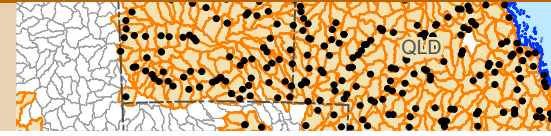


# Onshore Energy Security Program update



Ned Stolz

Geoscience Australia's Onshore Energy Security Program (OESP) commenced in late 2006. The Program is applying the latest geoscientific imaging and mapping technology to boost investment in exploration for onshore energy resources such as petroleum, uranium, thorium and geothermal energy. There have been significant data acquisition programs in several regions during the last few months as well as the release of processed data and interpretations from earlier programs.

Regular updates on the OESP are available through the program's website, which contains summaries of current and planned surveys, and recent presentations. The program's five year plan, which is

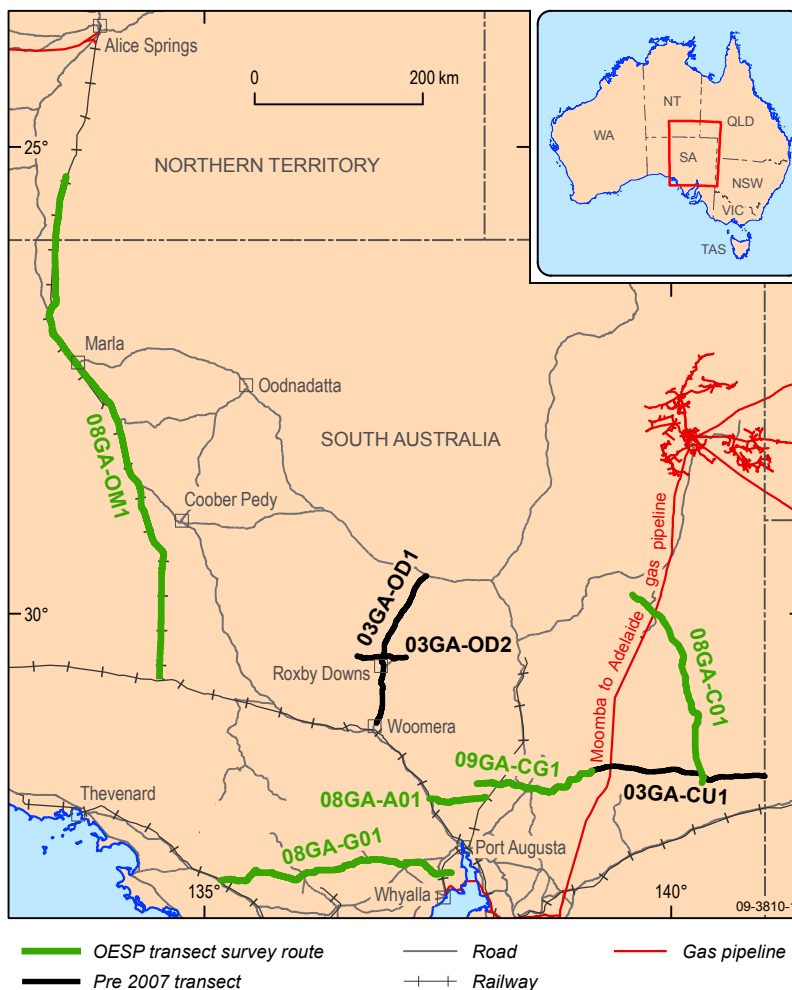
included on the site, provides further information on objectives, outputs and planned activities for each project. All new data releases for the OESP will be announced through Geoscience Australia's monthly *Minerals Alert*.

## Onshore Seismic Program

### Gawler-Officer-Musgrave-Amadeus (GOMA) Seismic Survey

Acquisition of deep reflection seismic and magneto-telluric (MT) data was completed along the Gawler-Officer-Musgrave-Amadeus (GOMA) line in December 2008. This line follows the Alice Springs to Adelaide railway line for 634 kilometres (figure 1) and crosses the northern margin of the Gawler Craton, the eastern ends of the Officer Basin and the Musgrave Block, and the southern margin of the Amadeus Basin.

The survey will provide new insights into the crustal architecture of the two Neoproterozoic sedimentary basins in Central Australia and their tectonic relationship to older (Mesoproterozoic) basement terrains. Of particular interest is the identification of structural elements in the basinal sections which may host hydrocarbons that were generated prior to the Alice Springs Orogeny.



**Figure 1.** Deep reflection seismic traverses in northern South Australia. The green lines are traverses acquired between May 2008 and February 2009, while black lines are traverses acquired prior to 2007.



This survey was jointly funded by Geoscience Australia through the OESP, Primary Industries and Resources South Australia and AuScope. AuScope is an initiative established under the National Collaborative Research Infrastructure Strategy to characterise the structure and evolution of the Australian continent. Processing of the data from the GOMA Seismic Survey as well as data from the Gawler-Curnamona Seismic Survey, acquired in mid-2008, will be continuing through 2009.

### **Curnamona – Gawler Link Seismic Survey**

In conjunction with Primary Industries and Resources South Australia, Geoscience Australia acquired 145 kilometres of deep reflection seismic data across the Flinders Ranges during January 2009 (figure 1). The main objectives of the traverse were to:

- Examine the relationship between the Gawler Craton and the Curnamona Province.
- Identify areas with potential for uranium-rich iron oxide copper-gold deposits (IOCGU) and sedimentary basin-related uranium deposits.
- Designate potential sites for hot rock geothermal energy.

When combined with the Gawler and Arrowie Seismic Lines (collected in mid 2008) and the Curnamona Seismic Line (2003), the acquisition of the Curnamona-Gawler Link line provides continuous west-to-east deep reflection seismic coverage from the western Eyre Peninsula to Broken Hill. The linked traverses span the Gawler Craton, Adelaide Geosyncline, and Curnamona Provinces which all host major mineral and energy resources. The seismic traverses acquired by Geoscience Australia will provide a comprehensive dataset for interpreting the geodynamic framework and geological evolution of northern South Australia.

### **Mt Isa – Georgetown Seismic Survey**

The Mt Isa – Georgetown Survey was the first major seismic project completed under the OESP, and comprises three lines for a total of 1175 line-kilometres (See *AusGeo News* 88). The project aimed to define a geodynamic framework for the uranium and geothermal energy potential of the Mount Isa, Georgetown, and Charters Towers provinces of northern Queensland. An additional 200 kilometre long seismic line (07GA-A1) was undertaken by AuScope and was designed to image the Tasman Line between the Proterozoic and Paleozoic rocks of eastern Australia. Deep seismic reflection and magneto-telluric data were acquired during 2007.

Processing and interpretation has been continuing through 2008 and early 2009. Seismic data for line 07GA-IG1 (432 kilometres) linking the Mt Isa and Georgetown blocks was released in December 2008 and to date, three significant features have been interpreted:

- A new sedimentary basin, now named the Millungera Basin, lying beneath the younger Carpentaria Basin.
- A major west-dipping shear zone which defines the eastern boundary of the Mt Isa Block.

- An interpreted fossil subduction zone penetrating the Moho and separating the Georgetown and Mt Isa Provinces.

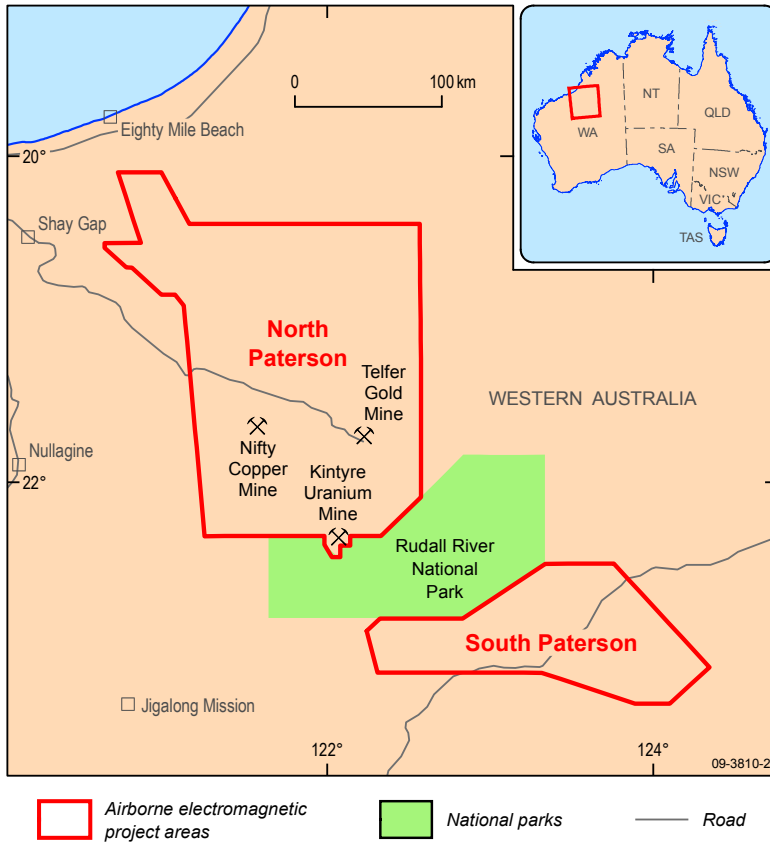
Data and interpretations from lines 07GA-IG2 (243 kilometres) and 07GA-GC1 (492 kilometres) will be released at the North Queensland Exploration and Mining Conference (NQEM) in Townsville in June 2009. Scientists from Geoscience Australia will be leading an interpretation workshop for industry geologists interested in finding out more about the seismic and magneto-telluric results during the conference.

## **Airborne Electromagnetic (AEM) Projects**

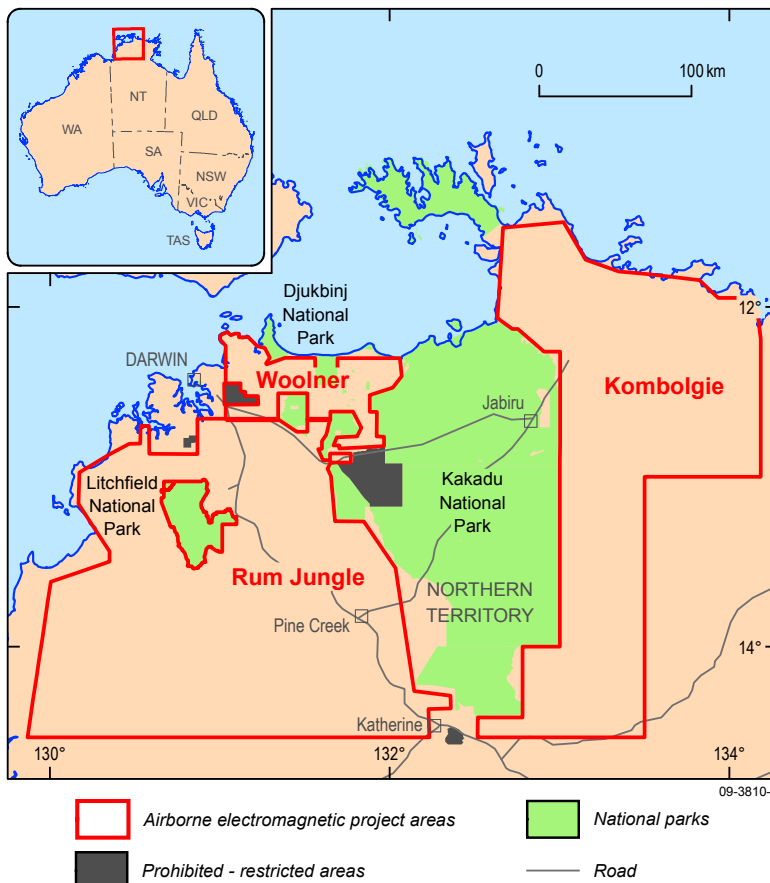
### **Paterson Project**

Airborne electromagnetic (AEM) surveys are being conducted over selected regions around Australia considered to be prospective for uranium. The Paterson AEM survey in north-west Western Australia was the first such dataset to be acquired under the OESP. The survey data comprises 29 200 line-kilometres covering 49 000 square kilometres flown on lines spaced 1 kilometre, 2 kilometres and 6 kilometres apart in a region which includes the Kintyre uranium deposit, the Nifty copper mine and the Telfer gold mine (figure 2).

The Paterson AEM Survey includes 5000 line-kilometres of infill flight lines funded by mining and exploration companies. The data funded by industry will remain confidential for a period of



**Figure 2.** Survey boundaries for the Paterson AEM Project.



**Figure 3.** Survey boundaries for the Pine Creek AEM Project.

12 months. Contractor-supplied data from the Paterson AEM survey has been released to the mining and exploration industry through Geoscience Australia's website and Sales Centre.

During 2009, Geoscience Australia's scientists will undertake further processing and inversion of the AEM. Results will then be combined with outcrop and drilling geology to interpret geological features with possible implications for the uranium prospectivity of the Paterson Province.

### **Pine Creek Project**

The second airborne electromagnetic (AEM) project to be conducted under the OESP is being flown in the Pine Creek province of the Northern Territory. This is the largest AEM survey ever undertaken in the Northern Territory and will cover more than 71 000 square kilometres of the top-end (figure 3). The project was subdivided into three separate survey areas: Kombolgie, Woolner, and Rum Jungle. Line spacings vary between 2 kilometres and 5 kilometres. Data acquisition in the Kombolgie and Woolner areas was completed in late 2008 and flying is anticipated to finish at Rum Jungle by late May 2009.

AEM results to date have improved the understanding of the mineral and groundwater potential in the region by mapping the conductivities of different geological, hydrogeological and regolith units. Inversions of the data will contribute to interpretations of the uranium prospectivity of the

Pine Creek Orogen by imaging key geological features including:

- the depth to the unconformity between rocks of the older Pine Creek Orogen and the younger Kombolgie Sandstone
- the depth and extent of the Woolner Granite and Koolpinyah Dolomite
- the thickness of regolith cover
- major faults and shear zones.

Infill flying is being funded over various locations within the survey area by ten exploration companies, and the National Water Commission provided funding for the Woolner Survey. Data from the Pine Creek AEM Project is expected to be released in late 2009.

## National Geochemical Survey of Australia

The National Geochemical Survey of Australia was initiated to complement the results of the Australia-wide airborne geophysical survey (AWAGS) and improve the existing knowledge of concentrations and distributions of energy-related elements, such as uranium and thorium at the national scale. It will also provide complete uniform geochemical coverage across Australia.

Sampling of surface and subsurface transported regolith at the outlets of large catchments for the project is now well underway in all states and in the Northern Territory. Of about 1500 sites selected to cover all of Australia, 78 percent had been received at Geoscience Australia by 31 December 2008 (figure 4). The field work component of the

survey has been extended to 30 September 2009, in an attempt to maximise the number of target sites that can be sampled.

Sample preparation (drying, sieving, milling, etc.) is well advanced with 50 per cent of the samples ready for analysis by January 2009. Analysis of 25 percent of the samples had been completed by 31 March 2009. The planned outputs of the NGSa project include a multi-element surface geochemistry data set, a web-delivered geochemical atlas, and reports on energy and minerals exploration implications by 2012.

### For more information

#### Onshore Energy Security Program

phone Ned Stolz on  
+61 2 6249 9753  
email ned.stolz@ga.gov.au

#### Seismic acquisition

phone Jenny Maher on  
+61 2 6249 9896  
email jenny.maher@ga.gov.au

#### Airborne electromagnetic surveys

phone Alan Whitaker on  
+61 2 6249 9702  
email alan.whitaker@ga.gov.au

#### National Geochemical Survey of Australia

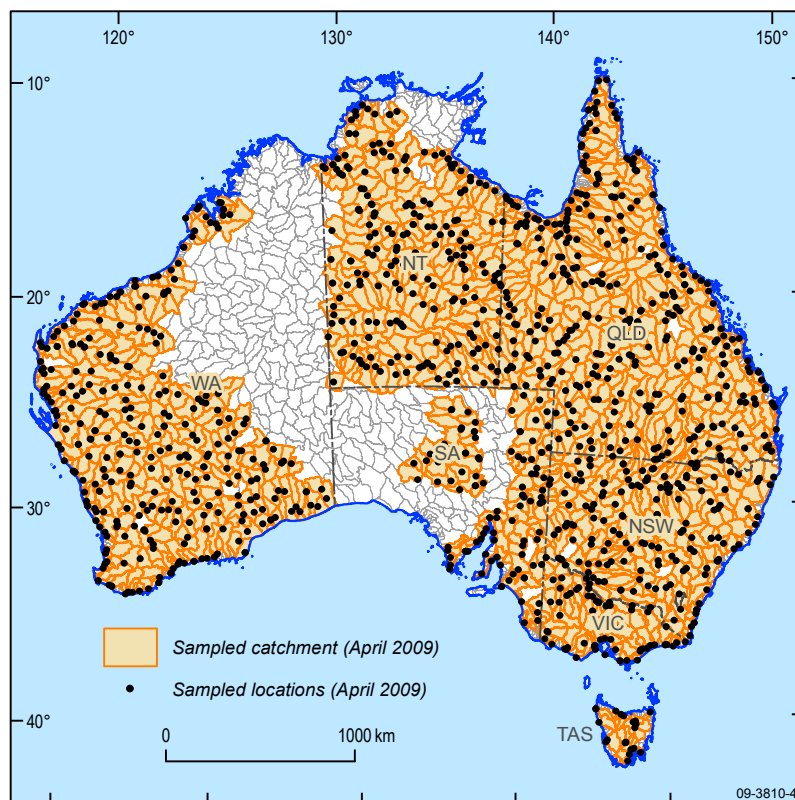
phone Patrice de Caritat on  
+61 2 6249 9378  
email patrice.decaritat@ga.gov.au

### Related websites/articles

Onshore Energy Security Program  
[www.ga.gov.au/minerals/research/oesp/](http://www.ga.gov.au/minerals/research/oesp/)

*AusGeo News* 86: Onshore Energy Security Program takes off

[www.ga.gov.au/ausgeonews/ausgeonews200706/onshore.jsp](http://www.ga.gov.au/ausgeonews/ausgeonews200706/onshore.jsp)



**Figure 4.** Sampling of surface and subsurface transported regolith for the National Geochemical Survey of Australia to 31 December 2008.