - ROVER 15 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO. 6
(From 333641E, 7789350N to 333640E 7789620N AMG)
Sheet 1 of 2
FIG.15g - ROVER 15 - VEHICLE MAGNETOMETER NAVIGATOR TRAVERSE NO.7
(From 333609E, 7789624N to 333610E, 7789350N AMG)
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