

Appendix 3

The Hydrocarbon Potential of the Birrindudu and Victoria Basins, onshore Northern Territory.

***Roger Meaney
Wiso Oil Pty Ltd
March 2012***

**The hydrocarbon potential of the Birrindudu and Victoria
Basins, onshore Northern Territory**

Introduction

The Paleoproterozoic aged Birrindudu Basin overlies metamorphic basement but underlies the Mesoproterozoic Victoria Basin. In some areas the Victoria Basin is in turn overlain by flood basalts of the Antrim Plateau Volcanics, which in some areas, particularly in the west, is then overlain by the Cambrian aged Ord Basin and in the south by the Cambrian –Devonian Wiso Basin sequence. It should be noted that good indications of oil have been encountered in recent mineral and stratigraphic drilling by CRA and the Northern Territory Geological Survey in intervals of the Kunju Formation of the Limbunya Group of the Birrindudu Basin, the Bullita and Wattie Groups of the Victoria Basin sequences respectively. An oil seep is recorded in the Ord Basin sequence near the intersection of the Ord and Negri Rivers in Western Australia. The discovery of this seep resulted in the formation of the Oakes-Durack Oil Company, which subsequently drilled a well near this seep, unsuccessfully.

In other more southerly areas the Birrindudu Basin sequence is overlain by the Paleozoic Wiso Basin sequence. The Wiso Basin is an analogue of the now highly regarded Georgina Basin, which is undergoing a boom in exploration, as it is recognized to contain extremely rich and mature oil source rocks. Whilst very prospective the Georgina Basin, with many hydrocarbon flows, is still to produce a commercial hydrocarbon flow. Drilling in the east of the Northern Territory and northwestern Queensland, particularly in the Georgina Basin, has been delayed by the prolonged “Wet Seasons” in recent years. Although recent drilling results have been very encouraging, as have the results of well drilled with the Proterozoic Mc Arthur Basin, these basins which are similar to the Birrindudu and Victoria Basin sequences are yet to produce commercial hydrocarbons. Similar encouraging results have been encountered in drilling in the Beetaloo Sub-basin of the McArthur Basin.

In the north the Victoria Basin is overlain by the Paleozoic Daly Basin, a correlative of the Wiso Basin. It too is unexplored for petroleum.

Previous Exploration

The old Proterozoic basins of northern Australia have not, traditionally, been targets for commercial oil exploration in Australia, with the exception of the McArthur Basin of northeastern Northern Territory and northwestern Queensland. Many oil inclusions are reported from rocks of the McArthur Basin. Amoco conducted a perfunctory hydrocarbon exploration program in the McArthur Basin, without commercial success, after encountering oil indications in mineral bores. Oil indications have also been recorded from rocks within both the Birrindudu and Victoria Basin sequences, as well as from the younger Ord Basin sequence.

Much oil has and is being produced from Proterozoic rocks in Siberia and Oman, amongst other areas. ***Hence old rocks can produce oil and gas***

Whilst the rocks of these some of these old Proterozoic basins are indurated, they are not metamorphosed. Many contain very rich organic shales, which analytical studies indicate could be good oil or gas sources. This is empirically confirmed by the many oil indications observed in Proterozoic rocks in several of these basins in northern Australia, particularly in the McArthur, Birrindudu and Victoria Basins. A stratigraphic column for the Birrindudu and Victoria Basin sequences is included as Figure 1.

Birrindudu Basin Sequence

The Birrindudu Basin has not been explored for petroleum and as such the hydrocarbon potential of the basin is poorly understood. To increase our knowledge of this un-metamorphosed basin, Australian Oil and Gas Limited plan to drill wells, coincidentally targeted at the overlying Victoria or Wiso Basins sections, then through the Birrindudu section to economic basement.

The Birrindudu Basin sequence is composed of two groups, the basal Birrindudu Group and overlying Limbunya Group. The Birrindudu Group is a sandstone dominated interval consisting of three formations, namely the basal Gardiner Sandstone, the Talbot Well Formation and the uppermost Coomarie Sandstone.

However fortuitously there are potential seals of carbonate and mudstone rocks in the upper most section.

The uppermost group of The Birrindudu Basin sequence is the Limbunya Group which is composed of eleven formations in its full section. These units are of sandstone, mudstone and mainly dolomitic composition and they indicate a cyclic shallow water anoxic depositional environment. Mineral drilling by Conzinc Rio Tinto Australia encountered organic matter in the Kunja Siltstone, which analytical studies indicate could be a potential petroleum source rock. In addition good quality potential reservoirs are present in the Stirling and Farquharson Sandstones. Excellent seals are also present in the dolomitic Margery, Amos Knob, Blue Hole, Fraynes and Killaloc Formations and the Pear Tree, Mallabah and Campbell Dolostones. Good quality and mature source intervals can also be expected in these units, which are of shallow marine, shelfal carbonate rich and stromatalite rich origin.

Victoria Basin Sequence

The Mesoproterozoic aged Victoria Basin Sequence unconformably overlies the Paleoproterozoic aged Birrindudu Basin Sequence. This sequence consists of four groups. In general the sequence is composed of basal arenites that grade upward to finer grade rocks and carbonates. However this group is interbedded, with alternating fine and coarser grain intervals, hence this cyclic deposition is favourable for the vertical juxtaposition of finer and coarser grained intervals. This is inductive to hydrocarbon generation, migration and entrapment.

The basal group, the Wattie Group, which unconformably overlies the Limbunya Group of the Birrindudu Basin sequence, consists of seven formations. These formations are generally regressive, with only the basal unit, the Wickham Formation well exposed in outcrop.

The basal formation, the Wickham Formation, is essentially a ferruginous, fine grained sandstone. It is overlain by the shallow marine Burtawurta Formation of mudstones and dolostones.

This unit is in turn underlain by the Hughie Sandstone, a fine to medium grained quartz sandstone. It has been assigned a transgressive, shallow marine genesis.

The Hughie Sandstone is conformably underlain by the Mount Sandford Formation composed of interbedded siltstone, stromatalitic dolostone, sandstone, dolomitic sandstone, chert, claystone and minor volcanic. This unit has a low energy shallow marine origin.

The Neave Sandstone disconformably overlies the Mount Sandford Formation, it too is a shallow water marine unit of regressive origin.

The Gibbie Formation, a regressive unit, conformably overlies the Neave Sandstone. It has a low energy, shallow marine genesis with periods of sub-aerial exposure. .

The Gibbie Formation is conformably underlain by the Seale Sandstone, thought to have a high energy, shallow marine transgressive genesis.

The Wattie Group is unconformably overlain by the Auvergne Group, which is composed of seven formations of which only two are present in the area of EP 200. These are the Jasper Gorge Sandstone a marine continental, near shore, marine unit and the Angalarri Siltstone, a deep water recessive lutite rich unit.

Structuring

Many tectonic episodes are recorded in post Proterozoic times in northern Australia hence structural traps should be present within the acreage. In fact surface mapping indicates that large scale structural potential traps are known to be present in the area. In general the Birrindudu Basin has been inverted, with the section younging to the basin margins. Hence older section is exposed in the basin centre.

As a consequence stratigraphic traps could also be present in this shallow marine transitional environment around the basin margins.

Petroleum Geology

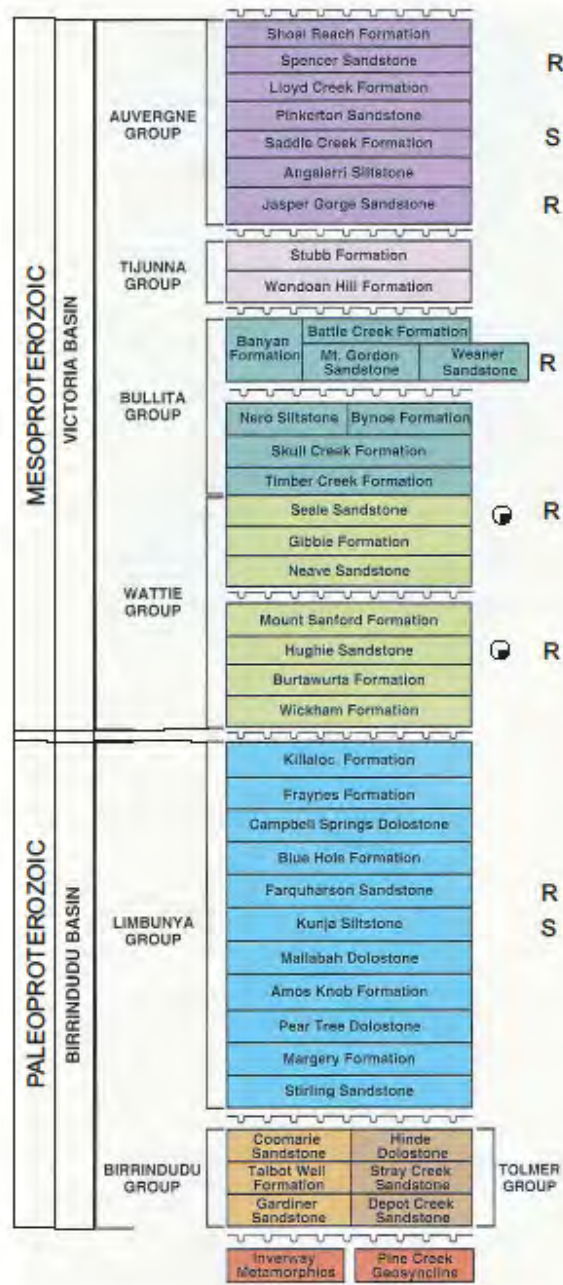
Given the above it is thought that all the necessary conditions for hydrocarbon generation and entrapment, namely:-

- ***Rich mature, source rocks***
- ***Porous and permeable reservoirs and carrier beds***
- ***Competent seals***
- ***Structural or stratigraphic traps in situ at the time of bulk hydrocarbon migration***

Our initial conventional hydrocarbon exploration program will be strongly guided by reconnaissance seismic recording, to identify structural traps. This will ensure that the prospects that we delineate and drill will be definitive tests of the hydrocarbon potential of the basin. This will apply for areas where a thick cover of younger Victoria or Wiso Basin sequence is present, as well as for areas where the Birrindudu/Victoria Basin sequence is in outcrop or close to the surface. We are also open to unconventional Hydrocarbon accumulations, particularly “shale gas” accumulations. We feel that the shallower Ord and Wiso Basin section in this area is too shallowly buried in this area to be a realistic hydrocarbon exploration target.

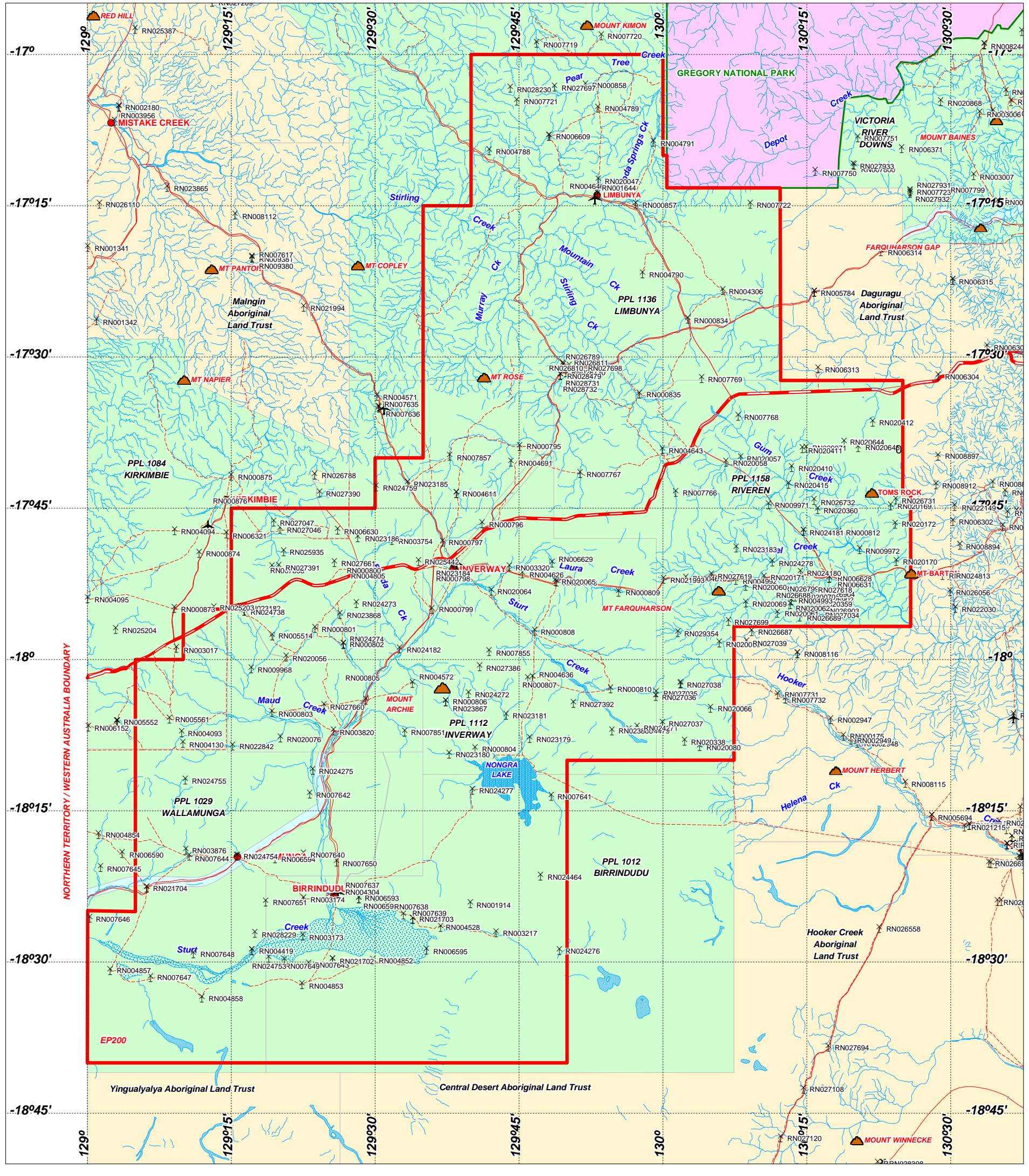
It is our view that the Birrindudu/Victoria Basin sequence may have appreciable tight gas or even shale gas potential. We will carefully monitor wells, when being drilled, with this in mind. The Paleozoic source rocks appear to be oil prone, so given the fact that these basins have not been highly deformed and metamorphosed, there is also a good chance of oil accumulations. And the fact that they are very old, may not be as counter a factor to hosting hydrocarbons as many think. And the chance of oil accumulations being discovered is reasonably high.

The Birrindudu basin is rank wildcat territory as once was the now productive Eromanga, Cooper, Surat Bowen, Carnarvon, Perth, Gippsland, Gunnedah, Otway, Amadeus, Canning, Bonaparte and Browse Basins, amongst others.



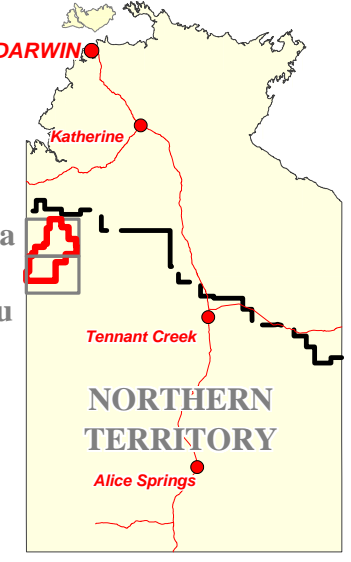
AUSTRALIAN OIL AND GAS LIMITED
VICTORIA / BIRRENDUDU BASIN
STRATIGRAPHIC COLUMN

- Legend**
- Oil indication
 - R Reservoir
 - S Source

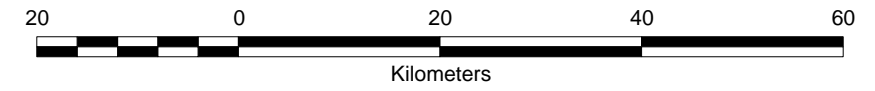


- GRANTED EXPLORATION PERMIT
- PERETUAL / PASTORAL LEASE
- ABORIGINAL FREEHOLD LAND
- CROWN LEASE PERPETUAL
- GREGORY NATIONAL PARK

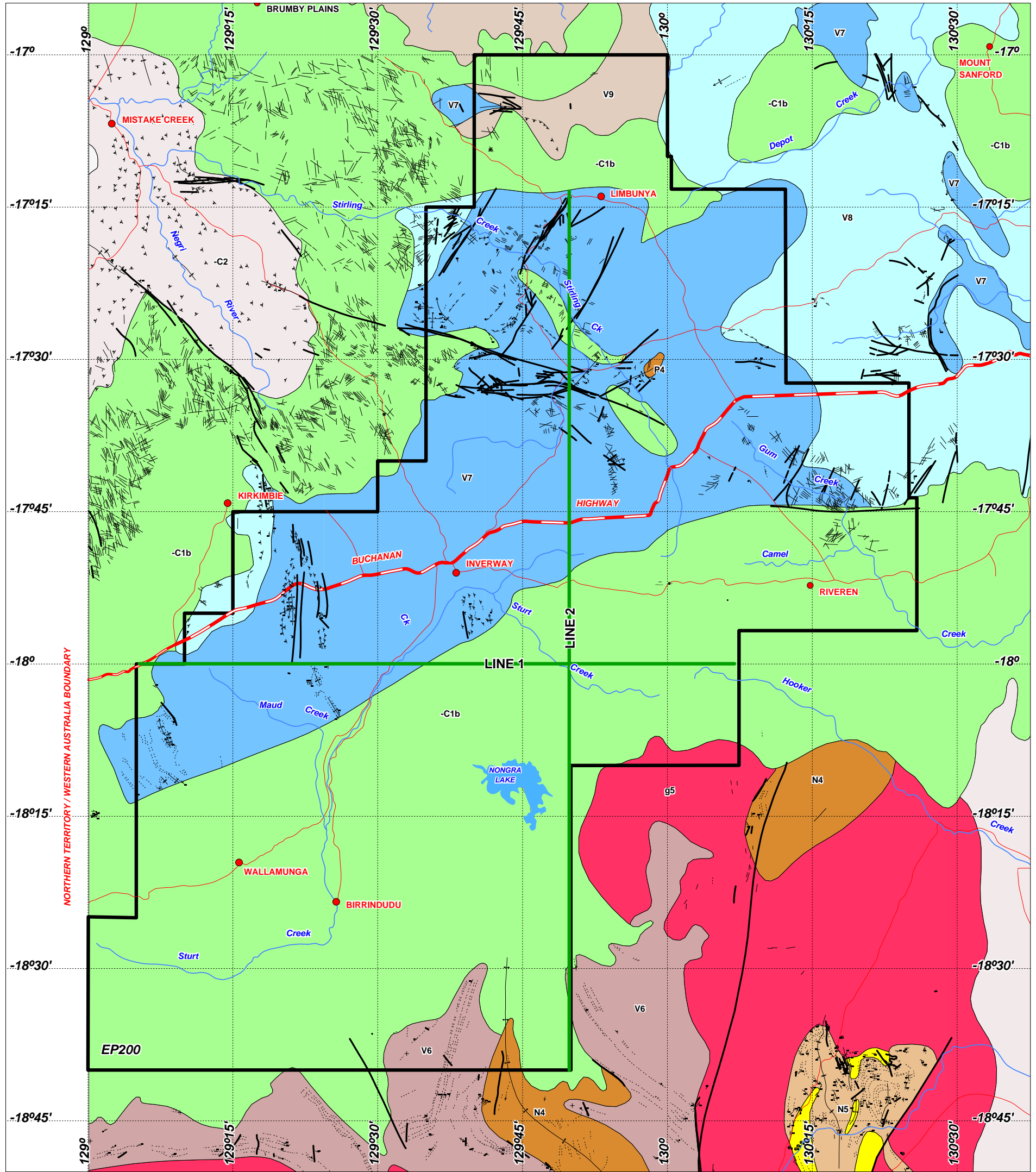
- Town / Homestead / Community
- ▲ Mountain or Hill
- ✈ Landing Ground
- Road / Track
- ~ Drainage
- x Water Bore




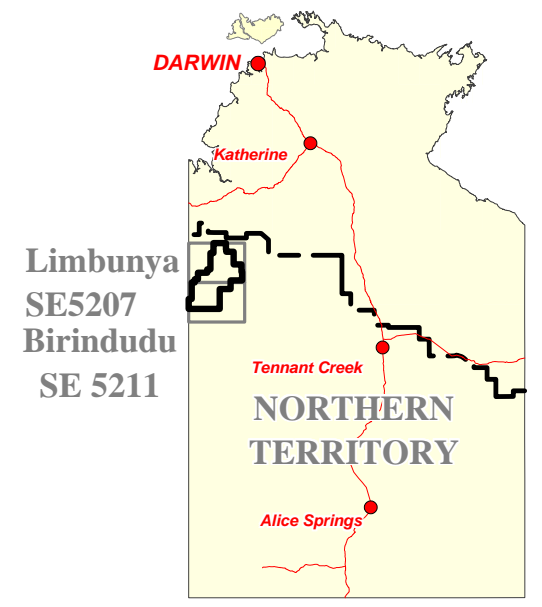
Limbunya
SE5207
Birindudu
SE 5211



WISO OIL PTY LTD		
EP200 "BIRRINDUDU BASIN"		
Cadastre, Topographic & EP Location		
Drawn: CAPRICORN	Datum: GDA94	Ref: AS ABOVE
Scale: 1:750,000	Date : FEB 2013	Plan No: WISO46



-  Exploration Permit
-  Fault
-  Lineament
-  Dip & Strike
-  Town / Homestead / Community
-  Highway
-  Road / Track
-  Drainage
-  Proposed Seismic Lines
- Line 1. 108.6 km
- Line 2. 160.5km
- TOTAL = 269.1km



WISO OIL PTY LTD		
EP200 "BIRRINDUDU BASIN"		
GEOLOGY & PROPOSED SEISMIC LINES		
Drawn: CAPRICORN	Datum: GDA94	Ref: AS ABOVE
Scale: 1:750,000	Date: FEB 2013	Plan No: WIS049

