

NORTHERN TERRITORY GEOLOGICAL SURVEY

REPORT GS 79/27

DIAMOND DRILLHOLE REPORT
PADDY'S PLAIN DDH 1

OPEN FILE

by

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October 1979

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SUMMARY

Paddy's Plain DDH1 was drilled in the southern central portion of Paddy's Plain to help define the eastern limit of Tertiary Sedimentation in the area. On penetrating the Quaternary alluvial layer, the hole passed immediately into schists and gneisses of the Precambrian basement. It was concluded that what remains of the Tertiary sequence on Paddy's Plain is confined predominantly to the central western portion of the plain.

LOCATION

Paddy's Plain is a broad, very flat area approximately 13 km long and 5 km wide about 100 km east-north-east of Alice Springs. Paddy's Plain DDH1 is approximately 2 km south-west of Paddy's Hole Dam, a water bore and dam near the centre of the plain (see Fig.1).

REGIONAL GEOLOGY

Paddy's Plain lies in the core of the White Range Nappe of Forman and Milligan in Forman et al (1967). It is bounded to the north and south by prominent ridges of Lower Proterozoic Heavitree Quartzite, the basal unit of the Amadeus Basin.

Much of the plain is covered by a layer of undifferentiated alluvium consisting of gravel, sand and red-brown clay.

At the eastern end of the plain are scattered outcrops of Lower Proterozoic metamorphics of the Arunta Complex, the Cadney gneiss of Joklik (1955).

The central western part of the plain contains a thin succession of Tertiary fluviatile and lacustrine sediments. These sediments are enclosed to the north, south and west by outcrops of Arunta metamorphics.

An area of approximately 13 sq km, the Paddy's Jump Up Prospect, at the western end of the plain has been extensively drilled and sampled by Esso Exploration and Production Australia Inc. in a search for possible uranium mineralization and a detailed discussion of the results of their work accompanied by a 1:5200 scale map of the area appears in their *Annual Report, MacDormell Range* (1977).

The Lower Proterozoic Basement Rocks

The Lower Proterozoic in the area consists of a series of meta-arkoses, now quartz-feldspar-biotite gneiss, which have been intruded by basic dykes, now amphibolite; leucogneiss and pegmatite. There appears to have been a first phase of regional metamorphism of amphibolite facies grade followed by a general retrogression to greenschist facies. Quartz-chlorite-sericite schists and gneisses appear along and adjacent to structural zones. These are thought to have developed during a later retrograde dynamic metamorphism, possibly associated with Carboniferous tectonism.

The Tertiary Sediments

The Tertiary sequence consists of sands, clays, lignites and limestone deposited unconformably on the Lower Proterozoic metamorphics. It dips gently, at not more than 5° , to the east and the thickest section drilled by Esso was about 25 m.

A seam of lignite up to 5 m thick was encountered in a number of the Esso holes. Its known areal extent is about 0.5 sq km (see Fig. 7).

Several periods of chemical weathering in the Tertiary have extensively altered the metamorphics producing a laterite-silica-kaolin profile on parts of the unconformity surface.

The Paddy's Plain Alluvium

Most of the plain is covered by a thin layer of Quaternary alluvium consisting of unconsolidated gravels, sands and clays. Cobbles in the gravel are well-rounded and composed of material resembling Heavitree quartzite and various types of Lower Proterozoic metamorphics.

PADDY'S PLAIN DDH1

Paddy's Plain DDH1 was designed to assist in determining the eastern extent of the Tertiary sediments, their lithology and the nature of the underlying metamorphics. It is about 1 km south-east of the area studied by Esso.

At a depth of 6 m the hole passed directly through from the unconsolidated Quaternary sand and clay into the quartzo-feldspathic and chloritic gneiss of the Arunta metamorphics (see Appendix).

A radioactivity log of the hole was carried out using an S.I.E. T1500 gamma log.

CONCLUSION

The Tertiary sequence in Paddy's Plain is a thin, shallow basin deposit and is confined to the central western portion of the plain. Further drilling might extend the known area containing lignite but it is doubtful that the seam could be extensive enough to be economically viable.

REFERENCES

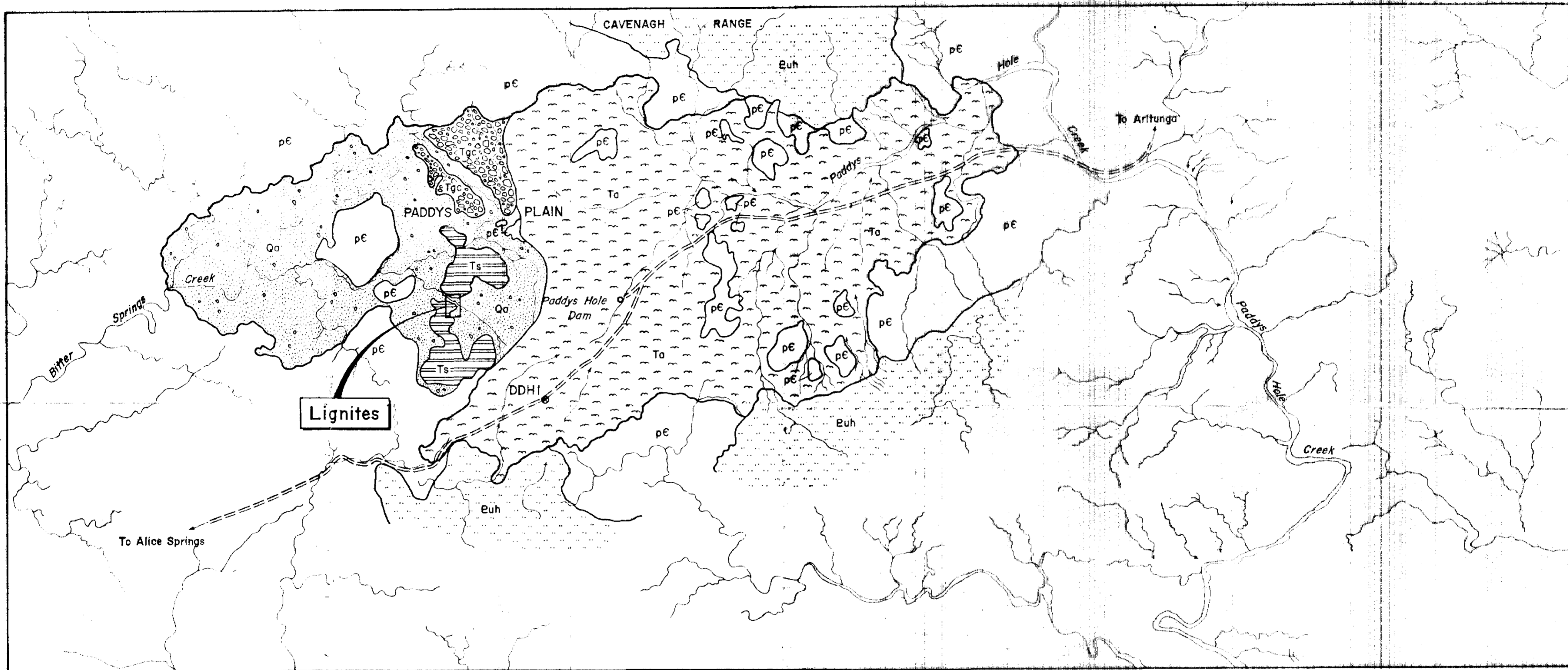
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- FORMAN, D.J., MILLIGAN, E.N., & 1967 Regional geology and structure of the north-eastern margin of the Amadeus Basin, Northern Territory. *Bur. Miner. Resour. Aust. Rep. 103.*
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APPENDIX

PADDY'S PLAIN DDH1 23⁰30'N 134⁰38'E Vertical Total Drilled 30.8 m.

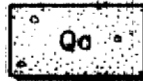
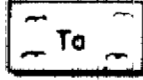
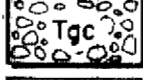
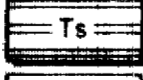
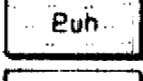
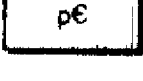
0 - 1 m	Dark red-brown clay with minor quartz sand.
1 - 2 m	Light brown fine sandy clay.
2 - 6 m	Medium grain sand with minor light brown clay.
6 - 7.15 m	Variably moderately to highly weathered fine-grained granoblastic quartz-feldspar-biotite gneiss.
7.15 - 13.9 m	Slightly weathered fine-grained granoblastic quartz-feldspar gneiss with minor muscovite, magnetite and limonite. Irregular coarse phenocrysts of quartz and plagioclase (up to 10 mm) and one band (20 mm thick) of coarse quartz-plagioclase-biotite.
13.9 - 20.0 m	Moderately weathered fine - v. fine grained quartz-feldspar-chlorite gneiss. Chlorite content variable. Common augen-like structures of v. fine grain quartz and feldspar. Well-developed foliation with a variable but generally shallow dip (70 ⁰ -90 ⁰ to the core axis.)
20.0 - 21.2 m	Moderately to highly weathered fine-grained granoblastic quartz-feldspar gneiss with minor muscovite.
21.2 - 24.8 m	Slightly to moderately weathered fine-grained quartz-feldspar-chlorite gneiss. Occasional coarser quartz and plagioclase. Weak foliation at 30 ⁰ to the core axis.
24.8 - 26.6 m	Highly weathered v. fine grained quartz-feldspar-chlorite gneiss.
26.6 - 30.8 m	Slightly weathered v. fine grain quartz-feldspar chlorite gneiss. Well-developed foliation at 25 ⁰ to the core axis..

PADDYS PLAIN - GEOLOGY



Note: Uncontrolled Compilation of 1950 Aerial Photography

REFERENCE

Undifferentiated Alluvium	
Paddy's Alluvium	
Cobble Gravel, occasional outcrops of pE Gneiss	
Tertiary Sediments	
Heavitree Quartzite	
Gneisses of the Arunta Complex	



Scale 1:46 000 (approx)

