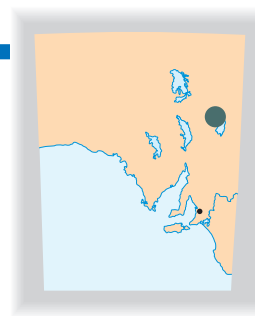


Beverley uranium project

— in situ mining approved

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Introduction

The Beverley uranium deposit lies beneath the Lake Frome plains ~530 km north-northeast of Adelaide and 100 km east of Leigh Creek. The mineralisation was detected by the Oilmin–Transoil–Petromin group in 1969 during a major exploration program for uraniferous breccias in the adjacent Proterozoic Mount Painter Inlier (Fig. 1). The deposit was outlined over the following three years by Western Uranium Ltd (later renamed Western Nuclear) under a joint venture agreement.

The project was frozen due to external influences in 1974, then revived in 1981 by the South Australian Uranium Corporation with the preparation of a draft environmental impact statement (EIS). The then Federal Government's 'three-mine' uranium policy again saw the project frozen after 1983.

Heathgate Pty Ltd, now Heathgate Resources Pty Ltd, acquired the property in 1990 and has investigated mining

using an advanced *in situ* leach (ISL) method (see MESA Journal 9, p.15 and 10, p.20; Heathgate Resources Pty Ltd, 1998).

This article summarises processes put in place that have led to the approvals to mine the Beverley deposit.

Geological summary

The uranium mineralisation at Beverley is confined to three main ore zones in friable sand and clay of the Tertiary Namba Formation. The ore zones occur at depths of 110–140 m over an area 4000 by 500 m. The ore mineral is coffinite, a uraniferous hydrosilicate thought to have been derived by leaching of primary mineralisation in the Mount Painter Inlier, 12 km to the west. The natural groundwater in the ore-zone aquifer is highly saline and radioactive, and is unlikely to be used for any purpose other than mining.

ISL uranium mining

Mines employing the ISL method are significantly different to traditional open pit or underground operations, and provide a number of advantages:

- little surface disturbance
- no exposure of the ore
- no overburden waste
- no large tailings storage areas
- even smaller radiation exposure to workers and the community.

The Beverley project will consist of a processing plant, relatively small evaporation ponds and a wellfield comprising a series of injection and recovery bores linked to the plant by pipeline. The most visible elements will be the plant, which will be about the size of a large shearing shed, the camp and airstrip (Fig. 1). The only evidence of the operating wellfield will be:

- the wells
- wellfield header houses, about the size of a two-car garage
- surface pipelines, which will not be visually intrusive in terms of the local landscape
- access roads.

There will be no pits, shafts, large holes in the ground, overburden dumps, ore stockpiles, tailings dams, smelter or refinery, and no permanently visible change to the terrain.

ISL is essentially a process of pumping and circulating groundwater. At Beverley it will involve reducing the pH of the groundwater to ~2, circulating it through the ore-zone

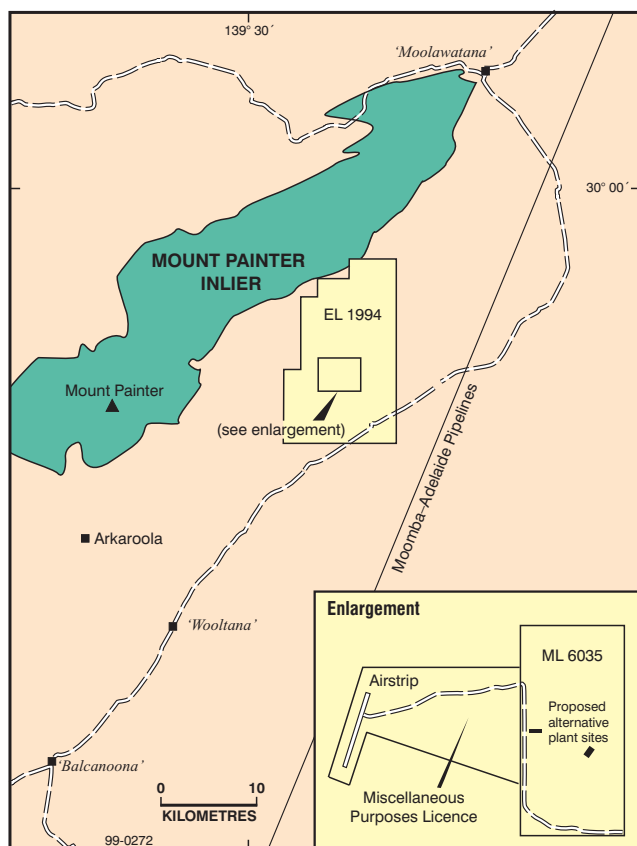
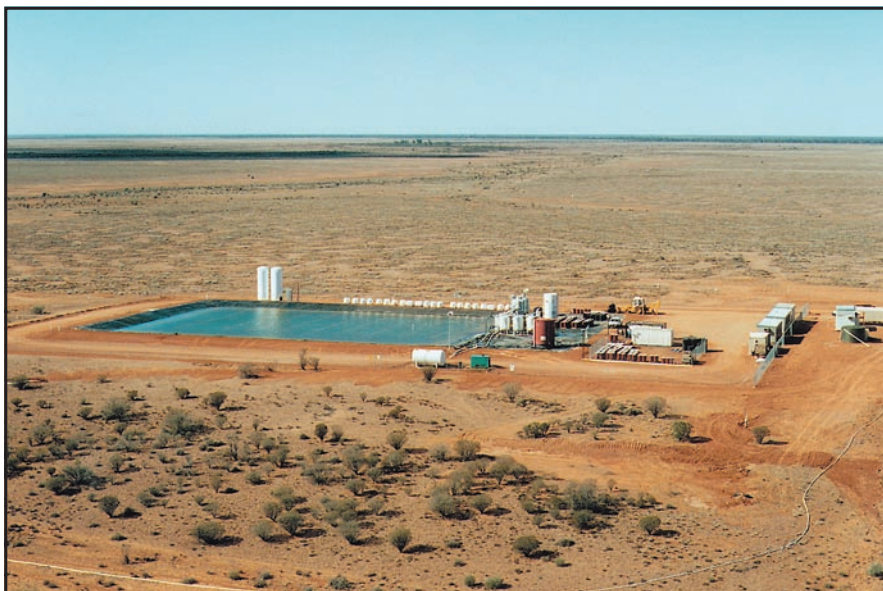


Fig. 1 Location of the Beverley uranium deposit and tenements.



Beverley trial in situ leach plant, 1998. (Photo 46768)

aquifer and adding oxidants, allowing the uranium to dissolve. The pregnant groundwater will be treated at the surface to recover the uranium, then recirculated through the aquifer to continue the process. Comprehensive monitoring and testing will ensure that there are no unacceptable environmental impacts, and provide safeguards for the health of workers and the public.

Field trials of the *in situ* leach process began in January 1998 and ended in December. The trials demonstrated commercial feasibility and provided valuable input into the environmental impact assessment.

Environmental impact assessment

The Beverley environmental impact assessment has been completed. The process was conducted jointly by the State and Commonwealth Governments, and was led by the Environmental Impact Assessment (EIA) Branch of Planning SA. In making its assessment, the EIA Branch coordinated input from a wide range of technical expertise within the State Government, drew on information and expertise from a number of Commonwealth agencies and independent consultants, and sought input from all interested parties, including members of the public, in a comprehensive consultation process. High-level input ranged across many disciplines including:

- hydrogeology
- Aboriginal and European heritage
- mining engineering
- social science
- environmental protection
- mine rehabilitation
- radiation protection
- biology — flora and fauna
- air quality
- economics
- hydrogeochemistry.

Recent events

An important hurdle for the Beverley proposal was cleared on 18 March 1999 when the Federal Minister for the Environment, Senator Robert Hill, confirmed the Commonwealth view that mining operations at Beverley will be environmentally safe. This view is in agreement with that put forward in the State's Assessment Report for the proposal. The Assessment Report arose out of the joint State–Commonwealth environmental impact assessment process and was finalised by Planning SA in December 1998. Senator Hill made his announcement after considering a further independent hydrogeological assessment of the project by the Australian Geological Survey Organisation.

The relevant Federal Ministers have recently decided on the conditions to be imposed on the project in order to gain approvals for foreign investment and export of uranium product. These considerations have been made by, respectively, the Minister for Industry Science and Resources, Senator Nick Minchin, and the Assistant Treasurer, Rod Kemp, with their decisions announced on 30 April 1999.

As South Australia did not wish to prejudice the Commonwealth deliberations, it voluntarily held off finalising the mining lease conditions until the Commonwealth was completely satisfied that the project is both safe and environmentally responsible. After Senator Hill indicated this to be the case, the State moved to complete its consideration of Heathgate's request for the grant of a mining lease.

In accordance with the *Development Act 1993*, the Deputy Premier and Minister for Primary Industries, Natural Resources and Regional Development, Rob Kerin, indicated his intent to grant a mining lease and requested advice regarding the proposed lease conditions from the Minister for Transport and Urban Planning, Diana Laidlaw. Minister Laidlaw referred the matter to the Development Assessment Commission for advice. After review of this advice, the Government granted a mining lease for Beverley, and imposed detailed conditions to protect the environment and safeguard the health and safety of workers and the public.

Benefits arising from Beverley

A wide range of benefits, both tangible and intangible, arise from all responsible mineral development projects such as that proposed for Beverley. The Beverley Mine is projected to have a life of 25–30 years, and to provide South Australians with many benefits:

- It will give rise to 120 direct jobs, and indirectly to a further 350 jobs in service, support and supply industries. An additional 75 jobs are expected to be created during the construction phase.

- Initial up-front investment by Heathgate should be ~\$30 million, over and above the \$9 million spent to date. About 90% of this will be spent within South Australia, mostly for capital works such as the commercial plant, production wellfields and monitoring arrays, roads, camp and accommodation, and an airstrip.
- Local contracting companies (e.g. drilling contractors and construction companies) will benefit substantially.
- The State will benefit directly from the substantial royalties, taxes and charges that will be payable. Depending on the sale prices of U₃O₈, annual royalty payments should amount to ~\$1 million. Heathgate will also be required to pay company taxes, payroll tax, licence fees, etc. Like all responsible members of the community, Heathgate's employees will also pay their full complement of taxes and charges.
- The move to commercial mining at Beverley will send a strong signal to the mining industry that South Australia is a good place to do business, and is serious about encouraging responsible development of its resources for the benefit of all South Australians.
- Substantial benefits will accrue to Aboriginal people from the project:
 - Native title claimants will share a substantial sum, approaching \$1 000 000/year, based on a percentage of sales revenue; these arrangements will continue for the life of the mine.
 - Agreements with the Native title claimants also provide for funding of community projects within the Flinders Ranges Aboriginal community and to each Native title claimant group to cover administration costs.
 - Heathgate has undertaken to achieve at least 20% Aboriginal employment among its Beverley workforce, to train its employees and contractors in Aboriginal culture and heritage, to establish an on-site Aboriginal heritage centre, to encourage development of Aboriginal businesses in the Beverley area, and to build a 5% advantage into quotations by Aboriginal businesses for the supply of goods and services to the mine.
- In addition, the Beverley Mine is expected to substantially boost regional economies through employment and supply of goods and services.
- Each tonne of uranium used for power generation replaces the need to burn an average of 17 000 t of coal (or the equivalent of other fossil fuels), which releases ~40 000 t of carbon dioxide. The atmosphere is therefore expected to benefit considerably from a reduction in greenhouse gas emissions.
- When Beverley commences commercial production in the middle of 2000, it is expected to produce ~500 t of U₃O₈ annually. Full production of ~1000 t/year will have a positive effect on Australia's balance of trade figures by generating export income of ~\$40 million annually.

Australian uranium safeguards

Australian-sourced uranium is used solely for peaceful purposes, primarily power generation, and strict safeguards are in place to ensure this. These include the Nuclear Non-Proliferation Treaties and a number of bilateral agreements. As part of Australia's commitment to policing these arrangements, the Australian Safeguards Office meticulously tracks all nuclear material derived from Australian uranium, wherever it may be in the world.

For further information contact Sam Walker (ph. 08 8463 3088).

Reference

Heathgate Resources Pty Ltd, 1998. *Beverley uranium mine, environmental impact statement, main report.* Heathgate Resources Pty Ltd, Adelaide. ■

DID YOU KNOW?.....

Uranium mining and power generation

- Australia has 25% of the known world estimated recoverable resources of uranium.
- Australia has the world's largest known uranium deposit, at Olympic Dam — ore reserves here contain 350 000 t of U₃O₈ along with 12 million tonnes of copper.
- Australia currently supplies 16% (7000 t) of new uranium mined around the world each year, earning export revenue of \$300 000 000.
- Mining currently provides ~55% (or 42 000 t of U₃O₈) of the world-wide fuel requirements of nuclear power utilities. The remaining 45% comes from drawing down accumulated stockpiles and from the conversion to peaceful purposes of highly enriched uranium and plutonium from military warheads.
- In the 45 years since the first nuclear power stations began operating in 1954, more than 9000 operating 'reactor years' have been accumulated by the civil nuclear power industry.
- Nineteen countries source more than 20% of their electrical power needs from nuclear energy. France and Lithuania both generate 80% of their electricity in nuclear power stations. Other notable members of the world nuclear electricity fraternity include (in order of decreasing nuclear generating capacity) USA, Japan, Germany, Russia, UK, Canada, Ukraine, South Korea and Sweden.
- There are 435 power reactors operating in 32 countries. The combined generating capacity is 350 000 Mwe, which is more than nine times the current total Australian generating capacity. USA has 104 operating power reactors which produce nearly two and a half times the total Australian generating capacity.
- Around the world there are 30 new power reactors under construction by 12 nations; 15 of these are in Asian countries.
- Uranium is currently mined in only two places in Australia, at Ranger in the Alligator Rivers Region of the Northern Territory and at Olympic Dam in South Australia.