CENTRAL PACIFIC MINERALS N.L.

DElAY - AUTHORITY TO PROSPECT No. 1726

NORTHERN TERRITORY

FINAL REPORT

21st January, 1969

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Distribution: Central Pacific Minerals N.L. (2)
Magellan Petroleum (N.T.) Pty.Ltd.
Northern Territory Mines Branch
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SUMMARY AND CONCLUSIONS

Authority to Prospect 1726 of 1,008 square miles is located 100 miles north-east of Alice Springs in the southern part of the Northern Territory.

Geological mapping has shown the area to consist of the Archaean Arunta Complex, Proterozoic Mount Swan Granite, Tertiary laterite and Arltunga Beds, and Quaternary alluvium. The Arunta Complex, a sequence of high grade regional metamorphics, crops out over less than one-third of the area. Most structural features of the basement are effectively masked by superficial Cainozoic and Quaternary formations.

Known mineralization within the 1,008 square miles consists of one small wolfram occurrence near the northern boundary of the Authority. It is so small as to be of mineralogical interest only. No further mineralization was found during this survey. Several traverses were carried out with scintillometers but no anomalous radioactivity was located.

Any conclusions on the metalliferous potential of the authority area must be based on these facts:

1. Geological mapping has shown non-prospective laterite, limestone and alluvium to cover more than two-thirds of the area.

2. Most of the remaining third consists of poorly exposed Arunta Complex. These rocks are poorly prospective and prospecting must be orientated towards finding large structurally controlled deposits. The location of favourable structures requires better exposure than is available here.

3. There is only one known mineral occurrence. It is not unlikely that other similar deposits may occur along the contact of the Mount Swan Granite but such deposits are typically small.

4. The most effective means of prospecting large areas both cheaply and quickly is by geochemical surveys. The terrain in the authority area is generally unsuitable for geochemical exploration. The drainage system is poorly developed, relief is small, and creeks are broad with indefinite courses.

Metalliferous prospects of this area are poorer than average for Central Australia and it is most unlikely that further exploration would result in the discovery of economic mineralization. Such effort could better be expended elsewhere than in Authority to Prospect 1726.
RECOMMENDATIONS

1. No further work is warranted in Authority to Prospect 1726.

2. The area should be surrendered on or before the expiry date, 6th April, 1969.
INTRODUCTION

Central Pacific Minerals N.L. carried out geological and scintillometer traverses within A to P 1726 during October and November, 1968. Details of expenditure are given in Appendix I. This is a final report on investigations.

SITUATION AND ACCESS

Authority to Prospect 1726 of 1,008 square miles is located about 100 miles north-east of Alice Springs in the southern part of the Northern Territory (Alcoota 1:250,000 sheet area, SF 53-10). The area is isolated being 120 to 160 miles by road from the nearest railhead at Alice Springs. Alcoota Homestead in the south-west of the area is the only established habitation: Delny Homestead in the north-east is abandoned. Good gravel roads connect the area to the sealed Stuart Highway about 50 miles north of Alice Springs. A network of station tracks provides reasonably good access within the area.

TOPOGRAPHY AND CLIMATE

Most of the area is underlain by flat lying Tertiary sediments or laterite and consequently there is little relief. In the central part of the Authority, where the laterite is much dissected, relief reaches a maximum of 50 feet. Mendip Hill in the south-west and Arno Peak in the north-west which consist of resistant metamorphics rise to 400 feet.

The climate is semi-arid and the region receives about 10 inches of rain a year. Diurnal and seasonal fluctuations of temperature are marked. Temperatures frequently exceed 100°F in summer and frosts are common in winter. Evaporation and transpiration are high and there are no permanent surface water bodies in the area.

HISTORY AND PREVIOUS INVESTIGATIONS

In 1968 Central Pacific Minerals N.L. acquired a 50% interest in A to P 1726 from Magellan Petroleum (N.T.) Pty. Limited.

No detailed geological maps of the area are available. Quinlan (1962) produced a 1:1,000,000 scale photo interpretation map of the Alice Springs area which includes the authority. However, it is too generalised to be of much assistance in prospecting operations in A to P 1726. A.G.G.S.N.A. (1941) described the Delny wolfram prospect but did not recommend any further investigation of the area. The area immediately north and north-east of the Authority has been regionally mapped by the Bureau of Mineral Resources (Smith 1964) and as some of the units mapped there extend into the authority area this mapping has been useful in interpreting the geology of the Authority.
GEOLOGY

Arunta Complex

The Pre-Cambrian rocks forming the basement are assigned to the Arunta Complex. They crop out strongly in the south-western and north-western corners of the Authority but elsewhere are poorly exposed being seen only through "windows" in the widespread Tertiary cover.

The basement is a complex of gneiss, schist, amphibolite and metaquartzite. In some areas, e.g. the Mendip Hill area, the metamorphics are obviously metasediments but generally the determination of parent rock is impossible. Migmatites are present in some places. The grade of metamorphism is probably high almandine-amphibolite facies.

In the Alcoota Homestead-Mendip Hill area the Arunta Complex comprises coarse-grained gneiss, amphibolite and quartzite. Small pegmatites and quartz veins are common.

In the Arno Peak area in the north-west corner of the Authority, gneiss, schist and amphibolite again form the basement. The gneisses are generally coarse-grained rocks of granodioritic composition. Numerous small muscovite pegmatites intrude the metamorphics south of Arno Peak but are rare elsewhere.

The basement in the central and eastern parts of the Authority is poorly exposed. Most outcrops are of gneiss. Several pegmatite and granite dykes were observed west of Delny Homestead.

The high grade regional metamorphics are of Archaean age.

Mount Swan Granite

The Mount Swan Granite (Smith 1964) crops out north-east of Delny Homestead. It forms plains broken by low hills and scattered tors. The granite extends eastward into the Buckitta Sheet area where it was first described by Smith (1964).

The irregular intrusion consists of coarse-grained, commonly porphyritic, alkali granite. Felspar phenocrysts longer than 1 inch are common. Biotite is the chief ferromagnesian mineral. Small highly reconstituted mafic-rich xenoliths are scattered throughout the granite. A belt of banded amphibolite two miles long by a quarter mile wide cuts through the granite. It may represent a younger intrusive mass or possibly a slice of highly reconstituted country rock. The intensity of foliation in the granite is variable. The granite is most likely a synkinematic intrusion. The age of the granite has been determined by Henley et al. (1961) at 1,460 million years.

Cainozoic and Quaternary Formations

(1) Laterite

At least one-third of the Authority is covered by
laterite. During the Tertiary the area was peneplained and lateritic profiles up to 40 feet deep were developed on the Arunta Complex. The laterite was subsequently much dissected and now forms several large low tablelands and numerous low mesas vegetated by mulga trees and scrub.

The laterite profile is generally about 20 feet thick and consists of a well defined ferruginous cap and a thicker bleached section. The mottled zone is poorly developed. The parent rocks are generally the metamorphics of the Arunta Complex but the occurrence of silicified sandstone ("billy") in some profiles suggest possible derivation from Tertiary sediments in some areas.

The age of the laterite is not precisely known but an early Tertiary age is considered most likely.

(2) Arltunga Beds

Much of the central and southern part of the Authority is covered by flat-lying Tertiary limestones which are correlated with the Arltunga Beds described by Smith (1964) in the adjacent Huckitta 1:250,000 sheet area.

The Arltunga Beds overlie the laterite developed on the Arunta Complex. They form low tablelands with sharply defined scarps up to eight feet high and their distribution can therefore be readily photo interpreted.

The surface of the Arltunga Beds consists of vuggy chaledony containing irregular relict masses of silicified limestone. A crude horizontal bedding is generally present. The chaledony grades downwards to a grey or white limestone which is soft and friable. The chaledonic cap is generally about five feet thick. Maximum observed thickness of the Beds is 10 feet but as the deposition surface was irregular, thicker limestone deposits are undoubtedly present locally. Smith (1964) records thicknesses up to 90 feet in the Huckitta sheet area.

No fossils have been found and the precise age of the sediments is unknown. They are tentatively considered to be of late Tertiary age. The limestones appear to have been lacustrine deposits.

(3) Quaternary Alluvium

Alluvial deposits cover about one-third of the 1,008 sq square miles of A to P 1726. The sand and gravel deposits form broad plains drained by Waite and Muller Creeks.

Structure

The widespread Cainozoic and Quaternary cover effectively conceals most structural features of the Arunta Complex. The regional trend of the metamorphics is, however, easterly. South-east trending shear zones marked by belts of siliceous recrystallised mylonites up to 300 feet wide and barren quartz veins are prominent in the Arno Peak area. These can be readily distinguished on aerial photographs as sharp
linear ridges up to 50 feet high. They have been examined in the central northern and north-western parts of the Authority.

MINERALIZATION AND GEOCHEMISTRY

Geochemical results are shown in Appendix II. The metalliferous potential of the Authority area is best considered by dividing the area into five parts.

Area 1: Alcoota Homestead - Mandip Hill

Ivor Paine, the owner of Alcoota Station, advised that mineralization was known in this area. Geological reconnaissance has shown that this area consists of metamorphics of the Arunta Complex. There is no reason to believe that this area is any more prospective than any other part of the Arunta Complex which is not considered to be a highly prospective unit. There are no geological structures in this area that warrant investigation.

Area 2: Arno Peak

The owner of Waite River Station which covers this area knows of no mineralization. However, the 1:1,000,000 aeronautical map of the area shows a mine 1½ to 2 miles south of Arno Peak. An unsuccessful search was made for this mine. If the workings were large the station owner would most surely have known of them. It is probable that the mine is a small mica prospect. Several muscovite pegmatites intrude the Arunta Complex in this area and it is most likely that any mineralization would be associated with these. Mineralization associated with small pegmatites would not be sufficiently large to be of interest to the company. No evidence of mineralization was seen in several shear zones inspected in the Arunta Complex. Much of the area is unsuitable for geochemical stream sediment sampling surveys and there is no other convenient and effective way of prospecting the area.

Area 3: Waite Creek

The central and central-western parts of the Authority consist of alluvial deposits forming a plain bordering Waite Creek. The superficial sediments are non-prospective - although modern exploration techniques can be applied to alluviated areas there must be strong encouragement to justify using such expensive methods. No encouragement exists in this area.

Area 4: Eastern part A to P 1726

This area consists chiefly of laterite and Arltunga Beds neither of which are favourable hosts for mineralization. Two samples of the Arltunga Beds were analysed for P₂O₅ but each contained less than 750 ppm. It is highly unlikely that the Beds would contain phosphates. There is no prospect of a large mineral deposit being found in either the laterite or limestone formations. The underlying formations cannot be prospected with the means at present available.
Area 5: North-east A to P 1726

Wolfram mineralization, as thin 1 to 2 inch thick quartz veins in garnetiferous gneiss along the contact of the Mount Swan Granite, occurs 4½ miles north-east of Delny Homestead. Several pits 2 to 3 feet deep are scattered over an east-west line 100 yards long. A 15 foot deep shaft occurs further west and there are shallow costeans several hundred yards east of the main group of pits. The workings extend for 1,000 yards along the contact. Several costeans up to a foot deep have been used to prospect the area for eluvial wolfram. The soil for a hundred yards on either side of the mineralized contact was inspected but no wolfram was found. It is concluded that the mineralization is very small and erratic. Prospects of alluvial deposits being derived from these lodes are negligible. The prospect which produced only a few bags of eluvial wolfram is too small to be of interest. It is probable that any hidden deposits in this area would be small wolfram deposits along the contact of the Mount Swan Granite. Deposits of this type offer no incentive for further prospecting as they are far too small to justify mining under the high cost conditions of Central Australia.

REFERENCES

A.G.G.S.W.A. 1941: Report for period ended 31st December, 1940.


APPENDIX II

GEOCHEMICAL RESULTS

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* Colorimetric analysis Geochemical and Mineralogical Laboratories.

+ Atomic Absorption Spectrophotometry. Geochemical and Mineralogical Laboratories; others by Emission Spectrography A.M.D.L.