Driving without a license: uranium mining 'trials' in SA
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Introduction

Under current South Australian legislation, the mining of real uranium and the polluting of real groundwater is permitted without an assessment of its potential environmental impacts or even public consultation. This occurs when a mining company is granted a "retention lease", allowing it to mine radioactive ores on a so-called "trial" basis before obtaining a commercial mining lease. Such a gaping legal loophole seriously challenges the South Australian government's expressed commitment to the "strictest environmental standards" for uranium mining.

A further "trial" is now tipped for Curnamona Energy Limited's Oban deposit, northwest of Broken Hill. "Field trials" of acid in-situ leach (acid ISL) uranium mining have already occurred at the Beverley uranium mine and the proposed Honeymoon site in north-eastern South Australia.

Given the history of leaks and spills that occurred at Honeymoon and Beverley during their "trial" phases, there is significant cause for concern around further such "trials". Six spills were recorded at the Honeymoon trial mine in 1999, including one "excursion" of 9,600 litres of "process fluid"[1], which had a significant uranium and toxic radon gas content[2], and another in which sulphuric acid injected into the groundwater as part of the mine process unexpectedly traveled upwards, contaminating a higher aquifer[3]. None of these spills were revealed to the public until after the project had been granted state and federal approvals. During the trial at Beverley through 1998, 500 litres of extraction fluid were spilt, the accident not revealed until 5 months after it occurred[4]. Beverley also experienced a major underground leak of radioactive mining solution to groundwater in 1999, also not confirmed until after state government approvals in 2001[5].

While one purpose of conducting a "trial" may be to determine the extent and nature of a groundwater system, the injection of acid and radioactive mine waste into aquifers is not an acceptable way of doing this. The South Australian community has a democratic right to participate in decision-making regarding activities with significant environmental impact such as mining. The history of leaks, spills and accidents that characterise ISL mining emphasise the urgent need for full environmental assessment to be conducted before the commencement of any mining, "trial" or otherwise.

South Australian mining legislation

Under the *Mining Act 1971 (SA)*, there are three leases that a mineral explorer can apply for: a) exploration, b) retention and c) mining. A retention lease allows a company to 'retain' the right to the land while they prepare to begin mining activities. Section 6A of the Act directs that a retention lease can be granted:

- If "for economic or other reasons the applicant is, in the opinion of the Minister, justified in not proceeding immediately to mine the land in pursuance of a mining lease"
- "[W]here in the opinion of the Minister sufficient investigation has not yet been carried out to enable him to determine the terms and conditions upon which a mining lease should be granted", or

[1] Hockley, C 2001a, 'New doubts on uranium mine safety', *The Advertiser*, 19 August 2001, p. 8
[2] Environment, Communication, Information Technology and the Arts References Committee 2003, 'Executive Summary and Recommendations', *Regulating the Ranger, Jabiluka, Beverley and Honeymoon uranium mines*, Commonwealth of Australia, p. 226
[3] Hockley, C 2001b, 'Company denies "inconsistency"', *The Advertiser*, 12 December 2001, p. 8
[4] Environment, Communication, Information Technology and the Arts References Committee 2003, 'Executive Summary and Recommendations', *Regulating the Ranger, Jabiluka, Beverley and Honeymoon uranium mines*, Commonwealth of Australia, p. 177
[5] Australian Conservation Foundation, 'Broken pipes and broken promises', 2002

- **"[W]here the applicant seeks an authorisation to carry out mining operations for the recovery of a radioactive mineral and the Minister thinks it desirable to defer the granting of a mining lease endorsed with such an authorisation."**

Through the legal anomaly of the third point, uranium mining can begin without public consultation and environmental impact assessment. At a minimum, uranium mining companies should have to work within the same legal framework as other companies with the same environmental safeguards and public processes. They should not be able to begin environmentally risky mining practices under special regulations that allow no scope for public comment or assessment of environmental impacts.

Curnamona's Oban: the next "trial"?

The Oban deposit is located 120 kilometres northwest of Broken Hill, on Mulyungarie Pastoral Station, on the southern edge of the Strzelecki Desert. Biological surveys of the North Olary Plains region indicate significant biological diversity[6], providing habitat to over 50 reptile species, 22 mammal species (including a number of conservation concern) and 2 amphibian species.

The region hosts over 125 species of birds, among these are over 20 birds on national and state vulnerable and endangered species lists including the Plains Wanderer, Freckled Duck, Scarlet-chested parrot, Australian Painted Snipe and many migratory species.

Vegetation records for the Lake Charles paleochannel area show 48 indigenous plant species, including stands of black oak, mulga, bullock bush and turpentine, with an understorey of saltbush and grasses.

In October 2007, Curnamona Energy Limited announced that drilling results confirmed "economic grades of uranium mineralization over at least 3 kilometres, hosted by water saturated sands"[7]. Curnamona intends to extract this uranium from groundwater through the acid ISL process. Acid ISL involves injecting large quantities of sulphuric acid into groundwater to dissolve uranium present in aquifers. The sulphuric acid solution, containing the dissolved uranium, is pumped back up to the surface, processed, and the mine waste (including radioactive particles and heavy metals) is dumped back into the groundwater.

The reinjected toxic and radioactive mine waste is now mobile in the aquifer and capable of spreading to pollute connected groundwater systems. The 2003 Senate Report into Regulating the Ranger, Jabiluka, Beverley and Honeymoon uranium mines emphasised that "at the very least, [acid ISL mines] should be subject to strict regulation, including prohibition of discharge of radioactive liquid mine waste to groundwater, and ongoing, regular independent monitoring to ensure environmental impacts are minimised". In stark contradiction to this recommendation, under current SA legislation, acid ISL "trials" do not even require an environmental impact assessment.

Very little is known about the groundwater of the Oban region. The uranium-bearing aquifer is part of an ancient riverbed, or 'paleochannel', but little is known about where the paleochannel begins or ends, where it discharges or how fast the groundwater flows. In fact, paleochannel systems are some of the least understood elements of Australian ecosystems. While part of the claimed purpose of a "field trial" may be to improve understanding of an area's groundwater, the treatment of that same groundwater as a nuclear sacrifice zone through the "trial" process is indefensible.

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[6] Playfair, R.M. & Robinson, A.C., eds, *A Biological Survey of the North Olary Plains, South Australia, 1995-1997*, Natural Resources Group, Department of Environment and Natural Resources, South Australia, 1997.

[7] Curnamona Energy Limited, 'Uranium mineralisation extended for over 3km at Oban', http://www.curnamona-energy.com.au/pdf/announce_2007_10_11_CUY.pdf

The legacy of acid in situ leach (ISL) mining

Twenty percent of the world's uranium comes from the ISL process, with countries such as the US opting for the less polluting but more expensive process of alkaline ISL mining. According to Monash University's Dr. Gavin Mudd, the use of alkaline chemistry is "partly related to the need to restore affected groundwater, and the recognition that alkaline mine sites are technically easier to restore"[8].

Both acid and alkaline ISL mines across the world have left a track record of contamination of surrounding groundwater systems, some of which are the main water supply for communities, with attempts to rehabilitate the groundwater often unsuccessful. Some of the European cases include:

- **Königstein** (Germany): as of 2005, there was still 1,900 million m^3 of radioactive and heavy metals contaminated water within the mining zone[9]. This pollution lies within an aquifer that supplies Dresden with drinking water;
- **Devladovo** (Ukraine): the surface of the site was heavily contaminated from spills, and groundwater contamination is spreading downstream from the site at a speed of 53m per year. By 1995 it had already traveled a distance of 1.7km, and will reach the village of Devladovo in the next 12 years[10];
- **Bolyarovo, Tenevo/Okop, Haskovo**(Bulgaria): very high concentrations of sulfate ions are found in surface water and in the wells of private owners as a result of accidental spilling of solution[11]. All uranium mining and milling in Bulgaria was closed down by government decree in 1992, after over 20km2 of the country was contaminated by uranium industry activity[12].

The contamination at these and many other sites, including the high concentrations of major ions, heavy metals and radionuclides, has not attenuated significantly over time (as uranium mining companies claim), and instead often migrates through groundwater to pollute other areas.

US geochemist and environmental scientist Richard Abitz comments on his own experience attempting to rehabilitate groundwater at ISL uranium mines in Ohio, Texas and Wyoming. When the mining chemicals are injected into groundwater, he observes, uranium contamination "goes through the roof". "Once it is in there, the damage has been done", he says. "It takes hundreds, perhaps thousands of years to transform aquifer water back into a drinkable condition", and "regardless of the millions of dollars and years of efforts, the water has never been restored."[13]

Australia's own problematic experience with ISL uranium mining (limited to the Beverley mine, and the Honeymoon and Manyingee, WA, "trials"), combined with the experience of ISL overseas emphasise the serious risks and impacts of this mining method. That such mining should be permitted in South Australia on a "trial" basis, without environmental impact or public consultation is a grave concern that demands legislative amendment.

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[8] Mudd, G. M. 2000, 'Acid In-situ Leach Uranium Mining 1: USA and Australia', *Tailings and Mine Waste '00*, p. 517, www.sea-us.org.au/pdfs/tmw00/TMW00-Oz-USA.pdf

[9] WISE Uranium Project, 2005, 'Impacts of Uranium In-situ Leaching', *WISE Uranium Project*, Amsterdam, http://www.wise-uranium.org/uisl.html

[10] Molchanov, A, Soroka, Y, Isayeva, N & Mordberg, E; 1995, *"The State of Environment on Former Site of In-Situ Leaching of Uranium"*. In: Slate, S, Baker, R & Benda, G (Eds.), Proceedings of the Fifth International Conference on Radioactive Waste Management and Environmenttal Remediation, ICEM'95, Vol. 2 - Management of Low-Level Waste and Remediation of Contaminated Sites and Facilities, ASME, New York, 1995, pages 1507-1510.
From http://www.sea-us.org.au/isl/islisbad.html

[11] Vapirev, E I, Dimitrov, M, Minev, L, Boshkova, T, Pressyanov, D S & Guelev, M G; 1996, *"Radioactively contaminated sites in Bulgaria"*. In: Planning for environmental restoration of radioactively contaminated sites in central and eastern Europe, Vol. 1: Identification and characterization of contaminated sites, IAEA-TECDOC-865, Vienna 1996, pp 43-63.

[12] Mudd, G M, 2000, Acid In Situ Leach Uranium Mining : 2 Soviet Block and Asia. Proc. "Tailings & Mine Waste '00 - 7TH International Conference", Fort Collins, CO, USA, January 23-26, 2000, pp 527-536

[13] Norrell, B 2004, 'Scientists back Navajos fighting uranium mining', *Indian Country Today*, 12 March 2004, http://why-war.com/news/2004/03/12/scientis.html, www.indiancountry.com/?1079105136

Summary and Recommendations
The legacy of in-situ leach uranium mining around the world demonstrates the risks and often dire impacts of the ISL mining method. Inexplicably, under current South Australian legislation, such uranium mining can proceed on a "trial" basis, without any environmental assessment or public process. Despite being called "trials", such mines inject real chemicals into real groundwater, extract real uranium and produce real radioactive waste.

Such legislation questions the State Government's espoused commitment to the "strictest environmental standards" for uranium mining in South Australia. This gaping legal loophole needs to be closed to ensure that state legislation appropriately acknowledges the unique risks and impacts of mining, to strengthen the accountability of mining companies, to allow the full participation in decision-making by all community members, and to protect the environment and the integrity of our precious water resources.

Friends of the Earth is calling for legislative amendment to the *Mining Act 1971 (SA)* to guarantee a) full public consultation, and b) environmental impact assessment, before any such mining activities occur.

For more information, contact:
Peter Burdon 0439 294 386, peter.burdon@foe.org.au
Joel Catchlove 0403 886 951, joel.catchlove@foe.org.au

Friends of the Earth Adelaide
120 Wakefield St
Adelaide SA 5000
(08) 8227 1399
http://www.adelaide.foe.org.au