ANNUAL REPORT

FOR THE YEAR ENDING 27.5.72

AP2602 - MT. STRZELECKI

P.E. COGAR

Geological evaluation based on reports by John Peros
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APPENDIX A - Co-ordinates of AP2602

APPENDIX B - References

APPENDIX C - Annual Report by John Feros, Geologist
1. INTRODUCTION

AP2602 covers an area of 167 square miles and is located some 25 miles to 40 miles north of the small hamlet of Barrow Creek which is, itself, located on the Stuart Highway 180 miles north of Alice Springs.

The authority to prospect was applied for by John Snyder on the 3/12/69. It was granted by the Mines Branch of the Northern Territory Administration on 21/1/70 for an initial period of 12 months. The AP was renewed on 21/1/71 with an expiry date 20/1/72. Following this it will need to be converted to an exploration licence if exploration work is to be continued.

There was no access road into the AP prior to commencement of field work in 1971. The field party formed a dirt road alongside the Crawford Range on the way in and then connected this southwards via the Ivy Tin Mine back to the Stuart Highway.

These roads have been named Westlander No. 1 and Southlander respectively. A further dirt road named Westlander No. 2 was put in through the AP later when field work was extended to the Lander River AP to the north-west.

The position of the AP within the Northern Territory of Australia is shown in figure 2602/LOC/1. Its position in relation to Barrow Creek is shown in figure 2602/LOC/2. The roads mentioned above are also shown in figure 2602/LOC/2 as is the position of the major grid.

The exact co-ordinates of AP2602 are set out in Appendix A.
2. **GEOGRAPHY**

(a) **General**

As mentioned earlier the AP is located in the Northern Territory of Australia. Control of this area is vested in the Commonwealth of Australia with major regional offices in Darwin, in the north, and Alice Springs in the centre. The day-to-day administrative functions are carried out by the N. T. Administration.

The Northern Territory is sparsely inhabited by whites with some 75,000 European descendent inhabitants at present. Most of these are concentrated in Darwin (37,000) and Alice Springs (18,000) localities.

There would be fewer than 200 whites in the Wauchope - Barrow Creek - Tea Tree area. Most of these people are located in the small hamlets or at the cattle stations located mainly to the east of the Stuart Highway.

There is a native settlement located at Warrabri about 45 miles east of the AP.

(b) **Climate**

Long, hot summers coupled with short, mild winters are usual. The summer shade temperatures frequently exceed 110°F and field work is unpleasant. The best climate for field work is from May to September when evenings and mornings are cool.

Annual rainfall is approximately 12 inches typically between November and March though both rainfall and distribution are somewhat unreliable.

Prevailing winds are strongly from the south-east.

(c) **Vegetation**

Where there is rock outcrop mainly spinifex, mulga and gidyea are found. Gidyea may be considered an indicator of acid volcanic rocks and porphyries as it is most common in this type of soil. Additionally, spinifex is generally absent from these areas but common elsewhere.
Eucalypts generally line the courses of the larger streams. In semi-desert country and on the western flanks of the ranges there are many varieties of acacia. Timber is scarce in this terrain with mainly Ghost Gum, Black Heart and Ironwood varieties of eucalypts being found.

(d) **Topography**

The area contains two major features which are named the Crawford and Osborne Ranges. These consist mainly of long, parallel, steep-sided, flat-topped ridges separated by wide, flat valleys. The Osborne Range contains Taylor Hills 1921ft above sea level. The Crawford Range contains Mt. Strzelecki and Mr. Morphett but these features are barely distinguishable from the general topography.

The ridges are strike ridges with few gaps in them. It is thus easy to travel parallel to the ridges but difficult to cross them by motor vehicle.

(e) **Economic Geography**

Telephone and telegraphic facilities are available at Barrow Creek. There is also a hotel here but no major supplies are available closer than Alice Springs to the south.

Several light aircraft strips are situated at the cattle stations with the closest at Neutral Junction station just north of Barrow Creek.

There are no permanent streams or rivers flowing in the area. No stream rising in the hills flows either to the sea or to a permanent inland lake. Most streams flow only immediately after rain.

Most drinking water is obtained from wells. The limestones in the area generally contain aquifers which have water available all year round.

The only business ventures currently in operation in the region, apart from stores and hotels, are the cattle stations. Mining has been conducted from time-to-time at Hatches Creek but not on a large scale.
No reticulated power is available within the area. No large storage dams are located within the area.

Freight comes generally from the Alice Springs railhead to the south and road freight charges are high by east-coast standards.

With the low population there is no labour pool nor suitable town site available for mine requirements should a mine be opened in the area.
3. GEOLOGY

(a) Regional Geology


Overlying the archaean are the lower Proterozoic Hatches Creek Group consisting of quartz sandstone, siltstone, shale, greywacke and acid and intermediate lavas. These were followed by basic igneous rocks, dolerite, gabbro, then various porphyries and granites which have been radiometrically dated at an average of 1450 million years.

It is believed that the igneous rocks up to the granites came in during the early stages of the folding of the Hatches Creek Group. On the other hand the granites show no relationship to fold structures either locally or regionally.

On the southern and western part of the area some upper Proterozoic sediments named the Central Mount Stuart Beds unconformably overlie the Hatches Creek Group. These consist of red arkose, red quartz sandstone, brown and white siltstone.

These, in turn, are unconformably overlain by Palaeozoic rocks ranging from the lower Cambrian Giant Bluff Formation (Glaucinite quartz sandstone, brown and white siltstone) to the lower Ordovician Tomahawk Beds (brown silty sandstone, quartz sandstone, siltstone, green silty limestone, blue oolitic limestone, brown dolomite, pebble and cobble conglomerate) to the upper Devonian Dulcie sandstone (cream and brown quartz sandstone, white siltstone, some pebble bands).

In the western part of the area are some possible Tertiary rocks comprising white silty limestone and chalcedony. The remainder is Quarternary red and brown wind-blown sand.
(b) Local Geology

The most prominent features within the AP are the Crawford and Osborne Ranges strike ridges trending roughly NW-SE. In the main these are comprised of the lower Proterozoic Hatches Creek Group Sediments with one large granite outcrop in the centre of the AP.

Two groups of Tertiary rocks are located to the west and NW of the granite. Palaeozoic rocks either do not outcrop or are entirely missing from the AP area, probably the latter.

This is deduced from the fact that the outcropping ridges of Hatches Creek Group Sediments are each along the axes of synclinal folds with archaean outcrops in close proximity. They may, therefore, be presumed to be towards the bottom of the sequence so that later rocks have undoubtedly been completely removed by erosion.

There are no archaean rocks or pegmatites disclosed by B.M.R. mapping but our field work has shown that each occur in the area of Prospect A grid.

The archaean outcrop is a minor one consisting of schist located on the southern side of the grid typically as low strike ridges veined by pegmatite and quartz, concordantly and discordantly. There is some crinkling of and disruption features evident in the foliation of the schists.

The pegmatite occurs close to and within the schist as a coarse muscovite pegmatite in bands 2ft to 3ft wide crosscutting the schists. A concordant phase is also present.

On the northern side of the grid the pegmatite is weathered to white quartz with minor muscovite and kaolinitic remnants of feldspar.

Our field geologist dates the pegmatites as late lower Proterozoic after the granites. At some places they have the appearance of greisen.
Figure 2602/GEOL/1 shows the mapped local and regional geology to the scale of 1" = 4 miles.

(c) Economic Geology

The only known orebodies of any size in this general region are located some 120 miles to the north of the AP at Tennant Creek. These occur in the lower Proterozoic Age Warramunga Group Sediments which are not known in this area. By world standards, however, the Tennant Creek orebodies are small to medium sized copper-gold bodies which require to be worked by underground methods.

The Hatches Creek Group rocks at and around Hatches Creek contain many (possibly hundreds) of small quartz lodes containing ores of wolfram, copper and some bismuth. The wolfram ores occur both in the sediments and the basic and acid igneous rocks but always in quartz reefs both concordant and discordant.

The introduction of the mineralization is thought to be associated with the granite which outcrops some 4 miles to the south of the workings. Ryan (1961) recognized three types of lode which are defined as:-

**Type 1:** Wolfram - Scheelite

Confined to lodes within gabbro, distinguished by abundant scheelite. Bismuth common and minor amounts of copper, molybdenite and gangue minerals present.

**Type 2:** Wolfram - Copper

Confined to lodes in, acid porphyritic volcanic rocks, scheelite rarely present. Small amounts of bismuth and molybdenite present but minor gangue minerals absent.

**Type 3:** Wolfram

Lie mainly in the sedimentary rocks and in basic volcanic rocks, distinguished by almost total lack of minerals except wolfram, quartz and mica. Sometimes molybdenite and traces of copper are present.
The mineral assemblage indicates moderate temperature and pressure. Cassiterite, tourmaline and garnet are rare and pyrrhotite, pyroxenes and amphiboles are absent. Small amounts of pyrite, kaolin and sericite are present but the reefs are not typically vuggy.

The control and emplacement of the tungsten deposits depends on two sets of factors namely those favourable to the emplacement of the lodes and those favourable to the deposition of the tungsten minerals within the lodes.

The first may be related to suitable host rocks which are seen to be basic and intermediate igneous rocks and some sandstones and greywackes. These shear easily and clearly providing uninhibited passage to the mineralising fluids. Rocks harder or softer than this are less suitable.

Deposition of ore minerals has been controlled by features of the fissure relating to a decrease in or a release of pressure. These fall into two common forms namely shoots and pockets.

The shoots lie in sections of the reef which have a different strike and dip from adjacent poorer sections. Pockets occur typically in any feature that has resulted in a drop in pressure and temperature in the reef.

Overall production of tungsten from the region has not been large by any standards and the reefs have only been worked to shallow depths (<200ft). However, they are thought to persist to many times this depth. Typically the lodes have only been worked in times of high tungsten prices.

The only other mapped mineralisation in the area is located to the south of the AP and is tin associated with the archaean rocks. This falls within AP2651 and has been described in the report covering work done within that AP.

There are no mapped ore mineral occurrences within AP2602.
4. **GEOPHYSICS**

There is not known to be any published information available on any geophysical work carried out in the vicinity of AP2602. An airborne scintillometer survey was carried out by the B.M.R. in 1957 over the Mosquito Creek region but it is not thought that this work has any validity in relation to AP2602.

There is no known published information on any airborne magnetic and/or electromagnetic surveys in this area. Neither is there any published information available on ground geophysical surveys.
5. GEOCHEMISTRY

There is not known to be any published information available on the geochemistry of the soils and/or rocks of this area. Smith et al (1961) give petrographic descriptions of certain of the rocks in the Hatches Creek Group.
6. FIELD PROGRAM

During April 1971 a field program of gridding, sampling and geophysical examinations was conducted over a prospect named Prospect 2602/A.

The initial grid lines were laid in by the D4 bulldozer and this was followed by airtrac drilling for geochemical samples from both surface and subsurface material. Some deep drilling was undertaken for geological mapping purposes.

The particular target was chosen because air photographs had disclosed a large circular feature about 10,000ft in diameter which seemed to localise most of the iron oxide outcrop. This was interpreted as a ring structure.

Ground examination disclosed many iron oxide and manganiferous outcrops which had the appearance of gossans.

Field mapping indicated the following stratigraphic sequence in this locality:

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The Hatches Creek Group sediments dominate the topography principally as strike ridges and major fold structures. The archaean schists and intrusives have poor surface expression and typically occur in anticlinal structures in the Hatches Creek Group.
Some of the Hatches Creek Group is covered and modified by what our field geologist considers to be possible Cambrian (?) cherts and chert-iron breccias. If the grid is plotted on the available B.M.R. map, however, it may be inferred that this material is Tertiary in age.

In discussion of this John Feros presents the following argument:-

(i) At Prospect AD pegmatites intruding the schists have been locally replaced by iron oxides. Drilling showed that these cut out at 56ft depth.

(ii) Schists also showed, in part, replacement to iron from negligible to almost complete stages. Therefore it seems likely that the iron was introduced after the pegmatites and would have been at relatively low temperature.

(iii) Replacement of the schists and slump breccias favours an origin of structural failure of the schists/quartzites followed by low temperature iron solutions replacing the failed sections.

(iv) The iron, however, also has features suggesting sedimentary origin - i.e. iron outcrops are limited to the flanks of the schist/quartzite outcrops facing low topography areas which may have been areas of marine deposition in the Tertiary. This is strongly the case for the northern outcrops which may represent a Tertiary shore line.

In general the schists and quartzites form a fold of amplitude approximately 10,000ft in the form of a syncline plunging to the north-west. The fold axis strikes SE-NW. Most dips are steep to the north-east so that the syncline may be slightly overturned in this direction.

Prospect A consists of a baseline placed at 300° magnetic some 10,000ft in length in order to cross the ring structure feature. Four grid lines at 210° magnetic were spaced at
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3000ft intervals with lines 1 and 2 running from 10,000ft west to 1100ft east and 1700ft east respectively and lines 3 and 4 running from 10,000ft west to baseline.

Geochemical samples were taken by airtrac drill at 400ft spacings on the grid lines. These were assayed for copper, lead, zinc, manganese, tin, molybdenum, lithium and Beryllium. The results of these assays are presented in line plot form in figure 2602/A/3.

Some deep holes were also drilled and assayed and these logs are given in figures 2602/A/4-a, -b and -c.

Each of the sample points was examined with hand-held magnetometer and hand-held scintillometer and VLF-EM/16 instruments. The magnetic and radiometric data has been plotted at 1" = 400ft in figure 2602/A/2. It was considered that the EM/16 data at 400ft spacings was useless for interpretation and it has not been plotted.

The geology of the area has been plotted at the scale of 1" = 400ft and presented in figure 2602/A/1.

During the examination of grid A certain smaller areas were examined in some detail and mapped at 1" = 100ft. These areas were named sub-prospects AA, AB, AC and AD. The individual details are given below:-

(a) **Prospect AA**

A small grid of three lines 1800ft long and 100ft apart was placed at the western end of the northern extremity of the iron outcrops. The grid was placed to test a magnetic anomaly picked up close to the prospect A grid datum.

No geochem sampling was done and investigation was limited to geological mapping and geophysical testing. This work has been presented in figures:-

- 2602/AA/1 - geological mapping
- 2602/AA/2 - magnetic contours
- 2602/AA/3 - radiometric contours
- 2602/AA/4 - EM/16 contours

at a scale of 1" = 100ft.

The surface geology is almost all rounded botryoidal outcrops of goethite and iron/manganese oxides.
(b) **Prospect AB**

This grid was designed to cover a radiometric anomaly giving a total count reading of 94 - 115 - 130 - 110 - 130 cps. over 200ft.

The additional work comprised three grid lines 1000ft long and 200ft apart with magnetometer, scintillometer and VLF-EM/16 readings taken at 50ft intervals. In addition two deep airtrac drill holes were put in for subsurface information. The logs for these are given in figure 2602/AB/5.

Geological mapping was done at 1" = 100ft and is presented in figure 2602/AB/1. The geophysical data is given in figures 2602/AB/2; /3 and /4 respectively.

The surface geology here is mainly red sands and iron-stained pebble scree. A costan indicated 3ft of sand and 3' - 5' of mottled leached lateritic material. The southern end of the prospect has an outcrop of white quartzitic breccia which sheds a quartz scree. Drill hole 1 showed 12ft of mottled laterite underlain by 60ft of light coloured, weathered schistose rock.

On the other hand hole 2 had 12ft of lateritic rubble and soil underlain by 84ft of quartzite/schist sequence intruded by pegmatites.

(c) **Prospect AC**

From the EM/16 data collected on line 2 of prospect A it was considered by the field staff that an EM/16 anomaly existed at 200ft north on line 2. Therefore a three line grid of lines 1000ft long and 200ft apart was placed over the 'anomaly' to sharpen it up for deep drilling purposes.

The prospect covers part of the "iron" outcrop on the northern limb of the syncline. It was not mapped separately from figure 2602/A/1 and only EM/16 values were obtained at 50ft spacings on the grid lines. These are presented in figure 2602/AC/1.

Two deep holes were put down at 200ft north and 50ft north on line 2, grid A. Logs for these are given in figure 2602/A/4-a.
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The grid geology is inferred as quartzitic schists and sericitic quartzite with a capping and/or replacement of the surface by iron oxides.

(d) Prospect AD

In locating the prospect A grid a particularly prominent iron outcrop was found on the southern end of the grid. No additional grid has been placed over this occurrence though it has been mapped in greater detail at 1" = 100ft scale.

Three deep holes were drilled across the lense shaped iron outcrop. These are named Holes 2, 3 and 4 and drilling logs are given in figures 2602/A/4-b and 2602/A/4-c.

From the drilling chips it is probable that the occurrence is an upper replacement of archaean schists to iron oxide with intrusive pegmatites at depth.
7. DATA REVIEW

(a) Prospect A

(i) Geology

The geological plan, figure 2602/A/1, shows only a general outcrop trend in the quadrant west of north. Dips are vertical or steep to the north-east except in the area of 9,300ft south on line 1 where dips are steep to the south-west.

No fault, folds or dykes are mapped within the grid area.

The "ring structure" selected from aerial photographs is not evident in the geological map.

(ii) Magnetics

There are no significant magnetic anomalies evident in figure 2602/A/2. Any feature shown therein is considered to be related to surface or shallow subsurface features.

The maximum variation across the grid is only 150 gammas. With the method of reading of the handheld magnetometer the order of accuracy of the readings is not sufficiently high for this to be considered significant.

The minor feature on the southern end of line 2 may be related to the unconformity inferred there but is more likely a function of the amount of iron replacement of the sediments.

(iii) Radiometrics

There is one broad area of low total radio-active count (<30 cps.) evident and this is consistent with the mapped extent of the Hatches Creek Group within the grid area.

The archaean schists and intrusive pegmatites are characterised by higher total count readings typically >40 cps.
The feature to the south on line 2 is coincident with the magnetic feature but is difficult to interpret as it is purely a surface feature in this instance. It is possible that a non-outcropping tongue of Hatches Creek Group rocks runs from approximately 10,000ft south on line 4 to approximately 6,400ft south on line 2 where it joins the mapped portion of these sediments.

The feature at 0 on line 1 is coincident with outcrop which is thus inferred to be surface iron replacement of archaean schists. This apparently extends subsurface to line 2 where our field geologist has mapped the outcrop as surface iron replacement of schists and sericitic quartzite inferring an unconformity between the archaean and the Hatches Creek Group. No information north of baseline is available east of line 2.

(iv) VLF-EM/16
This information has not been considered for interpretation.

(v) Geochemistry.
Several geochemical anomalies are evident in figure 2602/A/3 though unfortunately the information was not extended east to line 4.

If the inferences made above regarding the unconformities between the archaean and the Hatches Creek Group are correct then we can obtain correlation with the geochemistry also, viz. the geochemical anomalies to the south follow the "tongue" inferred from the radiometric data from line 3 to line 2 then swing south to line 3 where the mapped unconformity lies.

To the north they follow the inferred unconformity from line 1, zero, east to north of line 2 datum.

Several minor anomalies are also evident elsewhere within the grid but, other than the lead/zinc anomaly at 3200' south on line 1 have no great magnitude.
However, inspection of the manganese values shows that these are generally low within the entire grid area. In fact the highest surface manganese assay noted was 740 ppm at datum on line 1. This is low and does not support the premise of iron/manganese cappings within the prospect.

In fact the manganese values support a generally "leached" surface environment both in soils, scree and rock outcrops. This would further suggest that base metal assays for copper, zinc and molybdenum would also be low and lead, being less liable to leaching, would be somewhat higher.

Except for the anomalies near datum on lines 1 and 2 this is, in fact, the situation within the grid.

However, spacing of samples and spacing of lines has been too great to allow more than general conclusions to be reached, particularly in the absence of samples from line 4 to the east. This conclusion is that, on the evidence available, the anomalies show a correspondence with unconformities, mapped and inferred, between the archaean and the lower proterozoic. They may be enhanced by the pegmatite dykes in the northwest corner of the grid which is the only position where they correspond to a geophysical anomaly (radio-metric).

(b) Prospect AA

(i) Geology

No detailed geology is given in figure 2602/AA/1 which basically only gives the position of the iron outcrop.

(ii) Magnetics

All features shown are shallow features though there is a total variation within the grid area of some 1600 gammas. The major high relates to the mapped iron outcrop. The lows may relate to pegmatite dykes in the archaean schists inferred to be underlying a thin cover of goethite/haematite in this area.
(iii) **Radiometrics**
The information given in figure 2602/AA/3 suggests archaean over the majority of the grid area with unconformities on the east of line 1 south and on the west of line 1 north and baseline. This agrees generally with the geological plan.

(iv) **VLF-EM/16**
This shows no subsurface features. The only positive features evident coincide with the geological boundary at 1000ft west on line 1 north and the gully cutting lines 1 north, baseline and 1 south.

The large iron outcrop gives no anomalous response.

(v) **Geochemistry**
No detailed geochem was done over the smaller grid but from the grid A assays it can be seen that the copper, zinc highs correspond to the iron outcrop. The lead highs extend to 400ft west on the baseline and this coincides with the magnetic low. However, lead is generally higher than background from west to east on the baseline and also from south to north on the datum line.

Zinc and copper appears to follow a similar pattern.

(c) **Prospect AB**

(i) **Geology**
The mapped geology in figure 2602/AB/1 does not take advantage of the information available in the deep hole logs and is apparently restricted to surface features. It has little value, therefore, for interpretive purposes.

(ii) **Magnetics**
There are some minor features on lines least and 2 east but these are from shallow sources and do not persist to line 3 east. No correspondence is evident between magnetics and mapped geology.
(iii) Radiometrics

An anomalous area (>100 cps) extends over 200ft on line 2 east from 300' east to 500' east. A cotean was placed just on the boundary of the anomaly but no subsurface scintillator readings were apparently taken so that the origin of the high is unresolved.

The scintillator readings would suggest Hatches Creek Group rocks from 0 to 200ft east on all three lines as well as from 700' east to 850' east on line 1; 750' east to 1000' east on line 2; and 800' east to 1000' east on line 3.

This is apparently borne out by the log of hole 2.

(iv) VLF-EM/16

No subsurface anomalies are evident in figure 2602/AB/4. The only distinct feature found corresponds to a change in surface geology at 850' east on line 2 and 3.

(v) Geochemistry

Holes 1 and 2 disclose nothing of consequence other than the fact that manganese values are extremely low throughout evidencing extreme leaching to at least 96ft in the case of hole 2 and 72ft in the case of hole 1.

The one higher manganese value (120 ppm) in hole 1 shows direct correspondence with the base metals copper, zinc and lead.

(d) Prospect AC

This exhibits a small EM/16 anomaly at 250' north on line 2. It extends to 50' north on line 1 west and to 300' north on line 1 east.

The two deep holes put down at 50' and 200' north on line 2 show surface enrichment of base metals with the higher manganese values then sharp reductions in base metals content and manganese under the surface layer. This agrees with the EM/16 interpretation.
(e) Prospect AD

(i) Geology
The geological feature is one of an iron "plug" sitting on schists intruded by pegmatite dykes or veining.

(v) Geochemistry
The three deep holes drilled show generally low base metal values to either side of the iron outcrop until about 60ft in the case of hole 4 and 120ft in the case of hole 3. The best values found are at the bottom of hole 3 and towards the bottom of hole 4.

The dip of these beds is from hole 4 to hole 3 and we have previously inferred an unconformity some 600'/800' north of this locality showing high surface geochem. It is possible, therefore, that we have examined the southern extremity of a geochemical halo extending from the unconformity through the severely leached rocks.

(f) Conclusions
The work done to date has not indicated any possibility of a large orebody within the prospect A area. If any mineralisation exists it is likely to be below the weathered zone, inferred at greater than 200ft, and controlled by structure.

There is no positive evidence of hydrothermal orebodies of the Hatches Creek type though one geochem anomaly on line 1 has a molybdenum anomaly (10ppm) associated with it. This is in a highly leached area and may, therefore, be significant as an indicator of tungsten mineralisation.

The area cannot be given a high priority for further field work in 1972.
8. EXPENDITURE TO DATE

A breakdown of expenditure for work done within the AP area is given below. In addition an estimate of the additional cost of data plotting and evaluation is included for completeness.

The expenditure details are:-

(a) Operating expenses including salaries and wages, consultants fees, consumables etc. $ 8,800
(b) Overhead expenses including office rentals - Sydney and Darwin $ 1,100
(c) Capital expenses $ 1,500
   $ 11,400
(d) Data Plotting and evaluation $ 2,500
(e) Assays $ 750
   $ 14,650
The authority to prospect comprises that piece or parcel of land in the Northern Territory of Australia containing an area of 167 square miles more or less, the boundaries of which are described as follows:-

Commencing at the intersection of latitude 20 degrees 56 minutes 40 seconds with longitude 133 degrees 41 minutes 50 seconds thence proceeding to the intersection of latitude 20 degrees 56 minutes 40 seconds with longitude 133 degrees 52 minutes 30 seconds thence proceeding to the intersection of latitude 21 degrees 09 minutes 30 seconds with longitude 133 degrees 52 minutes 30 seconds thence proceeding to the intersection of latitude 21 degrees 09 minutes 30 seconds with longitude 133 degrees 41 minutes 50 seconds thence to the point of commencement excluding therefrom all mining tenements; all land set aside for rail and road purposes; all reserves under section 103 of the Crown Lands Ordinance 1931 - 1969 and sections 147 and 147A of the Mining Ordinance 1939-1969, but including reserves as defined by section 38Q of the Mining Ordinance 1939-1969.
REFERENCES


ANNUAL REPORT

FOR YEAR ENDING 27.5.72

AP2602 - MT. STRZELECKI

by
John N. Feros
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<td>REPORT ON PROSPECTS</td>
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INTRODUCTION:

Investigations were conducted in the Mt. Strzelecki AP Prospect A area in mid-April for approximately eight days. The target was chosen for the following reasons:

1. Extensive iron oxide and manganese outcrops that were interpreted to be gossanous.
2. An almost circular structure of about 10,000ft in diameter localizing most of the iron oxide outcrop that was interpreted as a ring structure.

MODE OF INVESTIGATION:

Initial gridding was followed by a geological, geophysical and drilling program. Drilling was rotary percussion and involved both deep drilling (<200ft) and geochemical sampling. Geophysical groundwork was by magnetometer, scintillometer and EM -16. Geological mapping on the sub prospects was done at close scale (100 feet to 1 inch), while the overall geological plan was constructed at 400 feet to 1 inch.

SCOPE OF INVESTIGATION:

1. Gridding and costeaming by D4 bulldozer.
2. Air rotary percussion deep drilling
3. Air rotary percussion geochemical drilling
4. Ground geophysical coverage by magnetometer, scintillometer and EM -16.
5. Geological mapping
6. Plan compilation - Prospect A - 400ft to 1 in.
   Prospects AA, AB, AC, AD - 100ft to 1 in.

REGIONAL GEOLOGY:

The Hatches Creek Group of sediments form strike ridges and major fold structures. The Archaean and the later intrusives have poor surface exposure and typically occur in the major anticlinal structures of the Hatches Creek Group. Some areas of the Hatches Creek Group are covered by (?) Cambrian brecciated ferruginous cherts.
STRATIGRAPHY:

(a) Sedimentary - Cambrian: brecciated ferruginous chert

Lower Proterozoic: Hatches Creek Group - massive orthoquartzite sandstone, volcanics, siltstone shale.

Archaean: muscovite, sericite schists

(b) Igneous - pegmatites intrusive into the Archaean schists and the Hatches Creek Group.

LITHOLOGY:

Pegmatites - On the southern side of the grid, there are outcrops of coarse muscovite pegmatite that cross-cut the schists as parallel bands 2-3ft wide. At depth, the coarse muscovite pegmatite is intersected in a quartz rich schist.

On the northern side, the rock is more weathered with little to no muscovite remaining and the remnants of feldspar being very kaolinitic.

In parts the pegmatites are greisenous.

Schists - The schists outcrop on the southern side of the grid area as low strike ridges veined by pegmatite and quartz. There is some crinkling and disruption features evident in the foliation of the schists.

The rocks occasionally show a phyllitic texture with the assemblage being quartz, muscovite, sericite.

Hatches Creek Group - Outcrop is poor and relief is low. Iron oxide cappings and replacement of slumped zones have modified the surface of the Hatches Creek Group.

(?) Cambrian brecciated ferruginous chert - outcrops are restricted to two zones on the prospect -

a) a small hill in the south

b) a broader one at the northern boundary
These outcrops are 10-15ft in height and are seated on the quartz schists and quartzites.

The mineralogy of these rocks includes goethite, limonite, hematite, psilomelane and quartz.

Rock Textures - a) Smooth, rounded goethite outcrops of several feet in diameter are present, with hand specimens showing globular and columnar textures.

b) Slump breccias of quartz schist with a matrix of iron and manganese oxides.

c) Banded goethite-limonite rocks.

d) Coarse quartz grits with limonite cement.

e) Light grey, granular quartzite.

Origin of the Iron Outcrops:

At Prospect AD, three important facts were established -

1. Pegmatites that intruded the schists were locally replaced to iron oxides.

2. Drilling of the iron outcrop showed that the iron cut out at 56 feet.

3. Quartz schists in part showed various stages of replacement.

From the above, it is deduced that the introduction of the iron post-dated the pegmatites. The pegmatites were almost certainly the last of the intrusive hydrothermal phases.

The iron also has the characteristics of a sedimentary origin. Since the outcrops occur on the flanks of the quartz schists that face topographically low areas of Tertiary marine origin, the iron may represent a Tertiary shoreline.

STRUCTURAL GEOLOGY:

The schists and quartzites form a very wide, north-west plunging syncline. Most dips are steep to the north-east so that the syncline may be slightly overturned to the north-east.

The iron oxides may have been localized in one of three ways:
1. Collapse zones in the crests of folds.
2. Collapse and slump features on a post Pre-Cambrian shoreline (sea cliffs)
3. Post Pre-Cambrian sedimentary deposition with contemporaneous slumping.

GEOLOGICAL HISTORY:

1. Geosyncline deposition of Hatches Creek Group.
2. Period of regional folding produced folds of 2-3 miles in amplitude and a regional metamorphism.
3. During and at the peak of the orogeny, dolerites and granite intruded the distorted geosynclinal pile, particularly in the crests of the major anticlines.
4. Late in the intrusive phase, pegmatites came in.
5. More folding resulting in some fracturing and brecciation.
PROSPECT AA

INTRODUCTION:

Prospect AA defines the western extremity of the northern limb of iron outcrops. A small (principally geophysical) grid was put over the iron as a result of a major magnetic anomaly picked up close to the datum of Prospect A grid.

WORK DONE:

(1) Gridding (three lines, 1800ft long - 100ft apart)
(2) Ground geophysics - magnetometer, scintillometer, EM -16.
(3) Geological mapping

SURFACE GEOLOGY:

The outcrop is of the iron and manganese oxide type described in earlier sections, with botryoidal goethite being common.

PROSPECT AB

INTRODUCTION:

Prospect AB is a small grid (1000ft x 400ft) on the northern side of the Prospect A area. Prospect AB was designated to cover a scint. anomaly of 130 cps.

WORK DONE:

(1) Gridding - 3 lines 200ft apart - 1000ft long.
(2) Geological mapping
(3) Geophysical coverage - magnetometer, scintillometer EM -16.
Drilling
(4) √2 deep air trac holes.
GEOLOGY: (Surface geology)

The scint anomaly is over an area of red sands and iron stained pebble scree. A costean showed 0-3ft of sand and scree and 3-5ft of mottled, leached, lateritic material.

The eastern end of the prospect has an outcrop of quartz and quartzite breccia that sheds a quartz scree.

Drilling Projects -

(1) Hole No. 1

Log : 0-12ft - reddish mottled laterite
     12-72ft - light coloured weathered, schistose rock.

Geochem : Cu 8-16 ppm
          Pb 20-70 ppm except for 120ppm at (36-48ft)
          Zn 20-60 ppm
          Mo < 5 ppm
          Sn < 20 ppm
          Be 1-3 ppm
          Li 307 ppm

(2) Hole No. 2

Location : Eastern side of the grid on the flank of the breccia outcrop.

Log : 0-12ft lateritic soil
     12-96ft quartzite schist sequence intruded by pegmatite.

Geochem : Cu, Pb, Zn, Mo, Sn, Be, Li - all low

PROSPECT AC

WORK DONE:

(1) Gridding - 3 lines 200ft apart - 1000ft long

Geophysics
(2) EM -16 coverage

Drilling
(3) Two airtrac holes (96ft and 72ft depth)
GEOLGY:

The Prospect covers part of the iron outcrop on the northern limb of the syncline (refer to Prospect A geological plan). The outcrops are quartz schists and sericite quartzite with an iron oxide capping.

GEOPHYSICS:

A strong EM anomaly is located 200ft within line 2 (Prospect A). The anomaly is only local and does not extend to either of the lines to the east or west.

DRILLING RESULTS:

Two deep holes were put down:

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>200ft N - line 2 (A grid)</td>
<td>96ft</td>
</tr>
<tr>
<td>50ft N - line 2 (A grid)</td>
<td>72ft</td>
</tr>
</tbody>
</table>

GEOCHEMICAL RESULTS:

Hole 200ft N -

<table>
<thead>
<tr>
<th>Cu</th>
<th>Pb</th>
<th>Zn</th>
<th>Mn</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>40</td>
<td>250</td>
<td>140</td>
</tr>
<tr>
<td>36</td>
<td>70</td>
<td>190</td>
<td>90</td>
</tr>
<tr>
<td>21</td>
<td>50</td>
<td>58</td>
<td>50</td>
</tr>
</tbody>
</table>

The top 36ft contains the highest values with the zinc values being anomalous. All values become progressively lower as depth increases. Mo, Sn, Be, Li values are low for the entire section.

Hole 50ft N -

All values of Cu, Pb, Zn, Mo, Mn, Sn, Be, Li are low.

PROSPECT AD

WORK DONE:

(1) Geological mapping

Drilling

(2) Three deep airtrac holes
INTRODUCTION:

Prospect AD covers a lenticular iron oxide outcrop situated on the southern end of the Prospect A grid. This was the site of the initial drilling in the Prospect A area.

DRILLING RESULTS:

(1) Three holes of 108ft, 168ft and 156ft depth were drilled across the iron outcrop.

(2) Hole No. 2 was sited on the middle of the less shaped body.

Log : 
0 - 56ft - iron and manganese oxides
56 -108ft - quartz schists intruded by pegmatite.

Geochem: - low
Cu - 12-50 ppm Mo -< 5-10 ppm Li - 2-9 ppm
Pb 20-50 ppm Sn -< 20 ppm
Zn 32-50 ppm Be - 3-11 ppm

(3) Hole No. 3 was put in 50 feet to the north, across strike on the iron outcrop.

Log : 
0-16ft - iron and manganese oxides
16-84ft - pegmatite schists
89-168ft - fine grained schists.

Geochem: Mo, Sn, Li, Be - all low.

156-168ft depth is anomalous for Zn, Cu, Pb.
Values are: Cu30, Pb 320, Zn 200.

120-168ft depth is anomalous for Zn.
Values are 95, 120, 95 and 200 ppm.

(4) Hole No. 4 was put in 50 feet to the south of Hole No. 2, across strike.

Log : 0-156ft - pegmatite, quartz sericite, schist, large mica flakes at 94ft.

Geochem:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu</td>
<td>from 48 - 120 ft</td>
</tr>
<tr>
<td></td>
<td>120 - 156 ft</td>
</tr>
<tr>
<td>Pb</td>
<td>86 - 108 ft</td>
</tr>
<tr>
<td></td>
<td>132 - 156 ft</td>
</tr>
<tr>
<td></td>
<td>&lt; 86 - ft</td>
</tr>
<tr>
<td>Zn</td>
<td>0 - 156 ft</td>
</tr>
</tbody>
</table>
Geochem: (cont'd.)

Mo, Sn, Li:

Be

<table>
<thead>
<tr>
<th>Depth</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>all low</td>
</tr>
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</table>

slightly higher values in the zone of mica rich pegmatite.
Increase from 2-5 ppm to 11-16 ppm.