

Encouraging exploration

Exploration Incentive Scheme

by Margaret Ellis

In early April 2009, in fulfilment of an election commitment, the Western Australian government announced funding of a five-year, \$80 million Exploration Incentive Scheme (EIS) to encourage exploration in Western Australia for the long-term sustainability of the State's resources sector. Most of the six broad programs (Tables 1 and 2) under EIS are focused in under-explored greenfields regions.

Implementation of EIS, involving additional expenditure of between \$16 and \$20 million per annum over the period from 2009–10 to 2012–13 effectively means more than a doubling of the Geological Survey of Western Australia's (GSWA) budget over the period. However, with only eight contract Public Service positions approved as part of the scheme, fee-for-service arrangements, contracting-out of services, and collaborative programs with university and government research groups and centres will be required to undertake the massive work program.

Approval of EIS came after the 2007 Review of the Geological Survey of Western Australia conducted by Resource Advisors Pty Ltd, an independent consulting group. The review (Cramsie and Deegan, 2007) recommended a five-year funding increase of \$59.5 million for GSWA with the option of an additional \$5 million per annum for a 'collaborative drilling program'.

Although the recommendations of the review differ in detail from the six broad programs of EIS, the amount of funding for the two is remarkably similar. EIS will have an enormous impact on GSWA over the next four years and will result in a step-wise increase in the amount of pre-competitive geoscience information available for the State.

Outline of EIS

The Exploration Incentive Scheme objective is to encourage exploration in Western Australia, particularly in under-explored minerals greenfields areas and frontier petroleum basins, and maintain it at the levels needed for the long-term sustainability of the State's resources sector. In the absence of any viable alternative, Western Australia's economy and its citizens' lifestyle will continue to depend in the medium- to long-term on development of the State's resources. The scheme addresses this longer term need as well as providing some shorter

term stimulus for the exploration industry during the exploration downturn caused by the global financial crisis. Importantly, the funding of a large exploration incentive package at this time signals that the State Government is serious about fostering investment in the State's resources sector and is concerned about the sustainability of resource production if discovery rates are not increased.

Two major components of the Scheme are the completion of the State's coverage by airborne magnetic surveys at 400 m (or less) line spacing and a major expansion of the area covered by gravity surveys with stations spaced less than 2.5 km apart.

Table 1 sets out the budgets for the six programs. Projects are described in more detail later. Analysis of planned expenditures under the scheme suggests that individual activities totalling \$24 million out of the \$80 million will directly benefit the petroleum, unconventional gas, and geothermal industries.



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EXPLORATION INCENTIVE SCHEME

Table 2. Exploration Incentive Scheme

<i>Exploration Incentive Scheme activity</i>	<i>Funding (\$ million)</i>	
<i>Exploration and Environmental Coordination in DMP</i>	1.5	
<i>Drilling</i>		
<i>Industry–Government co-funded</i>	\$20.9	
<i>Stratigraphic</i>	\$6.0	26.9
<i>Geophysical and geochemical surveys</i>		
<i>Airborne geophysics</i>	\$21.0	
<i>Ground geophysics and geochemistry</i>	\$12.3	33.3
<i>3D geological mapping</i>		13.8
<i>Promoting strategic research with industry</i>		
<i>MERIWA</i>	\$1.4	
<i>Embedding researchers in industry</i>	\$0.9	2.3
<i>Sustainable working relations with Indigenous communities</i>		
<i>Petroleum</i>	\$1.2	
<i>Minerals</i>	\$1.0	2.2
		80.0

Table 1. Components and projects making up the Exploration Incentive Scheme — budgets and employees

Component	Planned Cash Flow (\$ millions)					Total	Public Servants
	2008–09	2009–10	2010–11	2011–12	2012–13		
<i>Exploration and environmental coordination (Total: \$1.5 million)</i>	0.36	0.44	0.50	0.10	0.10	1.50	—
<i>Innovative drilling (Total: \$26.9 million)</i>	0.20	4.18	6.51	8.28	7.73	26.90	—
Government – industry co-funded exploration drilling	0.06	3.19	5.35	5.95	5.95	20.50	1
Targeted international exploration promotion	0.04	0.09	0.09	0.09	0.09	0.40	—
Stratigraphic drilling	0.10	0.90	1.07	2.24	1.69	6.00	—
<i>Geophysical and geochemical surveys (Total: \$33.33 million)</i>	0.65	7.395	9.085	9.615	6.585	33.33	—
Completion of State-wide coverage by airborne magnetic and radiometric surveys	—	4.845	5.80	6.40	4.00	21.045	—
Deep-crustal seismic lines	—	0.65	1.385	2.315	1.935	6.285	—
Regional gravity surveys	0.25	1.50	1.50	0.50	0.25	4.00	—
Geochemistry of the Yilgarn Craton and its margins	0.40	0.40	0.40	0.40	0.40	2.00	—
<i>3D geological mapping (Total: \$13.8 million)</i>	0.69	2.86	4.63	4.12	1.50	13.80	—
WA geology online — information delivery	0.10	0.50	0.50	—	0.10	1.20	1
Modernize petroleum information delivery system	0.36	0.44	—	—	—	0.80	—
3D geoscience	—	0.20	0.40	0.45	0.15	1.20	2
Open file geochemistry information delivery	—	—	0.60	0.20	—	0.80	—
Mineral drillhole database	0.15	0.50	0.45	0.45	0.45	2.00	1
Geological mapping and interpretation	0.05	0.75	0.75	0.75	0.40	2.70	1
Enhanced geochronology	—	0.20	0.20	0.20	0.20	0.80	—
Unconventional energy studies	0.03	0.27	1.73	2.07	0.20	4.30	1
<i>Promoting strategic research with industry (Total: \$2.3 million)</i>	—	0.65	0.65	0.65	0.35	2.30	—
WA Regional Researcher Initiative	—	0.30	0.30	0.30	—	0.90	—
Supporting MERIWA	—	0.35	0.35	0.35	0.35	1.40	—
<i>Sustainable working relations with Indigenous communities (Total: \$2.17 million)</i>	—	0.555	0.565	0.535	0.515	2.17	—
Developing Indigenous Land Use Agreements	—	0.050	0.120	0.120	0.120	0.41	—
Access-ready land for exploration	—	0.250	0.250	0.250	0.250	1.00	1
Heritage clearance for geothermal licences	—	0.160	0.040	0.010	0.010	0.22	—
Community awareness — mineral exploration	—	0.075	0.060	0.060	0.060	0.255	—
Regional heritage agreements for mineral exploration	—	0.02	0.095	0.095	0.075	0.285	—
TOTAL:	1.9	16.08	21.44	23.30	16.78	80.0	8.0

NOTE: See GSWA Record 2009/1 for further details of EIS and GSWA's recurrent work program

EIS programs

Exploration and environmental coordination

In keeping with the objective of EIS to encourage exploration in Western Australia it is essential to support the exploration industry with a robust tenement application and management system. Enhancements are required to the web-based title systems, to facilitate online tenement application and management, and provide comprehensive approvals-tracking.

These enhancements will integrate the environmental application and approval process into the minerals and petroleum tenement management systems and provide comprehensive tracking of tenement applications through the various approval stages, with online access to the status of tenement applications available to external stakeholders via a secure sign-on.

In addition to the online lodgement and processing of tenement applications, associated reporting obligations will also be facilitated online.

Innovative drilling

The Co-funded Government – Industry Drilling Program is designed to stimulate geoscience exploration and contribute to the economic development of greenfields regional areas of Western Australia. It will preferentially fund high-quality, technically and economically sound projects that promote new exploration concepts and new exploration technologies.

Following the completion of all drilling in 2009–10, the overall results, outcomes, and successes from the incentive program will be assessed, which will contribute to the establishment of a revised strategy for the program in 2010–11 and through to 2013. Consultation with industry is facilitated by representatives of industry bodies in Western Australia acting through the Drilling Advisory Committee. The Committee has a mandate to provide recommendations on the broad policy framework of the co-funded drilling program as well as annually reviewing the operations of the program and recommending amendments to the programs guidelines.

Core collected by companies that gain co-funding will be available in the relevant core library (Perth or Kalgoorlie) after a 6-month confidentiality period. Reports of the drilling programs will also be released online after a similar confidentiality period.

Stratigraphic drilling will be undertaken by the Geological Survey of Western Australia (GSWA) to validate seismic interpretation and provide additional pre-competitive geoscience information for use by both petroleum and mineral explorers.

The program will complement other mineral and petroleum drilling, and will fund coring of holes in the Canning, Eucla, and southern Perth Basins. Drilling in the Eucla Basin will be aimed at identifying the nature of its crystalline basement.

The data provided will aid interpretation of formations where there is little current information, as well as help to identify potential for hydrocarbons and geothermal energy.

Drilling in the southern Perth Basin will test sedimentary units that could be used for carbon geosequestration.

Geophysical and geochemical surveys

Prior to implementing EIS, only 70% of the State was covered by medium-resolution airborne magnetic and radiometric surveys, with about 30% of the area of Western Australia having only low-resolution (1600 m) airborne magnetic and radiometric coverage. These data were acquired around 40 years ago and have little current exploration value. This project will largely complete the medium-resolution airborne magnetics and radiometrics (400 m) coverage of the State (Fig. 1).

A network of deep seismic traverses to image WA's crustal structure at depth will be generated, as shown on Figure 2. Integrated geophysical and geological transects are planned across the West Australian Craton and its margins, and adjacent Proterozoic orogens and Phanerozoic basins, to provide a key to the geological evolution of the Western Australian lithosphere. Such traverses will aid our understanding of the localization of mineral systems within the upper crust.

The lines extend and integrate pre-existing deep seismic lines, and follow existing roads wherever possible to minimize costs.

A program of regional gravity surveys will be undertaken. The objective of this program is to provide 3D geological information to complement GSWA's geological mapping in selected greenfields exploration areas.

Additionally, regional geochemical surveys will provide multi-element geochemical coverage of under-explored parts of the Yilgarn Craton to

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stimulate mineral exploration there. Data collected from the surveys will then be incorporated into GSWA's web-based geochemical database.

3D geological mapping

A series of activities falling under the 3D geological mapping program will focus on the capture of geoscientific information at depth and its seamless delivery.

The WA Geology Online project will improve geoscience information services to DMP clients by developing an integrated system that allows all geoscience databases to be accessed seamlessly online. In addition to better integrating GSWA's online information, the WA Geology Online project will develop and facilitate new databases and services linked to current and future map layers. Through this activity, GSWA clients will be able to generate customized reports and maps.

The upgrade of DMP's Western Australian Petroleum Information Management System (WAPIMS) will be completed. This will help to provide a more streamlined information submission and release system for the petroleum industry, and will ensure that the WAPIMS system is interoperable with other departmental computer systems.

Another project will build and maintain interactive 3D geological models — from prospect to crustal scale — for selected greenfields exploration areas. 3D geological models can be used to test various structural models and interpretations, and to visualize the Earth at depth. They can be used as predictive models to characterize areas of known mineralization, as well as identify similar patterns to generate new exploration targets. Once developed, the 3D models will be available to view and download from the DMP website.

The existing GSWA geochemistry database will be upgraded so that it can accept the uploading of digital geochemistry data submitted by companies, as well as existing GSWA geochemistry data. This newly designed web-based facility will allow the query and extraction of both open-file company and GSWA geochemistry. Similarly, the drillhole information database project will improve online information services to DMP customers with an integrated system that allows all drillhole data, and related geochemistry, to be queried and integrated with other GSWA online data. These improvements will enable open-file company

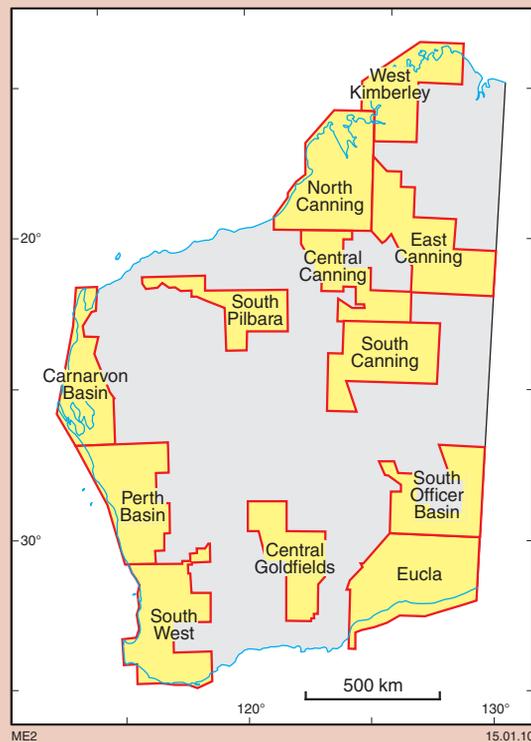


Figure 1. Planned magnetic and radiometric surveys

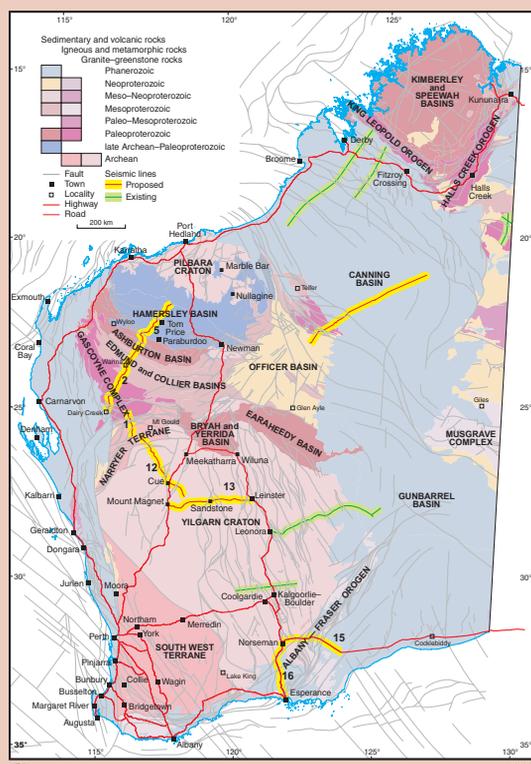


Figure 2. Planned deep-crustal seismic traverses

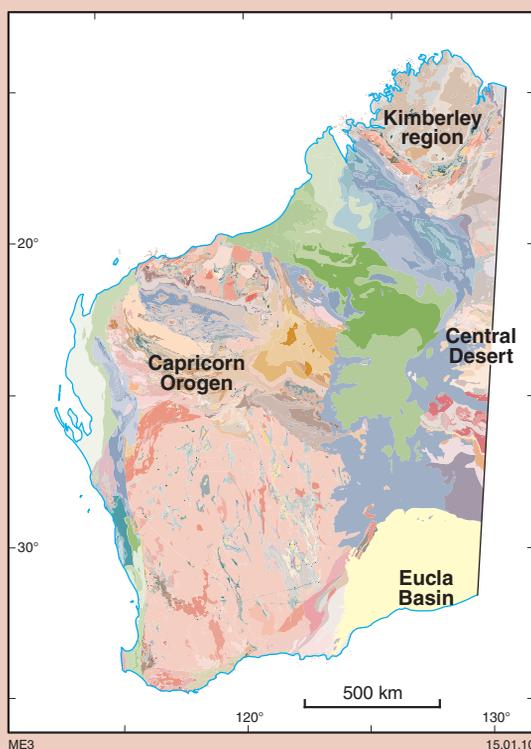


Figure 3. Remote greenfields areas will be the focus of geological mapping and interpretation.

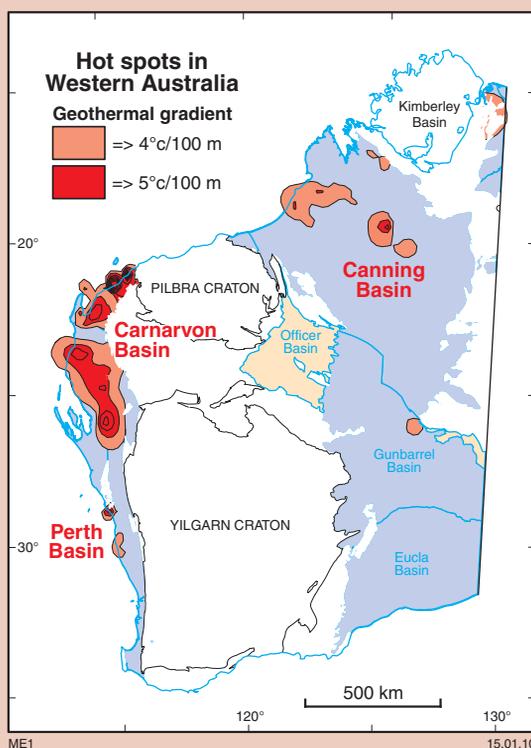


Figure 4. Hot spots in Western Australia

mineral exploration drillhole locations and down-hole geochemistry to be accessible via the DMP website.

Another project will involve undertaking regional geoscience mapping and the interpretation, from geophysical data, of bedrock under thin soil and sedimentary basin cover. The focus will be on remote greenfields areas including the basement to the Eucla Basin, the Central Desert area, the Kimberley region and the Capricorn Orogen (Fig. 3). Such a project will be built on an expanded program of isotopic dating providing information on the timing of rock units and specific geological events.

Alternative energy sources include geothermal, tight gas, and enhanced petroleum recovery from depleted reservoirs (Fig. 4). The national commitment to 'clean' energy also provides a requirement to look at coal technologies to reduce the State's carbon dioxide footprint. New geoscience information relating to the use of geosequestration to store carbon dioxide emissions is another key aspect of this project. The geothermal project will review current data for geothermal energy, conduct desktop studies on prospective basins, and provide new field data in areas with little coverage.

Promoting strategic research with industry

One of the key objectives of EIS will be helping to promote strategic research with industry. As part of achieving this goal, \$900 000 will be used to develop the Western Australian Regional Researcher Initiative.

The new initiative is aimed at the rapid transfer of new geoscience concepts, skills, and technologies into the Western Australian minerals exploration industry. It will involve the placement of three embedded researchers into company exploration teams focused on greenfields areas. The researchers will be employed by CSIRO. Funding to support these employees will be split evenly between EIS and the participating exploration company sponsors. Overall, the Western Australian Regional Researcher Initiative will help promote the flow of information between research teams and industry sponsors and create a two-way training process for industry professionals and researchers.

Increased funding of \$1.4 million will also be provided to the Minerals and Energy Research Institute of Western Australia to support the minerals and petroleum-related research the

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organization funds throughout the State in association with industry.

Sustainable working relations with Indigenous communities

The State Government will dedicate funding from EIS to providing initiatives designed to assist Indigenous and environmental approvals for prospecting, geoscience mapping, and mining and petroleum exploration and production. The strategy and work program will target under-explored onshore areas of the State that have access corridors to major interior basins. In addition, a model Indigenous land use agreement will be developed, which can be utilized where Native Title has been determined, and where it remains as a claim. Key objectives of this program are to address Indigenous heritage, the Future Act process under the *Native Title Act 1993*, and access to the land where exclusive Native Title exists.

Reference

Cramsie, J and Deegan, G 2007, Review of the Geological Survey of Western Australia: Resource Advisors Pty Ltd for the Department of Industry and Resources (now Department of Mines and Petroleum)
<www.dmp.wa.gov.au/GSWApublications>.