KEY RESOURCES PTY. LIMITED

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FINAL REPORT

E.L. 2827 SCRUTTON-TAWALLAM, N.T.

DECEMBER 1983

Eon F. Ward & Associates Pty.Ltd.
29 Binnari Road,
Hornsby Heights, N.S.W. 2077

PLAN IN L (1:50k)

CR 84/12A

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LIST OF PLANS

E.L. 2827 N.T. " SCRUTTON TAWALLAH"	1:25,000
GEOLOGICAL PLAN	

1. SUMMARY AND EXPENDITURE

E.L. 2827 was mapped and examined for copper mineralisation in the Amelia Dolomite, lead-zinc-barite mineralisation in the Toonganinie Formation and uranium mineralisation in the Scrutton Volcanics and Yiyinti Sandstone.

No evidence of additional mineralisation was found. The known mineral occurrences were clearly non economic.

Exploration was subsequently terminated.

It is recommended that EL 2827 be relinquished.

Final expenditure incurred on E.L. 2827 by Key Resources was :

Wages and Salaries	$5,400
Messing and Accommodation	800
Fares and Mobilization	1,120
Transport	750
Consultants	6,400
Sample Analysis	-
Other Items	280
Administration/overheads	1,200
Total:	$15,950

2. INTRODUCTION

E.L. 2827 covers an area of 166 sq. km and was granted to Key Resources on 15.6.82.

The area was applied for to examine the known copper mineralisation previously examined by CEC in 1971 and to search for higher grade deposits ; to test for extensions southwards of the Apollo lead-barite mineralisation; to re-examine the uranium potential of the Scrutton Volcanics and basal Tawallah Group sediments.

Work completed consisted of geological mapping and examination of known mineralisation and foot scintillometer traversing of the favourable rock types and contacts.

3. LOCATION AND ACCESS

The Scrutton-Tawallah E.L. is located in the Tawallah Ranges in the northeast portion of the Northern Territory. The Licence covers an area of 166 sq. km. on the north central margin of the Bauhinia Downs 1:250,000 sheet area. It is located 30 km N.W. of the McArthur River Zn Pb Ag deposit and 60 km west of Borroloola Settlement

Access is obtained from the sealed Borroloola beef road via Ryans Bend and the formed and maintained gravel road to Nathan River and Lorella Homestead. An unmaintained track traverses the area from west to east turning off the Nathan River Station road 7 kilometres north of the Tawallah Creek crossing.

4. HISTORY

The area was first mapped by geologists of the BMR during 1960-1961.

During 1961-1962, Mt. Isa Mines conducted a reconnaissance survey over the region (Marlowe 1963).

A stream sediment reconnaissance geochemical survey of the Amelia Dolomite was conducted by CEC during 1968 (Lord 1969). A later geochemical survey was conducted over the area west of the Tawallah Fault during 1969-1970 (Harris, Bedford, Koerner 1971). Detailed follow up continued during 1971 (Rawlins et al 1972) including soil sampling and I.P. During 1972 one diamond drillhole was cored in the Licence Area, Tawallah Pocket No. 1 D.D.

High density stream sediment sampling was conducted over selected areas by CEC during 1977-78 at a density of up to 5 per sq. km (Nenke 1977). This programme resulted in the location of Mariner and Apollo lead prospects in the Toonganinie Formation immediately west and north of EL 2827 respectively.

Uranium surveys were conducted over the region by Lamadec, 1968, Agip Nuclear 1972-74 and AFMECO 1980.

5. REGIONAL GEOLOGY

The rocks cropping out in EL 2827 consists of a horst block of Lower Proterozoic sediments and a gabbro sill (?) on the west flanked by a graben on the east in which Tawallah Group and McArthur Group sediments of Carpentarian age outcrop. These rocks form part of a larger north striking regional horst block within the Batten Trough which forms the Tawallah and Yiyinti Ranges.

The horst block on the west strikes NNW and is bounded on the west by the Lorella Fault and on the east by the Scrutton Fault.

The graben on the east forms Tawallah Pocket which is bounded on the west by the Apollo Fault and on the east by the Pocket Fault.

A narrow triangular wedge located between the horst and graben and bounded by the Scrutton Fault on the west and the Pocket Fault on the east has a pronounced scissor movement with the south end down. McArthur Group sediments on the east are downfaulted against basal Tawallah Group on the west. The northern end shows relatively little displacement where the whole area is occupied with Tawallah Group outcrop.

6. STRATIGRAPHY

6.1 Lower Proterozoic

The rocks outcropping in the western horst block have been mapped as Scrutton Volcanics by the BMR and were tentatively correlated with the Cliffdale Volcanics of the Murphy Tectonic Ridge on the south east margin of the McArthur Basin. The outcropping sediments consist of thin bedded siltstones, fine grained sandstones and shales with red bed affinities intruded by a basic sill (?).

The upper margin of the sill consists of phenocrysts of quartz and potash feldspar in a fine to medium grained groundmass which passes into a dark green black hypersthene gabbro downwards. The overlying sediments are hornfelsed for several metres.

Even though the area is much faulted, the only Lower Proterozoic rocks observed in the horst consist of the upper 50 metres or less of the sill and about 100 metres of the overlying sediments.

The Lower Proterozoic rocks pass under Yiyinti Sandstone towards the north and south ends of the horst block.

6.2 Tawallah Group

Only the basal and topmost sediments of the Carpentarian age Tawallah Group crop out within the E.L. These are the Yiyinti Sandstone the Masterton Sandstone and the Mullholland Sandstone.

6.2 Tawallah Group (cont'd)

The Yiyinti Sandstone crops out in the south west corner of the E.L. where it unconformably overlies sheared gabbro and metasediments of the Scrutton Volcanics. The basal section exposed consists of a cobble and boulder bed of variable thickness up to at least 50 metres thick above a sequence of arenites of medium to coarse grain, often impure, with cobble lenses.

The sediments are all strongly leached bleached and partially silicified.

The Seigal Volcanics do not crop out within the E.L. but do underlie sections of it. The volcanics consist principally of vesicular basalt flows with rare pillow lavas. The basalts are locally potash metasomatised to pink fine grained rock consisting principally of potash feldspar. The Volcanics are thin in the Tawallah Ranges probably less than 300 m. compared to about 1000 to 1500 m in the Westmoreland area.

The Sly Creek Sandstone and the Wollogorang Formation do not crop out in the area. The former consists mainly of thin bedded medium grained arenites while the latter consists of an upper and lower red bed sequence of silts and minor carbonate, arenite and evaporites separated by a medium grey bituminous dolomitic silt horizon with prominent dolomite concretions.

The Masterton Formation consists of two quartz arenite members in this area, a lower pink to red thick bedded

6.2 Tawallah Group (cont'd)

medium to coarse grained arenite, the Masterton Sandstone and an overlying fine to medium white cherty thin bedded arenite and minor siltstone unit, the Mullholland Sandstone.

The Masterton Sandstone contains large gypsum pseudomorphs locally while the Mullholland Sandstone contains pseudomorphed anhydrite modules locally and a silt-sand horizon with common boudinage and ball and pillow structures.

6.3 The McArthur Group

The lower half of the Umbolooga Subgroup only crops out in the E.L. and includes : the Mallapunyah Formation; the Amelia Dolomite, the Tatoola Sandstone and the Toonganinie Formation.

The Mallapunyah Formation consists mainly of red bed silts and shales and lesser carbonates, evaporites and sands. The prominent cauliflower chert horizon (quartz and chert pseudomorphing anhydrite modules) crops out in the central wedge and the north east corner of the E.L. In both areas, hematite and barite are present and locally abundant in the cauliflower cherts.

The Amelia Dolomite consists of a rhythmic silt-algal carbonate sequence about 200 metres thick. The algal sections contain abundant siderite pseudomorphs after bladed gypsum and/or anhydrite crystals. The carbonates are bituminous . Thin black shale interbeds are common.

6.3 The McArthur Group (cont'd)

The Tatoola Sandstone consists of a lower flaggy silt - fine sand sequence overlain by an upper dolomite - silt- sand sequence topped by a thin but persisent medium to coarse grained sandstone bed.

The Toonganinie Formation in the Tawallah Ranges is lithologically similar to the Amelia Dolomite consisting of rhythmic silt-carbonate. The top of the Formation is not exposed in the area.

6.4 Roper Group

No sediments were observed during the recent survey which can be assigned to the Roper Group.

6.5 Cambrian

A long period of erosion silicification and regolith development took place before deposition of a sequence of chert breccia and arenites which are tentatively assigned to the Bukalara Sandstone. These sediments were folded and eroded before deposition of the Mullaman Beds equivalents of Cretaceous age. The sequence commences with a sandy chert breccia the chert clasts being derived from weathering of the underlying carbonates of the McArthur Group. This breccia grades upwards into a coarse grained sandstone with local worm burrows (?Skolithes) and rare (?) shell fossils. This sandstone is overlain by a thin bedded fine to medium grained sandstone with local sub ellipsoidal markings reminiscent of Lingulella. Shelly fossils have not been

6.5 Cambrian (cont'd)

reported from the Cambrian in this region and may be younger than the basal Cambrian age of the Bukalara Sandstone but are appreciably older than a Cretaceous age. A maximum of 100 metres of section is exposed.

6.6 Cretaceous

Sediments of Cretaceous age rest unconformably on all older formations. The sequence is lithologically variable but usually commences with terrestrial sediments which may include a fossil soil, root holes and fossil wood. These sediments are overlain in turn by silty sands and sandy silts with locally abundant marine fossils Carbonate may have been a prominent constituent of some horizons originally but is now completely leached out.

Locally, the Cretaceous sands are lithologically identical to the Bukalara Sandstone and contain tubular holes similar to the Skolithos (?) burrows of the Cambrian sandstones. The two formations can only be differentiated if branching rootholes, leaves or fossil wood are present.

6.7 Cainozoic

Remnants of a laterite cap and a younger ferricrete are present locally and are the remants of a once extensive deep regolith. This regolith has been completely removed in local areas only and hampers geological and geochemical surveys considerably.

7. MINERALISATION

7.1 Copper

Significant copper mineralisation appears to be confined to the Amelia Dolomite of the McArthur Group. The copper mineralisation appears as chalcopyrite with minor chertification in the evaporite rich bitiminous algal dolomite and dololutite portions of the carbonate silt cycles. The mineralisation is the same style and in the same host formation as the Gordons Copper prospect located 15 km to the northwest.

The outcropping mineralisation within E.L.2827 is weaker and mostly concealed due to leaching and silicification at surface related probably to the post Cretaceous weathering period.

This mineralisation was gridded by CEC in 1971, soil sampled and a gradient arrayI.P. survey conducted over a grid 1800 metres long by 1800 metres wide over the west margin of Tawallah Pocket.

Low order anomalies were obtained and one hole was subsequently drilled, Tawallah Pocket No. 1DD, presumably on this grid.

This hole passed from Amelia Dolomite into Mullapunyah Formation at ? m and was terminated at 112 m.
The highest assays obtained by CEC were of the order of 0.2% Cu.

Geological mapping did not disclose any areas prospective for higher grade mineralisation.

7 7.1 Copper (cont'd.)

Trace chalcopyrite mineralisation occurs in some cauliflower cherts in the Mullapunyah Formation in the extreme N.E. corner of the area. It is of no economic significance.

7.2 Lead-Zinc-Barite

The mineralised dolomites of the Apollo Lead-Barite propsect immediately north of E.L. 2827 strike south into E.L. 2827. An E-W fault zone immediately inside the north boundary of the E.L. faults the mineralised and chertified Toonganinie Formation on the north against the silicified Amelia Dolomite on the south which does not appear to be mineralised. This silicification appears due to a pre Bukalara age regolith.

The Toonganinie Formation crops out south of this E.W. fault further west against the Apollo Fault and extends as a wide zone to the south boundary of the area. The carbonates throughout this whole area are fresh, lack chert and are barren of mineralisation. The Apollo mineralisation does not extend south of this E-W fault.

Thin grey tuff (?) float is present locally. The Great Scott horizon which carries minor lead-zinc-barite mineralisation elsewhere is also barren in this area.

7.3 Uranium

The Scrutton Volcanics and the overlying Yiyinti Sandstone and Seigal volcanics are stratigraphic equivalents of the hosts to the uranium mineralisation in the Westmoreland - Redtree - Pandanus Creek region.

7.3 Uranium (cont'd.)

Traversing of the Scrutton Volcanics and unconformably overlying Yiyinti Sandstone in the Western and Southwestern corner of the E.L. disclosed a generally high background radiation level in the sediments and the gabbro sill, however no evidence of significant mobilisation of uranium could be found.

The overlying Yiyinti Sandstone was generally strongly weathered and leached. It is doubtful that significant uranium mineralisation if present originally, would be detectable at surface.

This area contrasts with the Calvert South area in E.L. 2829 where abundant evidence of uranium mineralisation is present in the form of chlorite alteration and depletion of uranium in some lithologies coupled with hot spots and patches of visible uranium minerals in other localities.

It was therefore concluded that the south western corner of E.L. 2827 was not prospective for economic uranium mineralisation and the search was discontinued.

8. RECOMMENDATIONS

It is recommended that E.L. 2827 be relinquished since all known mineralisation is clearly non economic and no evidence for extensions or higher grade mineralisation could be found.

9. REFERENCES

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