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HALF-YEARLY REPORT ON WORK DONE IN APP. NO. 14 "LICENCE TO PROSPECT
FOR OIL" IN THE WATERHOUSE AND JAMES RANGES, N.T.

by

Dr. R. O. Brunnschweiler

INTRODUCTION:

The area concerned was first reported on last year by this Company. Since then, i.e. since the half-yearly report, for December 1956, intensive studies of the data gathered during last year's field season have been carried out and, in addition, the photogeological interpretation has been completed as far as is possible on the material available.

It will be noticed that the studies were extended over a much larger than the actual lease area. This was done in an attempt to evaluate the potentialities of the Amadeus Basin as a whole. From such an overall viewpoint the particular features of our lease area could then be better assessed.

The following members of Geosurveys' staff took part in the studies:

R. C. Sprigg, M.Sc., Managing Director and Chief Consultant.
R. O. Brunnschweiler, Ph.D., Chief Petroleum Geologist.
H. Wopfner, Ph.D., Geologist.
G. Swindon B.Sc., Assistant Geologist.
R. Grasso B.Sc., Assistant Geologist.

In addition, administrative personnel and drafting staff were engaged on the project.

As is customary there was no field work during the report period which covers the summer months.

OUTCOME OF STUDIES (Pl. 1 and Pl. 2).

The main result of the report period's work is the structural survey of the central and north-eastern Amadeus Basin.

This is, in the absence of detailed field checks, to be understood as a generalised picture which depicts and names what are believed to be the major structures (anticlines in this case). We realise that there are a number of complications, two of which we have already surveyed to some extent on the ground (viz. December 1956 report), and that the final picture may well look a bit different from what is presented here as a first approach to a working hypothesis.

For various and obvious reasons we have selected the Horn Valley Zone as a guide horizon to be followed - visible and invisible - through the various structures. This attempt at "structural detection" is believed to give sufficient data for a first and rough appraisal of the closures to be expected through the folded basins.

PR57/002

In Pl.1 (Structural Map 1:2*000*000) the anticlinal structures that can be detected (or suspected) on airphotos have been plotted and reamed. The map is self explanatory and there is no need to discuss the individual elements at this early stage. On most of them very little is known anyway. Moreover, particularly in the Lake Amadeus region there are probably some undetected structures which may alter the picture appreciably.

On pl.2 a number of sections across the Amadeus Basin are shown. In most of them the Horn Valley beds (in its widest sense, including zones such as the Walker Creek beds) is given as reference horizon in order to estimate closure of the various anticlines. The position of the reference zone through the basin was established by following the relevant beds on air-mosaics through the folding pattern, starting from known outcrops. In areas where there is no direct connection the position of the Horn Valley beds was estimated from the geometry of the folds and the distances and nature of the synclinal zones between them.

The geometry of many anticlines has been recomputed from the air on a number of flights. On our reconnaissance maps all thus observed dips and strikes have been plotted and this information is incorporated in the appended map and the sections.

CONCLUSIONS AND APPRAISAL

1. Among the many anticlinal structures, there are at least a dozen which warrant closer inspection because they appear to be closed in Ordovician rocks and would trap oil that may have originated in the fossiliferous shale and limestone sequences of the Middle and Upper Cambrian which are known to contain numerous bituminous horizons.
2. The geometry of the structures is in most cases rather simple but there are some very tight and steep folds and thrusting, is suspected in some areas. The regional tectonics are in many ways similar to those of the Appalachian Orogen but it is suspected that the thickness of the folded series varies appreciably in different parts of the basin. These thickness variations are probably the cause of the differences in the intensity and the tightness of the folding.
3. The suspected thickness variations call for caution in the evaluation of the oil possibilities of the area. It has to be established in each case which portion of the sequence is missing and what relevance this would have with respect to source formations, collector rocks, and cap sequences. There is an immense amount of exploratory work to be done before a reasonably reliable assessment of the oil potentialities of both the whole and parts of this basin can be made.

Adelaide 12th July, 1957

Reg. Brunnschweiler
Dr. R. O. Brunnschweiler
(Chief Petroleum Geologist)

Appended: 1. Structural Map - 1:2*000*000.
2. Structural Sections - Airmosaic scale.

Structural Map - Northeastern Amadeus Geosyncline, N.T.

1:2'000'000

- +--- Railway
- == Highway
- - - Road or Track
- Town
- Homestead

Anticlines

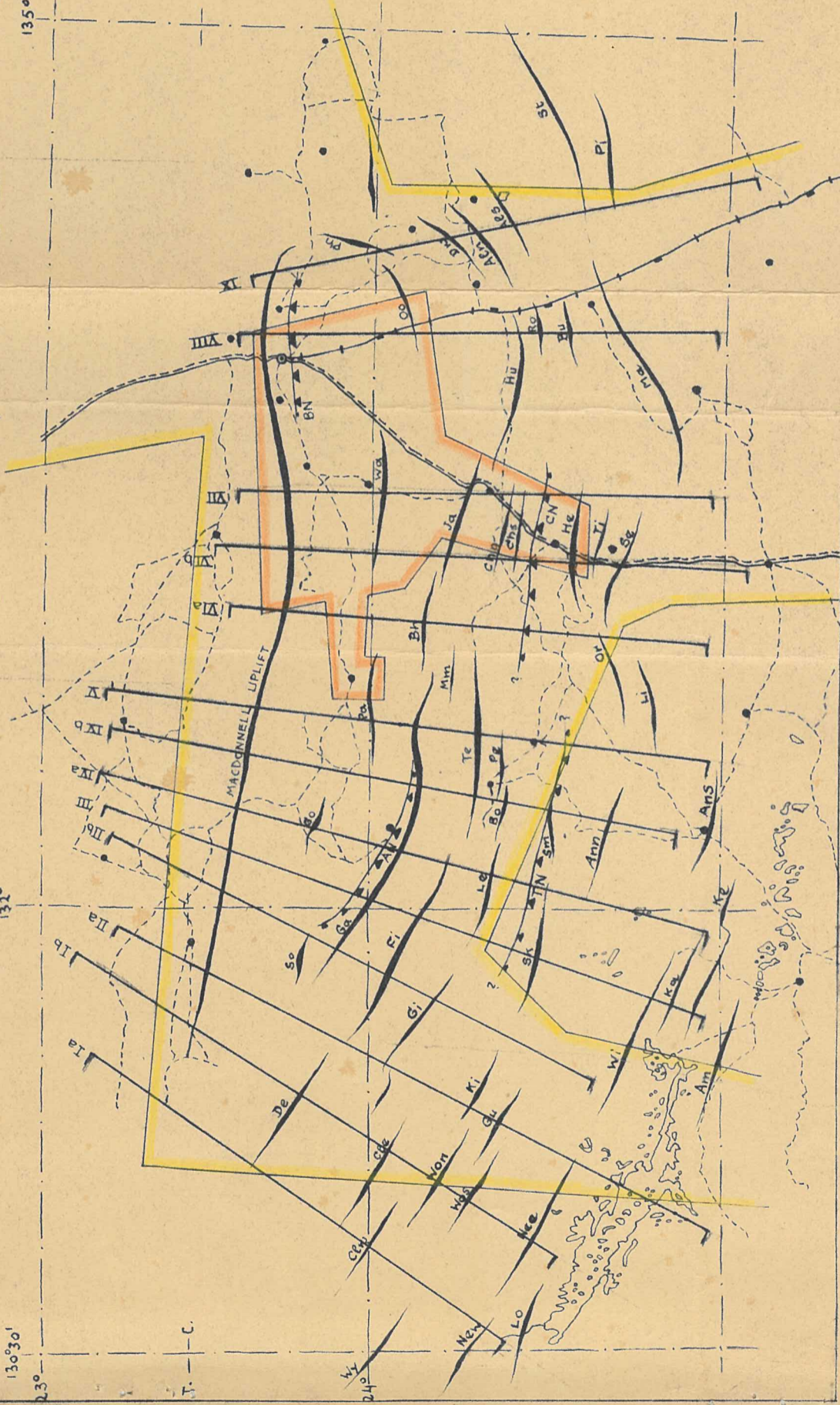
- A/N Anticline North
- A/S Anticline South
- A/M Amadeus
- A/N Angas North
- A/S Angas South
- B/H Buggy Hole
- Bo Box Flat
- Bu Burrell
- Chn Chandler North
- ChS Chandler South
- C/E Cleland East
- C/W Cleland West
- De Deering

- closure in U. Cambrian
- closure in U. Proterozoic
- closure in U. Ordovician?
- closure in L. Ordovician?
- closure in U. Cambrian
- closure in U. Proterozoic?
- closure in U. Cambrian?
- closure in M. Cambrian
- closure in L. Ordovician
- closure in L. Ordovician?
- closure in M. Cambrian?

- Deep Well
- Fifteen Mile
- Gardiner
- Geo. Gills
- Gosse
- Gum Swamp
- Henbury
- Hughes
- James
- Kamarans
- Kernot
- Kings Creek
- Levi

- closure in L. Cambrian
- closure in U. Ordovician
- closure in M. Cambrian
- closure in M. Cambrian
- closure in M. Ordovician?
- closure in U. Cambrian
- closure in M. Cambrian
- closure in M. Cambrian
- closure in L. Ordovician?
- closure in L. Ordovician?
- closure in M. Cambrian?
- closure in U. Proterozoic?

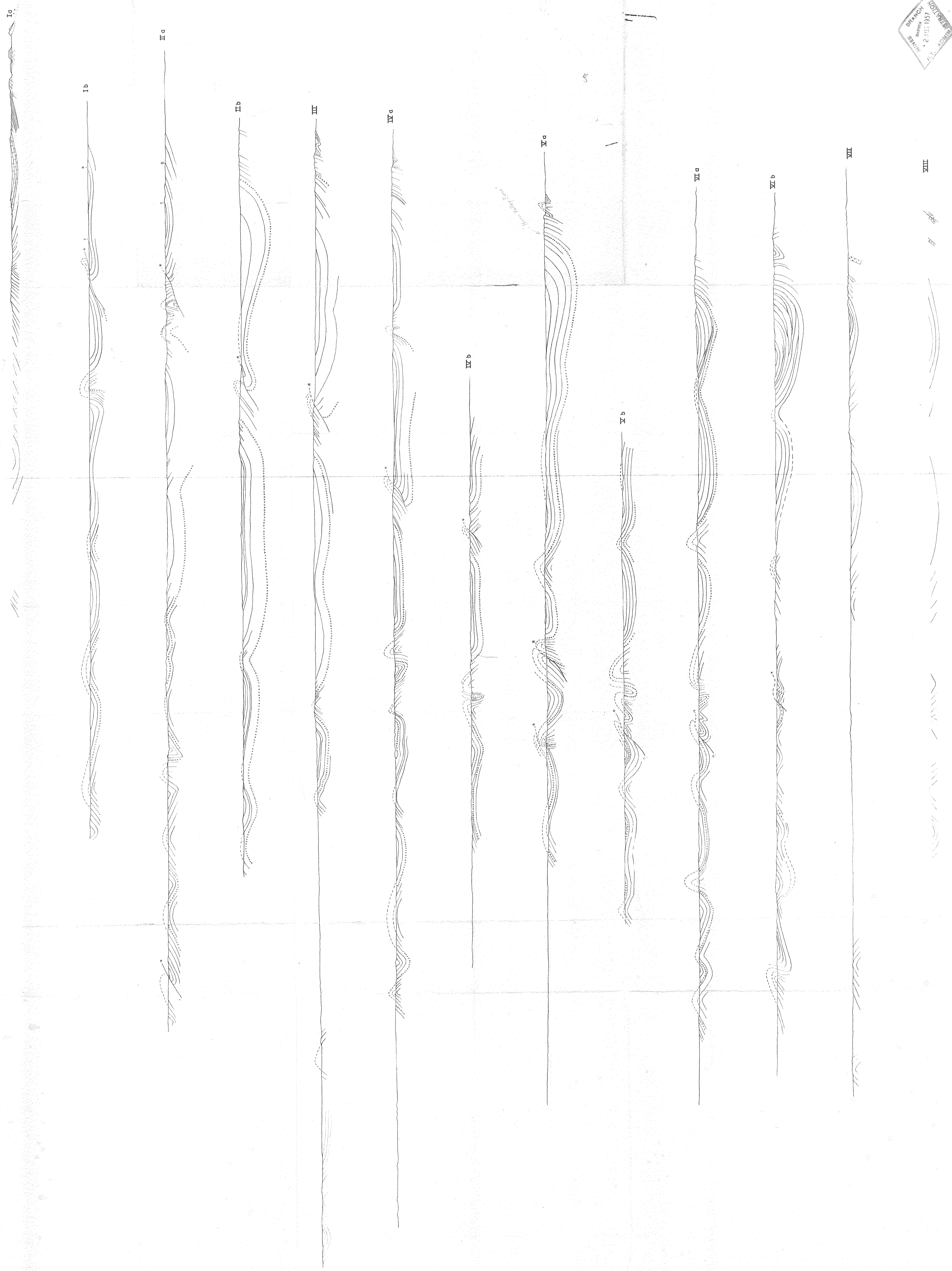
- Li Liddle
- Lo Longs
- Ma Maryvale
- Mm McMinn
- Nee Lake Neale East
- NW Lake Neale West
- Oo Ooraminna
- Or Ormerod
- Pa Palm Valley
- Pz Peterman
- Ph Philipson
- Pi Pillar
- Ro Rodinga
- Se Seymour
- Sk Stokes Creek
- Sm Storm Creek
- So Solitary
- St Steele Gap
- Tz Tempe
- Ti Tiera
- Wa Waterhouse
- Wi Winnalls
- Won Worrells North
- Wos Worrells South
- Wy Wykeokarri



Reliability of Information:

- Orange box: Airmosaics, flight a ground work
- Yellow box: Airmosaics a. flying reconnaissance
- White box: Airmosaics only

R. W. Amundson
26.3.57
SAN 95



CENTRAL NORTHERN AMADEUS BASIN
 NORTH SOUTH SECTIONS

1 inch = 4 miles