

Uranium Mining and Nuclear Facilities (Prohibitions) Repeal Bill 2019

Site visit report

Beverley Uranium Mine, and
Adelaide, South Australia
14 and 15 August 2019



Site visit to Beverley Uranium Mine

On Wednesday 14 August 2019, the Standing Committee on State Development (the committee) visited Beverley Uranium Mine (hereafter 'Beverley') in South Australia, accompanied by the following government officials from the South Australian government agencies:

- Mr Lachlan Pontifex, Director, Resource Policy and Engagement, Department for Energy and Mining
- Mr Greg Marshall, Director Mining Regulation, Department for Energy and Mining, and
- Mr Keith Baldry, Director Science and Radiation, Environment Protection Authority.

The site visit included a briefing, a working lunch and a tour of Beverley. The following organisation representatives were also presented during the visit:

- Dr Andrea Marsland-Smith, Head of Operations, Heathgate
- Mr Stephen Halliday, Head of External Relations & Public Affairs, Heathgate
- Ms Kathryn Levingstone, Regulatory & Compliance Superintendent, Heathgate
- Ms Rebecca Knol, CEO, South Australia Chamber of Mines & Energy, and
- Dr Ben Heard, Director, Bright New World.

A briefing was conducted by Dr Marsland-Smith, Ms Levingstone and Dr Heard and covered information that ranged from Beverley's business profile and its mining operation and practices, to nuclear as a source of power supply.

Dr Marsland-Smith and Ms Levingstone on Beverley's business profile and its mining operation and practices

Beverley is owned by Heathgate Resources Pty Ltd, a subsidiary of a global company "General Atomics" that also invests in other high-tech systems such as aircrafts for defence and drones.¹

Beverley uses in-situ recovery (ISR), an underground mining method, to recover uranium. ISR is a chemical mining process² that utilises uranium's physical property changes to extract uranium from underground. ISR process commences by extracting and using underground water, that has low environmental and ecological value, to produce a chemical solution. The chemical solution is then injected into an ore-bearing underground through an injection well to dissolve uranium. The uranium enriched solution is then extracted from a well and transported to an on-site chemical plant to separate uranium from the fluid and other minerals.³

Key advantages of ISR are:

- low surface disturbance: unlike the open pit mining process, ISR does not require the removal or breakage of ore-bearing rocks
- highly flexible: wellfields or pipelines can be quickly constructed, reused and rehabilitated
- low capital costs comparing to open pit mining
- low radiation exposure to workers.⁴

In terms of its economic value, the global demand for uranium has been relatively low resulting in a low uranium price. Uranium recovered from Beverley is currently sold at between 20 to 25 US dollars per

¹ Heathgate Resources, Presentation delivered to the committee on 14 August 2019, p 3.

² Heathgate Resources, Presentation delivered to the committee on 14 August 2019, p 9.

³ Heathgate Resources, Presentation delivered to the committee on 14 August 2019, p 9.

⁴ Heathgate Resources, Presentation delivered to the committee on 14 August 2019, p 10.

pound.⁵ South Australia currently has 80 per cent of the total, known Australian uranium (New South Wales is estimated to have one per cent).⁶ Heathgate believes that uranium mines they own (Beverley and Four Miles) have enough uranium to support local community and economy in the decades to come. Beverley currently employs 285 staff and twenty per cent of on-site non-professional employees are Adnyamathanha (local Aboriginal people).⁷

Dr Heard on uranium and nuclear power as a source of electricity supply

Uranium has a high energy density; one pellet of uranium can produce an equal amount of power generated by one tonne of coals.⁸ Nuclear power is also a clean energy. It produces zero gas emission at point of generation and very low greenhouse gas emission across the full lifecycle. It is the second largest greenhouse gas free electricity generation, after hydroelectricity.⁹ Unlike other types of low-carbon energy such as wind and solar that rely on weather considerations, nuclear power generates heat through fissioning nuclear fuel and is therefore a more reliable source for energy supply. China currently has approximately 47 operating reactors, and India 22. Currently, nuclear energy powers 10.3 per cent of the global electricity consumption,¹⁰ and while the absolutely quantity is increasing the share has declined from 17 per cent in early 1990s.¹¹

A complete uranium fuel cycle includes: mining, conversion/processing, enrichment, fuel fabrication, new fuel assemblies, reactors and nuclear waste disposal.¹² Under Australia's legal framework, only uranium mining is permitted in certain states and territories and 100 per cent of uranium recovered is exported.

In terms of building a nuclear power plant, the latest innovation is the Small Modular Reactors (SMRs). Smaller than traditional nuclear power plants, the commercial case for SMR is based on lower initial capital costs, shorter construction period, and repeat manufacturing leading to high quality and cost reductions. The nuclear regulatory bodies of USA and Canada are likely to both have licensed the first SMRs the mid 2020s, and the first power might be as early as 2026.

Regarding safety and the disposal of radioactive waste of nuclear power stations, Dr Heard advised that while used nuclear fuel is a serious hazard, the hazard management is 'uncomplicated'.¹³ Managing the hazard of used fuel is based on shielding, distance and time.¹⁴ If fully recycled, 95 per cent of used fuel can be reused in the power plants. Only three per cent of waste left requires disposal, and the disposal time frame is only 300 years. Current practice involves storage of used fuel assemblies in dry casks for

⁵ Heathgate Resources, Presentation delivered to the committee on 14 August 2019, p 7.

⁶ Heathgate Resources, Presentation delivered to the committee on 14 August 2019, p 5.

⁷ Heathgate Resources, Presentation delivered to the committee on 14 August 2019, p 4.

⁸ Dr Benjamin Heard, Nuclear power and the nuclear fuel cycle, Presentation delivered to the committee on 14 August 2019, p 34.

⁹ Dr Benjamin Heard, Nuclear power and the nuclear fuel cycle, Presentation delivered to the committee on 14 August 2019, p 10.

¹⁰ Dr Benjamin Heard, Nuclear power and the nuclear fuel cycle, Presentation delivered to the committee on 14 August 2019, p 10.

¹¹ Dr Benjamin Heard, Nuclear power and the nuclear fuel cycle, Presentation delivered to the committee on 14 August 2019, p 11.

¹² Dr Benjamin Heard, Nuclear power and the nuclear fuel cycle, Presentation delivered to the committee on 14 August 2019, p 14.

¹³ Dr Benjamin Heard, Nuclear power and the nuclear fuel cycle, Presentation delivered to the committee on 14 August 2019, p 34.

¹⁴ Dr Benjamin Heard, Nuclear power and the nuclear fuel cycle, Presentation delivered to the committee on 14 August 2019, p 23.

intermediate storage, with the intention of geologic disposal based on much longer timeframes. Used fuel in intermediate storage has not resulted in any deleterious human health or environmental impacts.

Dr Heard compared the potential harm caused by nuclear power generation to the air pollution caused by coal fire power. He reported published modelling results that suggest the reduction in air pollution by developing nuclear power instead of coal power has saved approximately 1.8 million lives from respiratory-related illness.

Dr Heard recommended that when policy makers consider the plan for the future national electricity grid, they should consider using the word 'clean energy' as oppose to 'renewable energy', as nuclear energy is often excluded in the mix when only renewable energy is considered.

Meetings on 15 August 2019

On Thursday 15 August 2019, the committee met with the following representatives from the South Australian Government, the former South Australian Nuclear Fuel Cycle Royal Commission and Response Agency, BHP and Flinders Ports:

- Rear Admiral Kevin Scarce, former South Australian Governor and Royal Commissioner to the South Australian Nuclear Fuel Cycle Royal Commission
- Mr Lachlan Pontifex, Director Resource Policy and Engagement, Department for Energy and Mining
- Mr Jason Downs, Manager, Engagement Solutions, South Australian Department for Innovation and Skills
- Mr Greg Marshall, Director Mining Regulation, South Australian Department for Energy and Mining
- Mr Keith Baldry, Director Science and Information, South Australian Environment Protection Authority
- Mr Paul Heithersay, Chief Executive, Department for Energy and Mining
- Mr Martin Smith, Head of HSE, Olympic Dam, BHP
- Mr Neil Camillo, Manager, Radiation and Hygiene A&I
- Mr Emmet Fay, Principal Government Relations, Olympic Dam Corporate Affairs, BHP
- Mr Jim Hondros, Consultant to BHP
- Mr David Sleath, General Manager, Flinders Adelaide Container Terminal, and
- Mr Joe Mastrangelo, Director, Infrastructure and Investment, South Australian Department for Energy and Mining.