GEOPEKO LIMITED

GEOLOGICAL REPORT ON AUTHORITIES TO PROSPECT NOS. 1638 AND 1639 (ROPER BAR).

by

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DARWIN. N.T.

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INTRODUCTION

Following the relinquishment of Authority to Prospect No. 1436 (Roper Bar) two small areas were applied for as Authorities to Prospect on which it was proposed to undertake more detailed investigation. These were duly investigated in more detail and eventually relinquished in turn. The Kookaburra Creek Formation which outcrops in these two areas was the main objective of the work and detailed traverses and sections undertaken on this formation are described in the report submitted at the time of relinquishment of Authority to Prospect No. 1436. Reference should be made to this report for these details.

GEOLOGY

STRATIGRAPHIC CORRELATION

The general sequence of major rock units within the formation is fairly clearly understood and is as given below:

5.	Quartzite and Chert:	Upper Siliceous member
4.	(?) Volcanics	Yalwarra Volcanic member
3.	(?) Volcanics and sediments	Yalwarra Volcanic member
2.	(?) Volcanics	Yalwarra Volcanic member
1.	Quartzite and Chert:	Lower Siliceous member

The most recent work on these two Authorities to Prospect has enabled a reasonably detailed correlation of the (?) volcanic-sediment assemblage of the Yalwarra Volcanic member and this suggested correlation is shown in Fig. 1.

From this strike section mainly taken from the more southerly of the two Authorities to Prospect, the following observations can be made.

1. The conglomerate is lenticular, being thinner and losing most of its coarse component west of Section Y 2; is more of a micro-breccia or greywacke grit in Section Y 3; and is possibly absent in Section Y 4. At locality Y 5

it is again truly conglomeratic but here has a porphyroidal igneous looking matrix.

2. While there is an appreciable argillaceous component in Sections Y 1 and Y 2, this decreases to the east and the two mudstone horizons are totally absent east of Section Y 3. For bed (e) in Section Y 1, at least, the process of disappearance can be seen to be accompanied by a progressive detexturing and mixing of the arenaceous and argillaceous components. In Section Y 4 this unit may be represented in part (together with inferior beds) by the detextured sandstone of bed (c). At locality Y 5 however, the lateral equivalent to all beds to the east between the conglomerate and the quartz sandstone capping the ridge appears to be the volcanic-looking rocks of bed (c).

3. The quartz sandstone and quartzite capping the ridge occupies a constant horizon, but to the east may cut down through the majority of the sequence in Section Y 4 and at locality Y 5. If this is not so then the whole (?) volcanic sediment sequence thins to the east.

ORIGIN AND SIGNIFICANCE OF THE SEDIMENTS

There is abundant evidence to show that most if not all of the sediments of the Yalwarra Volcanic Member have experienced soft sediment deformation at some stage of their history. Post-depositional movement has occured on all scales from simple sandgrain movement as shown by cross bedding and current ripples, to total bed movement and disordering as seen in bed (c) Section Y 1 and in its lateral equivalent.

The mudstone of bed (c) Section Y 1 shows evidence of both mobilization and to a certain degree some component segregation. That such movements may have occured on a more extensive and dynamic scale is suggested by the conglomerate.

the basic characteristics of which are:

1. The coarse component is virtually homogeneous, consisting almost exclusively of brown mudstone either massive or laminated, with only rare fragments of sandstone or lava-like rocks being present.

2. The majority of the coarse component is very similar in lithology to stratigraphic units which occur above and at the same horizon as the conglomerate but have not been found below it.

3. The coarse component is well rounded and has shapes consistent with static soft sediment deformation (discoidal) or with dynamic (i.e. rolling) soft sediment deformation (spherical, triaxial and cylindrical). The latter shapes could also be produced by sedimentary transport during a normal sedimentary cycle, but there is no evidence of the fracture of fragments which would almost certainly occur during the prolonged transport necessary to produce the observed high coefficient of rounding.

4. The proportion of coarse sediments in the matrix varies from high in Section Y 1, Y 2 and Y 5, to low in Section Y 3 where the coarse component has the appearance of large plastic masses being totally enclosed in a mudstream type of deposit.

5. The matrix varies from a normal clastic type of mudstone and micro-breccia, to a porphyroidal igneous-looking deposit.

6. "Eyes" of clear quartz are common. They are not typical of silicification and are most suggestive of an origin involving crystallisation or setting from a primary silica-rich liquid or gel.

These various observations lead to the conclusion that the conglomerate is not the product of the normal sedimentary cycle of erosion-transport-deposition, but rather of the breakdown and to some extent the ordered reconstitution of a competent but wet fine-grained sediment mass. Thus disturbance of a sediment pile of wet mud with a high water content induced movement of that mass in an unstable environment. The movement may well have varied from creep to slipping and slumping but at certain points progressed to a true flow of mud. The majority of the movement ended at the slumping stage, during which the sediment pile broke into fragments which being soft were easily rounded and shaped and were finally set in a thin matrix formed of the finer grained resultants of the slump movement. Where movement proceeded through slumping to almost total breakdown the mass became a tilloidal mud flow containing a few large resistant masses within a typical mudstream deposit. The conglomerate is therefore of the slide breccia type.

Sediment mobilization and segregation is strongly suggested by other movements in the sequence. All the muddy sediments for instance have quartz "eyes" and white masses, usually rounded, of clay mineral. The detextured sandstone of bed (c) Section Y 4 is also considered to show evidence of mobility and segregation. In this case it is believed the sediment was initially a muddy sandstone "knocked" or disturbed late in diagenesis, when compaction and lithification had proceeded to the point of incipient joint formation. Partial mobilisation occured, originating preferentially at joint faces, where internal grain pressure and therefore the thresh-hold limit of shear deformation and thixotropic yield, were least. Once initiated, mobilisation would proceed outwards from the incipient joint faces and continue as long as sufficient disturbance acted upon the sediment. With the cessation of the disturbance the partly mobilised sand reset apparently having been invaded along joint faces.

GOSSANS

Four gossanous masses occur within outcrop of the Upper Siliceous member south of Section Y 1. The sandstones at this point have a high clay component, and evidently include some siltstone. These gossans are not particularly impressive, being little more than iron enriched masses associated with some brecciated quartzite. They are not considered to have any mineralisation significance.

ECONOMIC GEOLOGY

MINERALISATION OF THE KOOKABURRA CREEK FORMATION

Known mineralisation of this Formation is limited. B.M.R. geologists note the presence of small inclusions of chalcopyrite and galena although localities are not specified, and local inhabitants talk of copper occurrences about one mile north-west of Roper River Mission. B.H.P. Pty. Ltd. has drilled gossanous chert breccia (presumably in the Upper or Lower Siliceous member) near Mt. Vizard, south-west of Urapunga homestead, but "failed to find significant mineralisation" Dunn (1963).

Apart from the possible presence of suitable source rocks in the area of the two Authorities to Prospect, there is the problem of trap rocks and ore body localisation. Only two thin impervious horizons are known within the sequence, and these tend to thin out to the east. Other possible trap rocks exist in the form of the dense quartzite of the Upper Siliceous member, particularly in zones of brecciation, but also to a certain extent in the argillaceous sandstone of the Yalwarra Volcanic member and Upper Siliceous member. It may be significant from this point of view that the gossans described earlier are located on such horizons. In the absence of any other indications however, it is concluded that the two Authorities to Prospect, 1638 and 1639 (Roper Bar) do not have sufficient economic potential to make further work of any value.

Eric E. Swarbrick

Reference

Dunn, P.R., 1963: B.M.R. 1:250,000 Geological Series Explanatory Notes, Urapunga, N.T.

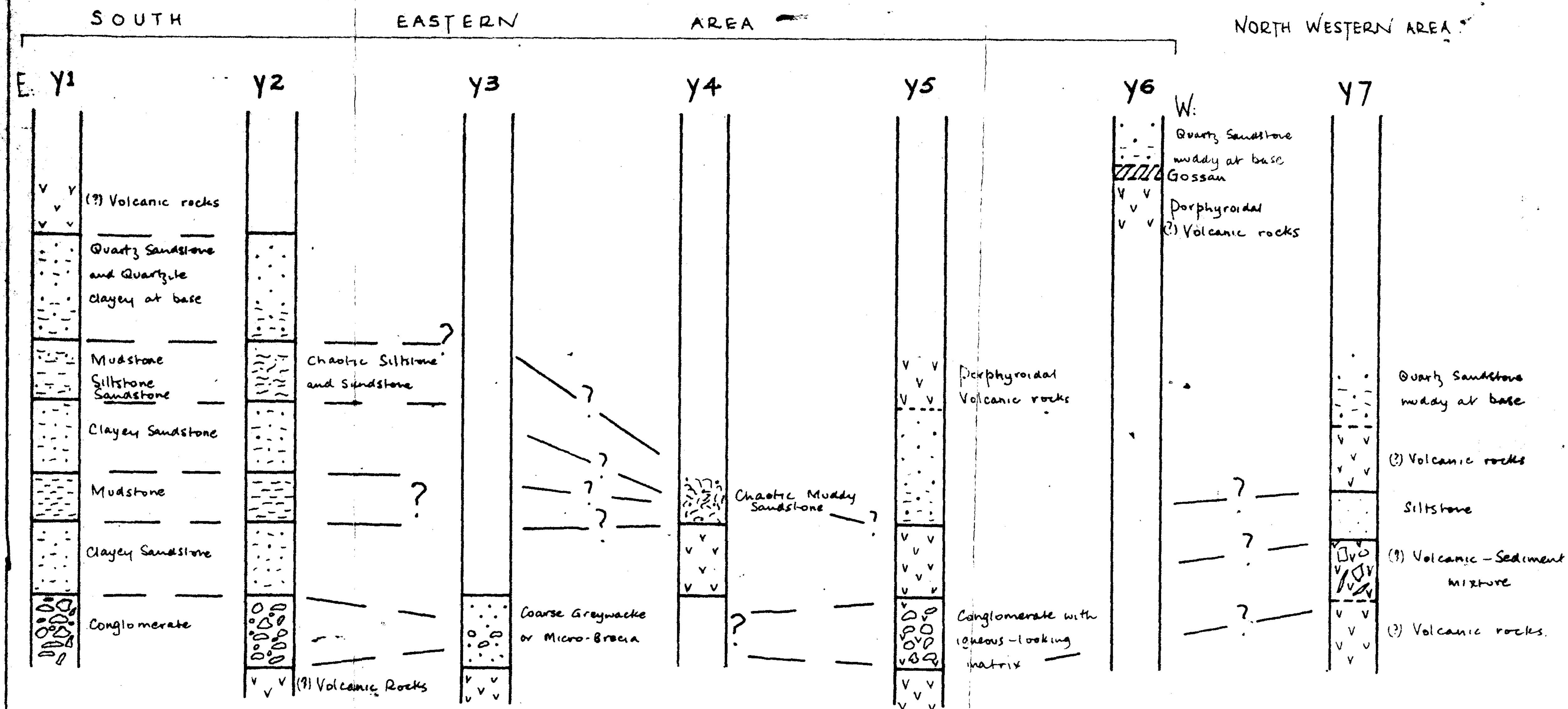

FIGURE 1

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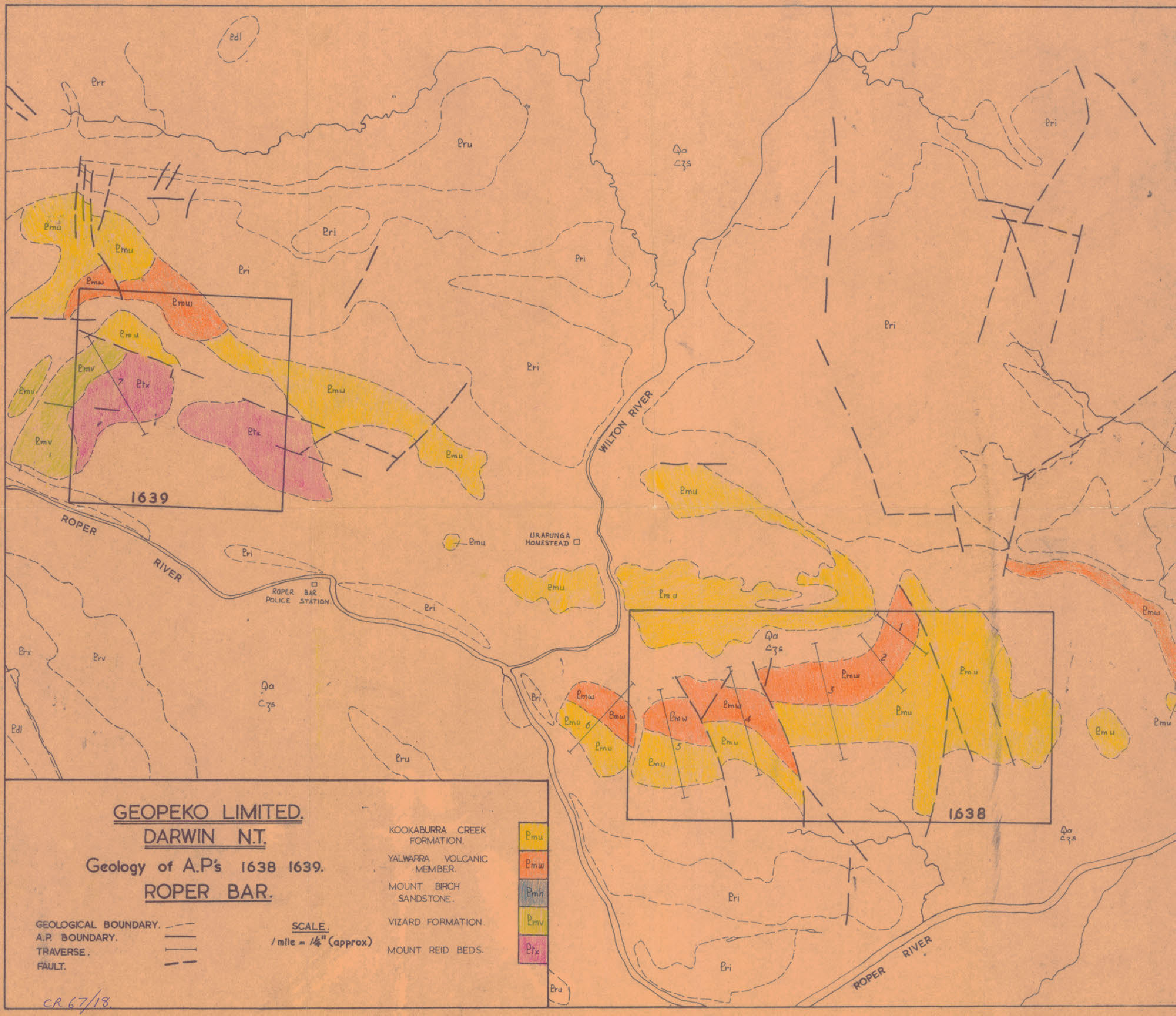
STRATIGRAPHIC CORRELATION OF THE YALWARRA VOLCANIC MEMBER

A.P. No. 1436

GEOLOGIST: E.E.S. DRAWN: E.E.S. NOT TO SCALE



GEOPEKO LIMITED.
DARWIN N.T.
Geology of A.P's 1638 1639.
ROPER BAR.
GEOLOGICAL BOUNDARY.
A.P. BOUNDARY.
TRAVERSE.
FAULT.
SCALE.
1 mile = 1/4" (approx)
KOOKABURRA CREEK FORMATION.
YALWARRA VOLCANIC MEMBER.
MOUNT BIRCH SANDSTONE.
VIZARD FORMATION.
MOUNT REID BEDS.
Pmu
Pmw
Pmh
Pmv
Prx
1639
1638
ROPER RIVER
WILTON RIVER
URAPUNGA HOMESTEAD
ROPER BAR POLICE STATION
Pri
Pru
Prr
Pdl
Prv
Qa
Czs
CR 67/18.