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EXPLORATION LICENCE 415
ANNUAL REPORT
FOR THE YEAR ENDING 30TH JUNE 1973

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1. **SUMMARY**

In January of this year a Progress Report (MG 226) had been submitted which covered the work carried out in 1972, which consisted largely of geochemical sampling in the Amphitheatre region and a photointerpretation. This interpretation outlined several "anomalous" areas within the Amphitheatre. These were investigated this year. Two short field missions failed to find any indication of basemetal mineralization. The anomalous patterns on the airphotos are due to slight changes in the flora or of the colour of the rocks. Both are insignificant.

It had been considered to drill two or three stratigraphical holes at Amphitheatre, but this plan should be dropped in the light of the recently obtained completely negative results and the lack of geological guidance. Instead geophysical means, i.e. IP should be applied.

An airborne radiometric survey revealed no anomalies.

2. **INTRODUCTION**

Progress Report MG 226 which covers exploration activity in 1972, was submitted in December 1972. The following report gives a description of the exploration work carried out in the first half of 1973.

Only a limited amount of work was done, for two major reasons. Firstly, results of previous work are rather disappointing, secondly exploration concentrated on areas to the N of E.L. 415 where very encouraging indications of basemetal concentrations have been found and it was hoped that knowledge of these showings would eventually lead to a better understanding of the geology of this E.L.
3. **EXPLORATION WORK CARRIED OUT IN 1973**

In the report from December 1972 it was suggested to diamond drill two or three stratigraphical holes in the Amphitheatre region. It was later decided, prior to such a programme, to investigate those areas in the Amphitheatre region which had given an anomalous pattern on airphotographs (Map 1 and 2, Report MG 226), as indicated by P. Haskins. For this purpose consultant geologist D. Cocquio, assisted by A. Ferry visited the area in June 1973 after having made his own photoassessment. Cocquio's report as well as two sketch maps (Figs. 1 & 2) are attached.

The writer, accompanied by D. Cocquio, visited the area by helicopter shortly afterwards. At this occasion all those "anomalous" areas which due to difficult access had not been investigated by Cocquio, were inspected. None of them had any indication of any Pb-Zn mineralization. Presumably slight changes of the flora and/or insignificant colour changes of outcropping rocks, caused the "anomalous" pattern. Also investigated was the N extension of the Amphitheatre fault. Sample MBK 173 was taken there (0.001% Pb, 0.0006% Zn).

4. **CONCLUSIONS AND RECOMMENDATIONS**

Geological and geochemical work in the Amphitheatre region has so far yielded only disappointing results. No indication of any basalmetal mineralization has been found and it is unlikely that any has been overlooked. In order to continue our quest for ore deposits in this area, we will have to apply geophysical means and/or drilling. The latter had been recommended previously, but in the light of recent negative results and the lack of geological guidance, it should be deferred until detailed targets have been outlined.
Geophysical means, e.g. IP, could be applied but it might be advisable to carry out firstly an Input survey. Such a survey could be flown over the entire length of the Bonaparte Gulf Basin margin between Legune Station and Amphitheatre, to lower the costs per line mile (approx. $35/line mile). Input certainly has its limitations: it requires generally resistive country rock and an overburden with 1052 m or more resistivity and a target with a conductivity at least 5 times higher than the country rock. The target has to be a conductor. The type of target would also have to be not deeper than 150 m. Line spacing would have to be 500 m. Thus, we will have the assurance that we have not missed a major high grade orebody down to at least 150 m. Some IP work, dipole-dipole and or/gradiant array should follow, even if Input gives negative results only.

5. **REFERENCE**


6. **EXPENDITURE**

Expenditure recorded in our books for the period June 1972 to June 1973 is as per attached sheet.

R. RAMDOHR
EXPENDITURE

Accommodation  $ 83.38
Freight  $ 14.30
Motor Vehicle expenses  $ 430.89
Air Travel  $ 431.31
Technical Information  $ 104.79
Rental of equipment etc.  $ 250.32
Miscellaneous land base expenses  $ 195.56
Fuel & Lubricants  $(19.09)
Other consumables  $ 48.04
Consulting SNPA-CRP  $1,849.00
Other Analyses  $ 190.10
Other consultants  $ 404.79
Mineral Geology - Lab. & assoc. expenses  $2,215.18
Mineral Geology - General expenses  $ 227.00
Administration  $1,877.81
Printing & drafting  $ 278.12
Permit fees - rentals  $ 108.00

$8,689.50
APPENDIX

REPORT ON RECONNAISSANCE WORK IN THE AMPHITHEATRE
AREA (N.T.) E.L. 415

By: D. S. Cocquio

1. INTRODUCTION

On behalf of Aquitaine Australia Minerals Pty. Ltd., a geological reconnaissance was carried out between the 13th June and 16th June 1973, in the "Amphitheatre" area (Northern Territory) which is covered by E.L. 415.

The party, composed by the writer and the geologist A. Ferry, reached the area of operations via Policeman Waterhole on June 14th.

The main target was the investigation of the Burt Range Formation, which crops out at the northern and southern ends of the Amphitheatre, and which is known to be mineralized in other areas of the Bonaparte Gulf Basin. Ground checking of the anomalous zones indicated on the photogeological map prepared by P. Haskins in 1972 was also required (Report MG. 226).

The party was equipped with an excellent set of aerial photographs at the scale 1:16,000. Unfortunately, owing to mechanical troubles and to bad weather conditions, the mission had to be cut short. Whilst the northern part of the area has been thoroughly prospected, the reconnaissance in the northern part cannot be considered complete; in particular, there was no time to check the southernmost photo-anomalies (which are of rather difficult access).
2. WORK CARRIED OUT

2.1 Northern Outcrops

In the northern part of the Amphitheatre, the Burt Range Formation crops out in a N-trending anticline, eroded at the core and limited on both sides by two major faults (Cockatoo Fault on the E and Amphitheatre Fault on the W).

Immediately south, the Burt Range Formation forms a group of low hills which extends in the flat, sandy bottom of the Amphitheatre. Here the Formation dips gently to the NE and is separated from the anticline by a secondary fault.

The rock sequence is regular and monotonous, and consists of medium-bedded grey sandy limestone, inter-bedded with soft fawn sandstone and calcareous sandstone; very little dolomitic limestone is present. As the base of the formation is not exposed, the unconformable contact with the Cockatoo Formation could not be investigated.

No mineralization was observed, and even local ferruginations and manganese concentrations are largely absent.

The observations carried out in the northern part of the Amphitheatre can be summarized as follows (see attached map).

Location 1 (Photo-anomaly) The Cockatoo Fault puts in contact the Cockatoo Formation (Ragged Range and Kelleys Knob Members) and (?) Enga Sandstone (which crops out only in a small creek bed). In the fault zone, approx. 50m wide, the sandstone has been silicified and locally brecciated; the bedding is completely disrupted.
Eroded remnants of this shearing zone have a distinctive photo-pattern, and are the cause of the anomaly.

**Location 2 (Photo-anomaly)** The anomaly is an isolated hillock of buff-orange sandstone, very ferruginous and with abundant manganese stains (Sample DC 1, also sample MBK 172 taken from very ferruginous-manganiferous parts: 0.0018% Pb, 0.0330% Zn).

To the N of the hill, the same geological setting as in Location 1 can be observed. The hill is considered Euga sandstone (?), and is tentatively correlated to the small outcrop in the creek at Location 1, as well as to the sandstone occurrence at Location 4.

Although no Pb-Zn mineralization was observed, the sandstone contains abnormal limonitic and manganiferous concentrations. If a drill rig should be moved into the Amphitheatre one or more of the drill holes proposed by RAMDOHR in his report of January 1973 should be drilled in this area.

**Location 3** The Burt Range Formation consists of a fossiliferous sandy limestone and softer calcareous sandstone (channel-fillings ?). The area was thoroughly prospected, but no mineralization was observed (Samples DH2 and DC3).

**Location 4 (Photo-anomaly)** The anomalous slope is formed by partly silicified Euga Sandstone and by a fault zone, in conditions similar to the areas at Locations 1 and 2.

The sandstone is ferruginous (although not as much as in Location 2) and overlies well bedded Burt Range Limestone (Sample DC4).
Location 5 & 6  Burt Range Formation, very similar to the one in Location 3 (sandy limestone, limestone, softer calcareous sandstone) crops out in these localities. No mineralization was found. No further outcrops of Burt Range Formation were observed in a traverse along the creek south of these hills.

Location 7 (Anticline) Several traverses in the anticline area failed to find any mineralization. The Burt Range Formation mostly consists of monotonous, more or less sandy, often soft limestone. It is overlain on the east by orange-red Euga sandstone (Sample DC5).

Location 8 Western side of the Anticline - No more Burt Range Formation outcrops between the western wing of the Anticline and the main Amphitheatre creek. West of the fault, the sequence consists of Zimmermann Sandstone overlain by Border Creek Formation (conglomerate and sandstone).

The Zimmermann Sandstone (soft, friable, yellow to fawn quartz sandstone) is to be found also on the eastern side of the Amphitheatre fault; here the Septimus Limestone is missing and the Zimmermann Sandstone overlies directly a thin sequence of Euga Sandstone, followed by Burt Range Formation.

The Amphitheatre fault is well exposed on the hillside, between Border Creek Formation and Zimmermann Sandstone. At the foot of the slope, the fault contact between Border Creek Formation - Zimmermann Sandstone and Euga Sandstone-Burt Range Formation is concealed by scree.

Samples DC6 and DC7 were collected in Burt Range Formation.
Locations 9 & 10  Two isolated hills SW of the Anticline. These hills are formed by "sugary" sandstone, soft at the base and more compact and siliceous in the upper part.

The age of the formation was not determined, but could possibly be (at least in part) Zimmermann Sandstone.

2.2 Southern Outcrops

Location 11  The elongated sandstone ridge in this locality can be correlated to Locations 9 and 10. The friable sandstone is overlain by hard, silicified, ferruginous quartz sandstone.

Locations 12 & 13  Burt Range Formation: limestone, sandy limestone, some calcareous sandstone. The sequence is again similar to the one at the Anticline. No mineralization was observed. The northern part of the N-S fault indicated on P. HASKINS' map was not recognised (Sample DC8).

Location 14  This locality was inspected because of its abnormal photo-pattern. It resulted to be a channel filled by landslide debris from the above lying Enga Sandstone. The fossiliferous limestone and calcareous sandstone are again completely barren (Sample DC9).

Location 15 (Photo-anomaly)  Rocks outcropping in this area are the same sheared and silicified sandstones as in Location 1 (Kelleys Knob Member or Enga Sandstone?).

West of the fault, the last outcrop of Burt Range Formation was prospected. No mineralization was found in slightly ferruginous sandy limestone.
Location 16  Burt Range Formation limestone was tested with negative results (Sample DC10). Near the fault, a red friable sandstone (Euga Sandstone in part, and possibly a sandy facies of the Burt Range Formation) was prospected (Sample DCl1).  

3. CONCLUSIONS AND RECOMMENDATIONS

No Pb-Zn mineralized occurrences were found during the reconnaissance, although most of the potentially favourable areas (fault zones, vegetations-bare patches, etc.) were thoroughly prospected.

Structurally, the area is attractive; the Burt Range Formation crops out extensively and certainly underlies at shallow depth the sand-covered flat; its facies however is different from the one at Spirit Hill (where mineralization occurs) being more calcareous and monotonous, and lacking the well developed dolomitic levels which occur further north.

The hypothesis of RAMDOHR (Jan. 1973 Report), that the lack of mineralization could be explained by the location of the Amphitheatre at the southernmost end of the Bonaparte Gulf Basin, is substantiated by the writer. In addition, it is noted that the Amphitheatre Fault has considerably uplifted the Burt Range Formation in the eastern block. In this way the fault could have acted as a barrier to the metal-bearing brines, stopping them from penetrating the Amphitheatre area (see sketch).

For this reason, some drilling could be warranted in the NW part of the Amphitheatre and on the waterway between Ena Ridge and the central Burt Range, west of the fault, to test the Burt Range Formation at depth.
One or two holes are also recommended near Location 2.

D. S. COCQUIL

Kununurra June, 1973
Possible migration of metal-bearing brines, stopped by the fault.