



GOVERNMENT SUPPORT FOR THE PETROLEUM INDUSTRY

The Geological Survey of Western Australia is assisting the petroleum industry by fully supporting a Petroleum Initiatives Program (PIP). Within the program a number of regional investigations of onshore frontier areas are being undertaken in order to stimulate further petroleum exploration in these areas. The PIP is divided into two teams; one studying in the Western Margin sedimentary basins (Perth and Carnarvon), and one studying the Interior Basins (offshore and Canning). These studies will provide an integrated regional structural, stratigraphic, depositional and geochemical history of these basins. To assist the investigations, a program of data collection is being carried out, including stratigraphic drilling and geophysical surveys (gravity and aeromagnetic). The results from these studies will be released as a series of basic and interpretive reports, maps and digital data.

The Western Margin team has completed two regional studies of the onshore northern Perth Basin and one on the Merlinleigh Sub-basin in the onshore southern Carnarvon Basin. A report on the petroleum potential of the northern Perth Basin by Crostella (1995) is already available for sale and a comprehensive stratigraphic and structural study by Mory and Iasky (in prep.) is due to be released as Report 46 later this year. This report includes 9 appendices, 18 plates, 59 figures and 3 tables and is currently being edited prior to release. An initial review of the structural evolution and hydrocarbon potential of the Merlinleigh and Byro Sub-basins (Crostella, 1995) was published in 1995. Other reports in preparation include a review of the source rock potential of the Merlinleigh Sub-basin (ghori, in prep.), a reservoir study of the Moogooloo Sandstone in the Merlinleigh Sub-basin (Havord, in prep.), and a review of the Permian stratigraphy and palynology of the Carnarvon Basin (Backhouse and Mory, in prep.).

A high-resolution aeromagnetic and spectrometer, and semi-detail helicopter-supported gravity surveys of the Merlinleigh Sub-basin were conducted in 1995 to assist the structural interpretation. Furthermore,

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Geological Survey of Western Australia

DEPARTMENT OF MINERALS AND ENERGY OF WESTERN AUSTRALIA

FOR THE PETROLEUM INDUSTRY

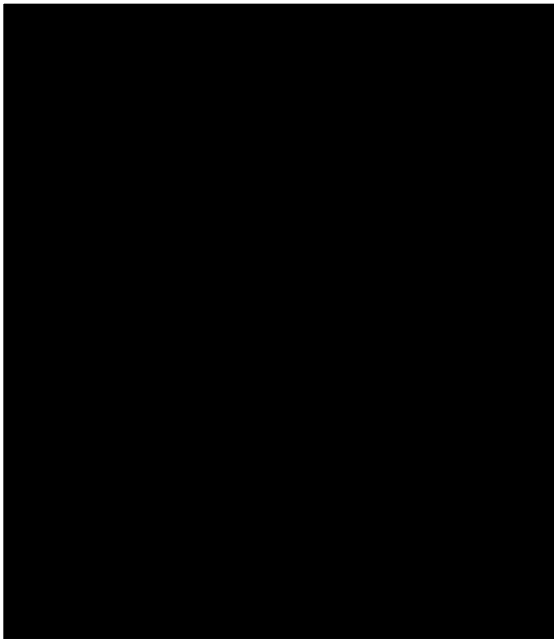


Ballythanna 1 and Gneudna 1 stratigraphic wells were drilled in 1995 to test the source rock potential of the Permian and Devonian sequences respectively. Reports are being prepared for each of these activities and will be released in 1996.

A final interpretive report on the Merlinleigh Sub-basin is being prepared (Iasky et al, in prep.). It will include a comprehensive structural study with structure maps at four horizons including basement, seven cross-sections, a review of stratigraphy based on correlations made with new data, and an interpretation of the hydrocarbon potential based on the source rock and reservoir potential in the sub-basin.

The Western Margin team has completed a review of the hydrocarbon potential of the North West Cape (Crostellla, in prep.) and is presently carrying out investigations of the Giralia area (Crostellla and Iasky, in prep.), Peedamulla Shelf and Gasgoyne Sub-basin. With the latter, following encouraging results from the Gneudna 1 stratigraphic drilling, it is planned to drill an additional two stratigraphic wells during the 1996/97 financial year to fully test the Devonian potential of the Gasgoyne Sub-basin.

The final outcome of these studies in the onshore Carnarvon Basin will be a GSWA Bulletin of the Carnarvon basin that will provide a greater emphasis on the structural evolution than the previous GSWA Bulletin on the basin (Hocking et al., 1987).



Robert lasky

Robert received a Bachelor of Applied Science and a Graduate Diploma of Science in Physics (Geophysics Major) from the Western Australian Institute of Technology in 1978 and 1979 respectively, and in 1991 received a Master of Applied Science in Geophysics from Curtin University specialising in the interpretation of seismic, gravity and geothermal data in sedimentary basins.

In 1980, his career began with Scintrex Perth office processing aeromagnetic and radiometric data. In 1981 he joined the CSIRO in Sydney to carry out research to detect hydrocarbons using vehicle-borne magnetics and self-potential methods.

Robert returned to Perth in 1982 to join the Petroleum Resources Section of the Geological Survey of Western Australia where he monitored petroleum exploration in the State and was responsible for developing the Western Australian Petroleum database (WAPEX). During this time Robert also carried out a review of the geology of the Officer Basin and a geophysical interpretation of the southern Perth Basin.

In 1991, Robert was transferred to the Basin Studies Section where he investigated the structural and depositional evolution of the northern Perth Basin by carrying out structural interpretation using seismic, gravity and magnetic data, and geochemical analyses by geothermal history modelling. Robert was promoted to Project Geophysicist in 1992, and since late 1994 has been working in the Petroleum Initiatives Program Western Margin team and is responsible for geophysical interpretation and acquisition programs in the onshore Carnarvon Basin.

“REPORT 45” - PROSPECT OF A HANDSOME REWARD

Report 45 -“**Structural evolution and hydrocarbon potential of the Merlinleigh and Byro Sub-basins, Carnarvon Basin, Western Australia**” by A. Crostella is a study that forms part of the Petroleum Exploration Initiatives program being conducted by the Geological Survey of Western Australia. This regional review will be followed by more analytical studies, which will also incorporate new data currently being acquired.

The Carnarvon Basin extends from Geraldton to Karratha along the coastline, and covers 115 000km² onshore, and 535 000km² offshore to the continental-oceanic crust boundary. It has long been of interest to geologists and petroleum explorationists.

Interest in the Merlinleigh Sub-basin was initially shown in the 1930s but the first serious oil exploration program was carried out by West Australian Petroleum (WAPET) in the 1950s and 1960s, following the euphoria of the Rough Range discovery.

The last determined effort in the search for oil was by ESSO in 1982-84. In 1991 Pan Pacific Petroleum limited its activity to a geochemistry survey in the northern part of the Merlinleigh Sub-basin.

The Geological Survey of Western Australia carried out geochemical activities on all well samples, utilising also coreholes drilled for coal or other minerals. These studies confirm the good source potential of the Permian Wooramel Group both for gas and oil in the northern half of the Merlinleigh Sub-basin. The Devonian Gneudna Formation also has potential to generate hydrocarbons and is more oil prone than the Wooramel Group. As a result of their basinal position the maturity of the source rocks varies greatly.

Following the two unsuccessful drilling campaigns by WAPET and ESSO, oil companies have displayed limited interest in the area, although effective source rocks, reservoirs, seals, and traps are present.

It is concluded that the hydrocarbon potential of the two sub-basins is still to be evaluated, however, new investments may handsomely reward the explorationist willing to undertake further exploration activities in the area.

Report 45 can be purchased for \$35.00.

Release of Airborne Geophysical Data

January saw the publication of the first of a series of maps of airborne magnetic and radiometric data from the Pilbara National Geoscience Mapping Accord (NGMA) project. The maps published cover parts of the Dampier, Yarraloola, Roebourne and Pyramid 1:250 000 sheets in the West Pilbara. Planning of the data acquisition program for 1996, which involves a substantial contribution by the Australian Geological Survey Organisation (AGSO), is well advanced. Subject to final arrangements, the remaining areas of Archaean geology should be flown during 1996. Map products similar to those recently published will be available for sale in 1997. In addition to the Pilbara surveys, data for the Nabberu 1:250 000 sheet will also be acquired by AGSO in 1996. Total Magnetic Intensity images for the Duketon 1:250 000 sheet are now available from GSWA and AGSO and production of images for the Wiluna and SirSamuel 1:250 000 sheets are in progress. These images are being published in standard 1:100 000 and 1:250 000 sheet formats.

Regional Gravity Surveys

The Eastern Goldfields gravity project, which is being managed by AGSO, is due to recommence in April. Data collection is planned for the Menzies, Kurnalpi and Kalgoorlie 1:250 000 sheets. Preliminary results from the 1995 program should be available in March. Further gravity programs are being developed in conjunction with AGSO.

Radiometric Calibration Site

A review of available sites suitable for a radiometric calibration range including the existing Pinjarra site is being undertaken initially as a cooperative effort between the Perth based airborne geophysical contractors and the GSWA. Subject to one or more of these sites meeting the required criteria, the site(s) will be documented and publicised for use.

Index of Airborne Geophysical Digital Datasets

GSWA has made significant progress in the development of an index and database of WA airborne geophysical survey digital data sets. The database will initially contain publically available datasets such as those owned by GSWA and AGSO, as well as multiclient datasets. Digital datasets relating to company surveys being submitted to GSWA as provided for under the recently amended reporting requirements will be added progressively as data comes onto open file.

For further information contact: Greg Steemson - Telephone (09) 222 3331

North Pilbara National Geoscience Mapping Accord Project

The second field season of the North Pilbara National Geoscience Mapping Accord (NGMA) Project (GSWA & AGSO) brings a major expansion to the mapping program. The ROEBOURNE 1:100 000 sheet will be completed and mapping will move onto the MOUNT WOHLER, PINDERI HILLS, NORTH SHAW (AGSO), TAMBOURAH (AGSO), and MUCCAN 1:100 000 sheets. The 1996 NGMA team consists of three geologists from GSWA and three geologists from AGSO, one of the latter commencing a regional metallogenic study. A major geophysical survey is planned for 1996, and will cover most of the central and east Pilbara.

Mapping in the west Pilbara last year has resulted in substantial revision of geology in the area, particularly with respect to the stratigraphy of the Whim Creek Belt and the recognition of three distinct tectonostratigraphic domains in the Dampier-Roebourne area. Recent suggestions of accretionary tectonics in the west Pilbara, with the Dampier-Roebourne greenstones having a maximum age of c.3.1Ga (cf. 3.5 - 3.2 Ga in the east Pilbara), are improbable with results from new field and isotopic evidence obtained in 1995. Additional zircon U-Pb dating and Sm-Nd work, and the completion of fieldwork around Roebourne in 1996, should conclusively resolve this issue.

South of Whim Creek, the 1996 field season will address the major problem of the age and stratigraphic affinities of the regionally extensive Mallina Formation. This unit, which outcrops over an area of 7000 km², effectively separates the granite-greenstone terrains of the east and west Pilbara, and has long created problems for regional stratigraphic interpretation. Two geologists, one from GSWA and the other from AGSO are assigned to this daunting task and will undertake detailed structural studies near Whim Creek with assistance from zircon U-Pb dating.

Publications in 1996 will include the DAMPIER and SHERLOCK 1:100 000 sheets, summary reports on the 1995 mapping (GSWA Annual Review), aeromagnetic and radiometric images, data tapes for the west Pilbara, and papers presenting new geochronological data. Additionally AGSO will produce a GIS Atlas for the entire granite-greenstone terrain of the North Pilbara, compiling all mineral deposits and geophysical data in relation to a detailed geological base map.

LATEST PUBLICATIONS

REGOLITH GEOCHEMICAL DATA

GLENGARRY 1:250 000 SHEET Geochemical mapping of the Glengarry 1:250 000

by \$100.00*

Price includes 5 plates and a disk containing digital sample data.

* _ _ individual maps available at 1:250 000 scale including:

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| 1. Regolith materials map | | \$20.00 |
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| 3. Sample locations | | \$10.00 |
| 4. Element-distribution and other maps including major-
and trace-elements (maps _-__) | each | \$10.00 |
| Also available in GIS format (ARCINFO/ARCVIEW) | | \$100.00 |

REPORT 42

The Woongarra Rhyolite—a giant lavalike felsic sheet in the Hamersley Basin of Western Australia

by A.F. Trendall \$40.00

RECORD 1995/7

Geology and hydrogeology of the Scott Coastal Plain, Perth Basin

by L.J. Baddock \$20.00

EXPLANATORY NOTES

Geology of the WEDGE ISLAND 1:100 000 sheet

by A.J. Mory Map and Notes \$20.00

Geology of TRAINOR 1:250 000 sheet (2nd edition)

by I.R. Williams Map and Notes \$15.00

NEW RELEASE IMAGES

DUKETON 1:250 000 Total Magnetic Intensity Images at 1:100 000 scale

6 standard 1:100 000 sheets Per sheet \$250.00

LATEST PUBLICATIONS (cont)

NEW RELEASE PUBLICATION

Atlas of Western Australian Mineral Deposits and Petroleum Fields	\$10.00
Digital Data (Microstation Design Files) Simplified geology layer	\$50.00
Mineral deposit and petroleum field layers	\$50.00
Both layers	\$100.00

NEW RELEASE MAPS

Plate 1. Geological map of the King Leopold Orogen, West Kimberley region 1:500 000
 Plate 2. Structural and metamorphic interpretation of the King Leopold Orogen, West Kimberley region 1:500 000
 by I.M. Tyler and T.J. Griffin \$20.00 each
 (Plates for Bulletin 143 *in prep.*)

1994–95 ANNUAL REVIEW

The purpose of the Geological Survey of Western Australia's Annual Review is to provide up-to-date information on the achievements and working progress during the past financial year. That 1994–95 was a year of substantial success for the Survey is reflected in the wide range of articles appearing in the current Annual Review.

The 1994–95 Annual Review is free of charge.

Products are available from:

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