

CHAPTER 3

South Australia: Beverley and Honeymoon

Introduction

3.1 This chapter examines the uranium mining operations in South Australia at Beverley and Honeymoon. From an environmental perspective, the key commonality between these two South Australian operations, and what sets them apart from the Olympic Dam uranium mine in South Australia, is their use of *in situ* leaching (ISL) as the extraction technique. The use of this technique was contentious and the Committee in the first part of the chapter addresses concerns and issues regarding ISL as an extraction technique for mining uranium. This discussion about the environmental impact of ISL is not specifically within the Committee's terms of reference; however the Committee considers that concerns regarding the ISL technique are sufficiently inter-related to the matters being examined by the Committee to warrant consideration. The second section of this chapter, deals with the effectiveness of the reporting, monitoring and regulatory regime for the Beverley uranium mine and the third section relates to the Honeymoon uranium mine.

The ISL technique

3.2 Beverley is currently the only Australian uranium mine in commercial production that employs the ISL extraction method, although it is also proposed for use at Honeymoon in the event that it enters full production. For the sake of convenience, this part substantially addresses the use of ISL at Beverley with only minor references to Honeymoon.

3.3 ISL was originally developed in the USA during the 1970s for use in geological formations containing potable water, and was first employed commercially in 1975. ISL projects are presently licensed to operate in Wyoming, Nebraska, New Mexico and Texas, with most being less than a decade old. Although some are relatively small by Australian standards, they supply some 85% of the USA's uranium output. ISL - in varying degrees of technological complexity - has been adopted by the uranium mining industries of several nations, including the Czech Republic, the People's Republic of China, Uzbekistan and Kazakhstan. Approximately 15 per cent of world uranium production is obtained through ISL, including the whole of the Uzbekistani output and the majority of Kazakhstan's. ISL mining is expected to begin in the Russian Federation soon.¹

1 Uranium Information Centre (2001), *In Situ Leach (ISL) Mining of Uranium*, Nuclear Issues Briefing Paper, No. 40: www.uic.com.au/nip.

A description of ISL

3.4 ISL, known also as ‘solution mining’, involves leaving the ore in the ground and pumping liquids through it in order to recover the minerals from the ore by leaching. It removes economic minerals from the host ore without also removing the ore and overburden. A concise description of this form of mining has been provided by Environment Australia (EA):

ISL mining is the process of passing acidic or alkaline groundwater (the reagent) through the ore host (usually sand) to dissolve the uranium minerals where they occur.

Patterns of vertical boreholes (wells) are drilled into the deposit and lined with watertight casings to maintain hole integrity down the well to the top of the ore zone. Perforated screen liners are installed in the wells below the casing, to enable injection and production of fluid from the uranium-bearing sand and fine gravels (ore zone). Natural groundwater is withdrawn from the ore zone via wells designated as production wells and pumped to the processing plant on the surface. At the plant, leaching agents and oxidants are added to replenish the leach solution that is then recirculated to the ore zone via other wells designated as injection wells.

In the ore zone, leach solution dissolves uranium from between the sand grains, leaving the sand intact. The resultant ‘pregnant’ solution is drawn to production wells and pumped out to the processing plant where the uranium is recovered as the commercial product, yellowcake. The barren solution is then reconditioned, if required, by adding more leaching agent and oxidant, and recirculated through the well field and process plant in a continuous cycle of leaching and uranium recovery, until production and recovery levels of uranium fall below economic levels.²

3.5 The ISL method is less capital intensive than conventional mining; it does not require the complex infrastructure necessary for underground mining. Its ‘economic viability is dependent on the concentration of uranium in the host ore and on groundwater chemistry, ore permeability and reagent cost’.³

3.6 Uranium deposits that are economically suitable for ISL are found in permeable sand or sandstone formations, confined above and below by impermeable strata, and situated underneath the water table. The uranium minerals usually comprise uraninite (oxide) or collinite (silicate) coatings on individual sand grains. The two main methods of leaching are acid and alkaline leach: the former lowers the pH; the latter raises it. Both geology and groundwater chemistry determine which ISL operating regime is used. If the ore body contains a significant amount of calcium, such as limestone or gypsum, alkaline leaching is employed in preference to acid ISL, because the use of acid necessitates uneconomic consumption of that chemical.

2 Environment Australia, *Submission 86*, pp 6-7.

3 Environment Australia, *Submission 86*, p 6.

However, acid (sulphate) ISL is generally quicker-acting and more economic than alkaline (carbonate) leaching.

3.7 In the USA, where sandstone deposits contain a high level of limestone, the alkaline method is used. It involves substantial *in situ* solution regeneration and rehabilitation combined with remote, deep well bleed solution disposal. The acid ISL techniques cannot be used in the USA due to prevailing calcium (limestone) levels and the extensive groundwater rehabilitation needed in order to maintain the amounts of potable water relied on by nearby users. Alkaline solutions like ammonia or sodium carbonate were originally employed in the USA. The difficulties encountered in restoring ammonia-based sites, however, led to the substitution of sodium bicarbonate or carbon dioxide-based solutions.

3.8 Whereas in America uranium mines resort to alkaline leach because of limestone's neutralising effects on acid, the Beverley mine operates on acid leach method. According to Heathgate Resources, the prevailing salt levels and the incidence of slight acidity render acid leaching more effective. Theoretically, Beverley could be leached using the alkaline method because its salt content is below the required threshold. However, given the geology and chemistry of the site, the acid leach method is the more efficient.⁴

3.9 Dr Matthews contrasted the acid method adversely with the alkaline approach:

There are no technical reasons for not using alkaline. In fact, environmentally, if you had to choose between acid and alkaline, it is by far the best choice. Economically, however, sulfuric acid is the best choice. Environmentally, if you use sulfuric acid, you dissolve a heap of other elements apart from the uranium, ...

It therefore becomes more important when you are using acid that you have proper waste management. Proper waste management in most places around the world means—for example, as at Roxby [Downs]—that you cannot pump the liquids underground.⁵

3.10 The ACF stated:

People should understand that alkaline ISL is, by its nature, much less impacting. The use of alkaline tends to be specific to dissolve uranium. With a suite of heavy metals and radionuclides in the ore, the use of alkaline tends to be much more specific to dissolve the uranium rather than that whole suite. The use of acid dissolves the whole suite of radionuclides and heavy metals, so the use of acid leads to a very much larger pollution load. That which was originally immobile, inert and in solid form in the orebody,

4 Heathgate Resources Pty Ltd (1998), *Beverley Uranium Mine Environmental Impact Statement: Main Report*, Adelaide, 5.4.1; Amdel Ltd, Mineral Processing Services, *Leach Testing of Beverley Uranium Samples*, Report No 07353, March 1992.

5 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 168.

through the use of acid becomes mobile, soluble and bio-available—and a moving pollution plume in ground water.⁶

Wellfield, processing plant and uranium recovery

3.11 The Beverley project consists of wellfields that are progressively established over the orebody as uranium is depleted from sections of the orebody immediately beneath it. Wellfield design is laid out on a grid with alternating extraction and injection wells, each of identical design and each resembling normal water bores. Each pattern of four separate injection wells, set some 30 metres apart, possesses a central extraction well equipped with a submersible pump.



Beverley Wellfield

Source: Heathgate Resources Pty Ltd.

3.12 Within the active mining area, the volume of solutions extracted is always slightly more than the volume injected, thus ensuring a slight and continuous inflow from the surrounding formation into the designated mine area and minimising leakage of mining solutions away from the active mining area (called ‘excursions’). A series of monitoring wells is situated around each mineralised zone to detect any movement of mining fluids outside the mining area. The wells are cased for the purpose of ensuring that liquids flow only to and from the ore zone and to prevent them adversely affecting any overlying aquifers. They are also pressure-tested before use.⁷ The ISL method requires the continuous circulation of large volumes (20–40 million litres each day) of leach solution that contains uranium (20–200 mg/litre or 0.002%–0.02%).⁸

3.13 The extraction process involves altering the pH level of the groundwater in the uranium-bearing aquifer and adding oxidising and complexing (acid or alkaline)

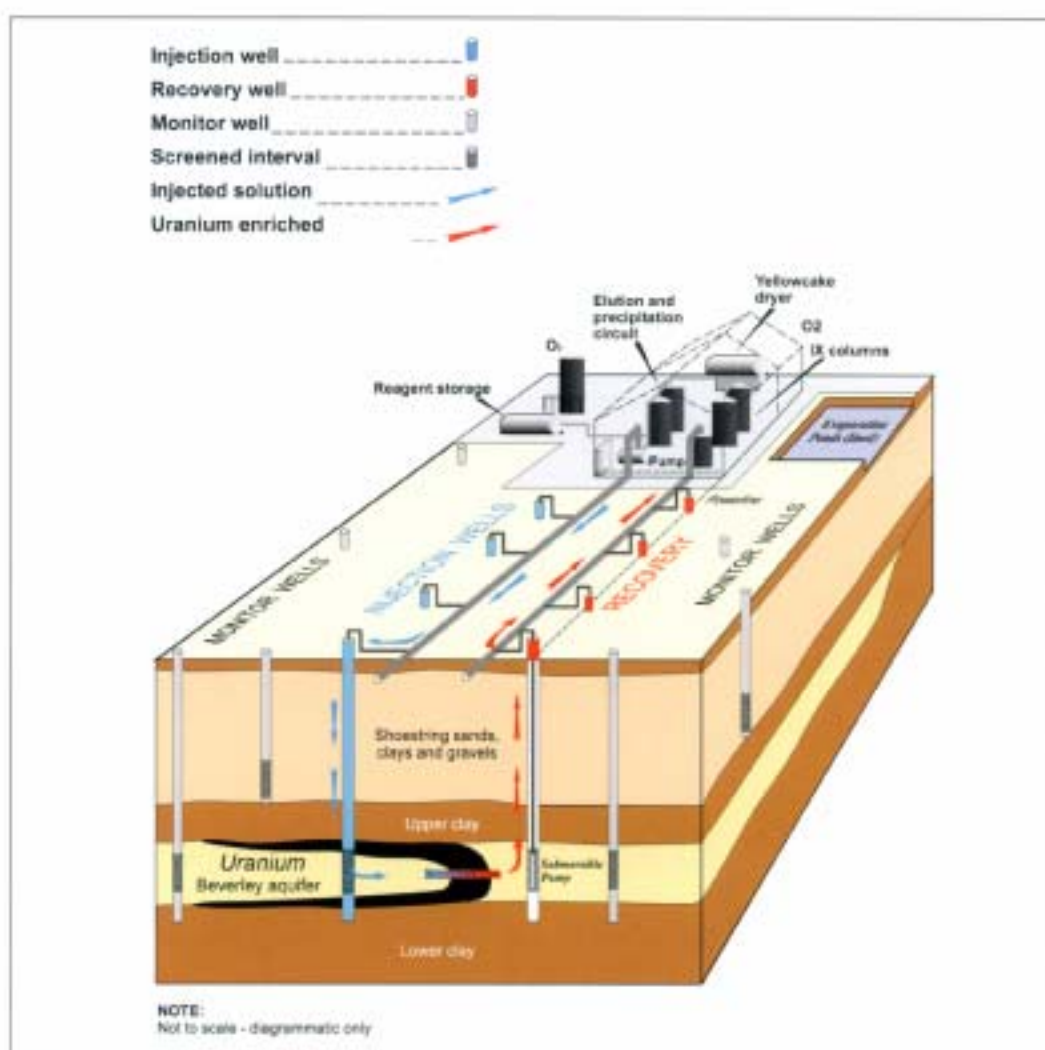
6 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 200.

7 Heathgate Resources Pty Ltd (1998), *Beverley Uranium Mine Environmental Impact Statement: Main Report*, Adelaide, pp 4 (22)-4 (27).

8 South Australian Chamber of Mines and Energy, *Submission 39*, pp 3-4.

reagents to enable the creation of an environment in which the uranium dissolves. The oxidant mobilises the uranium, the acid retaining it in solution until it reaches the processing plant, where it is extracted from the mining solution. Commonly used oxidising reagents are oxygen and hydrogen peroxide, though alternatives are sometimes used. This solution is then pumped to the surface and treated at the processing plant to recover the uranium. The barren solution is refortified in order to replace used reagents, and recycled to the injection wells. Within each area, this cycle continues until the uranium remaining in the core is depleted to uneconomic levels.

Figure 3.1 Schematic processing model showing ISL leach method used at Beverley



Source: Heathgate Resources Pty Ltd.

3.14 The two principal methods of recovering uranium from solution are resin ion exchange (IX) and liquid ion exchange, or solvent extraction (SX). The choice of method is determined largely by the chemistry (principally salinity) of the groundwater surrounding the mine. Since IX is more effective in regions of low

salinity, it has been implemented at Beverley. The processing technique used is determined primarily by groundwater chloride levels and orebody characteristics.

3.15 In IX, the uranium attaches itself to resin beads that are constantly re-used as part of a process strongly resembling the way in which the resin in a domestic water softener draws minerals from water.⁹ This is known as the ‘capture’ process. Once ‘captured’, the uranium is extracted from the resin by reversing the capture process. The resulting liquid is treated with chemicals, leading to the precipitation of the uranium as a flaky solid. Most of the water is then removed, producing yellowcake.

3.16 In SX, the uranium-bearing solution is mixed with a kerosene-based solvent that causes the uranium to transfer to the solvent, which can then be separated from the mining solution. The mining solution is then re-treated with leaching agents and returned to the ore zone to recover more uranium, while the solvent is treated with sodium carbonate which in turn is passed through a hydrogen peroxide circuit to precipitate uranium oxide as yellowcake.¹⁰

3.17 At Honeymoon, Southern Cross plans to use solvent exchange owing to the high salinity levels. Heathgate may also have to use SX in the southern portion of the Beverley deposit where salt levels in the aquifer are higher than in the northern and central parts.¹¹

Discussion of the issues

3.18 There were numerous objections put to the Committee on the ISL method used at Beverley and the regulatory regime that permits discharge of waste to groundwater in particular. The ACF stated:

... the regulatory regime at state and Commonwealth levels should be able to demonstrate how the company can operate without any ground water impacts and without any surface leaks. That would involve, in our view, that they should have to conduct a new public environmental impact assessment on how they manage their radioactive wastes and on their ground water impacts. That should have some minimum standards in place which should include that there be no discharge of liquid wastes to ground water, that there be rehabilitation of the acid leach impacts on ground water and that there should properly be required bonds for ground water impacts. Just as they require a bond for surface impacts, they should require a bond for ground water impacts. They should also require—as should have been done in the trial mining but was not done—a demonstrated capacity to rehabilitate

9 Uranium Information Centre (2001), *In Situ Leach (ISL) Mining of Uranium*, Nuclear Issues Briefing Paper No. 40: www.uic.com.au/nip.

10 <http://www.southerncrossres.com/im/index.html>

11 Minister for Primary Industries, Natural Resources and Regional Development, South Australia, Assessment Report on the Environmental Impact Statement for the proposed Beverley Uranium Mine, 1998, p 21.

the ISL impacts on ground water. Otherwise the company should not be allowed to operate.¹²

3.19 Mr Bruce Thompson, representing the Friends of the Earth, Australia (FoE), called for a re-examination of two major, interrelated features of the ISL process as employed at Beverley: the liquid disposal of radioactive waste and the rehabilitation of groundwater. In order to achieve this, he advocated a review of the Beverley operation under the terms of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).¹³ The Australian Conservation Foundation (ACF) shares FoE concerns about the discharge of liquid mine waste into groundwater, and recommended that responsible Commonwealth agencies undertake a new public environmental assessment of Heathgate Resources' Waste Management Program.¹⁴

3.20 Dr Dennis Matthews, Nuclear Issues Spokesperson for the Conservation Council of South Australia (CCSA), told the Committee that the connected questions of how sulfuric acid and the chosen oxidant react in dissolving the uranium, and of proper waste management, are pivotal in evaluating the ISL method.

3.21 In Dr Matthews' judgment:

The issue here is: what is the oxidant being used in this process? There are a variety of oxidants. Oxygen, hydrogen peroxide, sodium chloride and ferric chloride are some of the common oxidants. They are crucial to the process. Without them, no effective mining occurs. Depending on which oxidant you use, you will get a variety of contaminants and pollutants in the final solution. Therefore, this has an effect on how you treat and manage those wastes.¹⁵

It therefore becomes more important when you are using acid that you have proper waste management. ... in most places around the world means ... that you cannot pump the liquids underground. They are put into a tailings dam. You evaporate most of the liquid. You are left with a relatively small amount of solid which then should be properly managed and kept out of the ecosystem. That is not being done at Beverley and Honeymoon.¹⁶

In all the documentation that the public has had access to and which it commented on, the oxidant in both cases has been assumed to be oxygen. That is a relatively mild oxidant. Since then, we have learnt—and we still do not know 100 per cent the answer to this—that it appears that the oxidant

12 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 181.

13 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, pp 285-286.

14 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 292.

15 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 167.

16 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 168.

they are now using is hydrogen peroxide. That puts a completely different complexion over the whole process.¹⁷

3.22 In his submission to the inquiry, Dr Matthews asserts that, as the mobilisation of radioactive and toxic materials is intrinsic to ISL, all waste materials should be kept out of the groundwater. He says that at Beverley, liquid detritus is being disposed of into the groundwater, and the aquifer polluted by acidic, toxic, radioactive liquid.¹⁸ Dr Matthews argues that ISL mine operators should be required to evaporate the liquid wastes at the surface via a tailings dam, which would reduce the volume to a relatively small amount of stable solid:

The solids that end up after evaporation are relatively easy to deal with because they are much lower in volume. They are a fraction. We are talking about a solid content of, I would say, less than 0.1 per cent.¹⁹

3.23 Heathgate Resources rejects the idea of above-ground storage, claiming that ‘an exhaustive investigation process conducted by the Commonwealth has shown that above-ground storage is not desirable’.²⁰

3.24 Heathgate Resources also argues that the aquifer was polluted before mining began by contaminants like natural radioactivity, salt and minerals, which had already rendered it unfit for human, agricultural or livestock use.²¹ In similar vein, the company dismisses the suggestion that the extracted solution central to ISL mining poses a potential environmental threat to nearby aquifers. Heathgate Resources argues that extraction levels are increased and decreased to prevent the extracted solution from entering nearby aquifers and the Beverley aquifer is completely isolated, with no demonstrable connection to surrounding aquifers.²²

3.25 The issue of the connectivity between aquifers was particularly contentious. Several environmental groups, including the ACF, argued that there is considerable uncertainty surrounding this issue. These arguments were supported by Mr Tim Khan of Environment Australia, who suggested that the questions of aquifer self-containment and the ultimate destination of outflows from the ISL process are not yet fully resolved.²³ Heathgate Resources’ opinion on this issue is that the Beverley aquifer is ‘an isolated palaeochannel’ and that the issue of connectivity has been

17 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 168.

18 Dr Matthews, *Submission 16*, pp 6, 15-16.

19 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 169.

20 Heathgate Resources Pty Ltd, *Submission 70a*, pp 24-25.

21 Heathgate Resources Pty Ltd, *Submission 70a*, p 24.

22 Dr Matthews, *Submission 16*, p 17; Heathgate Resources Pty Ltd, *Submission 70a*, p 34.

23 Mr Kahn, *Committee Hansard*, Canberra, 18 October 2002, p 310.

resolved.²⁴ Clearly, this is one aspect of the Beverley project that requires additional research.

3.26 Owing to the uncertainty about the linkages between aquifers, there is a concern that the Beverley project may pose a risk to the Great Artesian Basin (GAB). Heathgate Resources argues that the Beverley operation does not pose any threat to the Great Artesian Basin because the mine poses no threat to the Beverley aquifer, and further that the Basin and the Beverley aquifer are separated by 200–175 metres of impermeable shale and clay.²⁵ Mr David Noonan, of the ACF, disputes this:

... the aquifer at Beverley may be moving only a few metres a year, but the company claims that somehow it is isolated or stagnant. Again, in our view, that does not make sense in that the Great Artesian Basin only moves at a few metres per year but people readily accept that as a functioning system, although it may function over long periods of time. People do not claim that the Great Artesian Basin is somehow stagnant because it moves at the same rate as the Beverley aquifer.²⁶

3.27 Dr Philip Bush, representing Southern Cross Resources Australia Pty Ltd (SXR), the operator of the Honeymoon project, rejected these criticisms arguing that the disposal solution injected into the basal aquifer for disposal is compatible with the natural ground water and generally falls within the range of impurity concentrations found in the area. In this regard, he argued that the disposal solution:

... contains no component that is not present in the natural ground water. The concentrations of some of those components differ from the natural ground water but the natural ground water does not have a single chemical analysis. We have found quite a range of chemical analyses in that ground water because of the nature of the aquifer. It is almost stagnant—a very low flow rate of the ground water—and it is not flowing through a chemically uniform environment, and so you do get very considerable variations in the chemistry of the natural ground water, as is pointed out in the environmental impact statement.²⁷

3.28 The Committee records its concern over the lack of clear scientific agreement on this issue of connectivity/isolation of the Beverley aquifer. The Committee notes that many of the arguments as to the minimal environmental impact of the Beverley project are predicated on an assumption as to the isolated nature of the Beverley aquifer.

24 Australian Conservation Foundation, *Submission 74*, p 30; Heathgate Resources Pty Ltd, *Submission 70a*, p 19.

25 Australian Conservation Foundation, *Submission 74*, p 30; Heathgate Resources Pty Ltd, *Submission 70a*, p 19.

26 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 197.

27 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 234.

3.29 In relation to both ISL mines, the FoE also expressed concern about the potential for worker exposure, stating that ‘there remains no government collection of records to assess long term health impacts to workers’.²⁸ The same matter was raised by the Mining and Energy Division of the Construction, Forestry, Mining and Energy Union (CFMEU), which pointed out that, in the absence of any ‘national register’ concept, ‘there is no long term monitoring of the health of workers who have been employed in the uranium mining and processing industry’.²⁹

Modelling and ‘natural attenuation’

3.30 Natural attenuation is the dilution, dispersion, (bio)degradation, irreversible sorption, and/or radioactive decay of contaminants in soils and groundwater. It causes a net reduction of contaminant toxicity and human and ecological risk.³⁰

Natural attenuation makes use of natural processes to contain the spread of contamination from chemical spills and reduce the concentration and amount of pollutants at contaminated sites. Natural attenuation—also referred to as *intrinsic remediation*, *bioattenuation*, or *intrinsic bioremediation*—is an *in situ* treatment method. This means that environmental contaminants are left in place while natural attenuation works on them.³¹

3.31 There is considerable disagreement amongst stakeholders about the issue of natural attenuation. A number of environmental groups argued strenuously that there were flaws in the modeling that had been carried out in relation to natural attenuation at Beverley.

3.32 In this regard, Dr Matthews stated:

The Beverley mine ... justifies disposing of its radioactive liquid and wastes into the underground water by referring to what they call natural attenuation. According to the theory of natural attenuation, all the liquid wastes go underground very quickly within a period of anywhere from one to 10 years, depending on who you believe, and very quickly reverts back to the solid form from which it came. There is no empirical evidence for that under these situations. In other words, there is nothing hard or concrete you can show. The only justification or the only reason for that is theoretical; it is computer modelling. That computer modelling uses a part of science called thermodynamics, which, although it will tell you what tends to happen, it does not tell you how quickly it happens. So any conclusions about how

28 Friends of the Earth, Australia, *Submission 69*, p 2.

29 Construction, Forestry, Mining and Energy Union, *Submission 80*, p 3. (According to the CFMEU submission, a national inventory was advocated by the Liquor, Hospitality and Miscellaneous Workers Union.)

30 www.sandia.gov/eeseector/gc/gc/snap.html

31 www.environmental-center.com/articles/article45/article45.htm

quickly this hypothetical process occurs, any conclusions about the time scale, are completely incorrect. The modelling cannot possibly tell you that because it is a thermodynamic modelling. What you need is kinetic modelling, which is extremely difficult modelling and has not been done and is unlikely to be done.³²

Similar concerns were voiced by the FoE's Mr Thompson, who described current modelling as neither 'rigorous' nor 'independent'.³³

3.33 Heathgate Resources rejects these criticisms, arguing that evidence from the Beverley Field Leach Trials (FLT's) and from samples taken some two-and-a-half years after the trials affirms the clear and predictable presence of naturally occurring attenuation.³⁴ The company has no concerns about the adequacy of present modelling in establishing the efficacy of the natural attenuation model.

3.34 The natural attenuation process was also discussed in relation to Honeymoon. This issue was examined in detail in the assessment process discussed above, and the question as to whether or not wrong conclusions have been drawn is a technical issue relating principally to the adequacy of the modelling employed.

3.35 EA's Mr Kahn claimed:

It is certain that attenuation will take place.

... Even if you just took physical dilution into account, as you have an almost infinite area and you are putting a limited amount of stuff into it, natural diffusion and dilution will occur over time. If you take the physical modelling of that, which is one element of the process, you get diffusion back to background levels within time.³⁵

Accordingly, Mr Kahn advocated a new series of tests on the 1982 Honeymoon test site in order to validate the modelling.

3.36 Any projections concerning the future of ISL at Beverley, Honeymoon and elsewhere in Australia must rest on a solid understanding of the most recent research into its environmental implications, especially the question of natural attenuation. Even over the past two years, scientific opinion on the subject has differed considerably. W. E. Falck pointed out in October 2000:

32 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, pp 166-167.

33 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 287.

34 Heathgate Resources Pty Ltd, *Submission 70a*, p 65.

35 Mr Kahn, *Committee Hansard*, Canberra, 18 October 2002, pp 308-309.

There is still no unified opinion on what is considered the best process causing the least harm to the environment ... Removal or neutralisation of residual process acids, however, has proven to be difficult or impossible.³⁶

3.37 In 2001, the IAEA concluded:

According to the latest research, a contamination halo progressing through unmineralised, unleached rock does not decrease in size (as was previously hoped) but actually spreads out, chiefly due to hydraulic dispersion and gravitation differentiation of the fluid. However, maximum contamination within the halo continuously decreases.³⁷

3.38 The Committee considers there is sufficient uncertainty regarding natural attenuation at Beverley and Honeymoon to warrant additional independent research. It is therefore recommending that the continuation of both projects should be contingent on the presentation of strong evidence supporting the conclusion that the natural levels of attenuation are consistent with existing projections.

ISL in Australia: the international perspective

3.39 The use of ISL at Beverley and Honeymoon has provoked continued controversy. Mr Sweeney informed the Committee that acid ISL is applied commercially as a technique of uranium extraction in no other Western country. In response, Heathgate Resources argues that ISL's low international usage rate is due to its unsuitability for the prevailing soil regime (for example, in the USA), rather than to any potential or actual hazardous environmental characteristics.³⁸

3.40 The Committee's terms of reference do not require it to find whether the environmental impact of the ISL technique is unacceptable, despite submitters asking it to do so. However, it is clear that ISL is a controversial technique that does not have broad public support.

Recommendation 16

The Committee recommends that, owing to the experimental nature and the level of public opposition, the ISL mining technique should not be permitted until more conclusive evidence can be presented on its safety and environmental impacts.

36 W E Falck, 'Overview of IAEA Activities in Restoration of Former Uranium Mining and Milling Sites', *International Symposium on the Uranium Production Cycle and the Environment*, Vienna, 2-6 October 2000, IAEA-SM-362/38, p 358.

37 International Atomic Energy Agency, 'Manual of Acid In Situ Leach Uranium Mining Technology', IAEA-TECDOC-1239, Vienna, 2001, p 228.

38 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 292; Heathgate Resources Pty Ltd, *Submission 70a*, p 9; Heathgate Resources Pty Ltd (1998), *Beverley Uranium Mine Environmental Impact Statement: Supplement*, Adelaide, pp 4 (2)–4 (3).

Failing that, the Committee recommends that at the very least, mines utilising the ISL technique 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.

The Committee further recommends that the continuation of both the Beverley and Honeymoon projects should be contingent on the presentation of strong evidence supporting the conclusion that the natural levels of attenuation are consistent with existing projections.

South Australian Government Inquiry

3.41 Shortly before the finalisation of this report, the South Australian Environment Minister, the Hon John Hill, announced that the Environmental Protection Authority (EPA) will coordinate a project to investigate and assess the environmental impacts of acid leach uranium mining. The specific objectives of the project are:

- hydrology, groundwater management and impacts on aquifers;
- the management of process liquids, spill response and clean up;
- surface disturbance, including vegetation clearance;
- waste management, recovery and disposal (both liquid and solid); and
- issues relating to rehabilitation on cessation of operations (including aquifer and surface rehabilitation)³⁹

The Committee awaits the outcome of the EPA inquiry with interest.

The Beverley Uranium Mine

Location and Geological Overview

3.42 The Beverley uranium deposit is situated between 500 and 600 kilometres north of Adelaide, and some 300 kilometres east of Port Augusta. It lies on the plains north-west of Lake Frome, a 5,000 square kilometre salt lake located east of the Flinders Ranges. The uranium deposit at Beverley, South Australia's second largest, is a localised resource comprising some 21,000 tonnes of uranium oxide. It consists of three mineralised zones (north, central and south) lying in a buried palaeochannel, the Beverley aquifer, a porous, water-bearing and ore-yielding geological layer, contained in tertiary sediments of the Frome basin. Groundwater salinity ranges from 3,000 mg/L total dissolved solids (TDS) in the north to 12,000 mg/L TDS in the south.

39 Hon John Hill, Minister for Environment and Conservation, News Release, 27 March 2003.

Historical Development.

3.43 The deposit at Beverley was discovered in 1969 by the OTP Group (Oilmin NL, Transoil NL and Petromin NL). World uranium prices forced the abandonment in 1974 of plans to proceed with mining, but by 1981 mining was again considered to be a commercially feasible proposition. Accordingly, a draft Environmental Impact Statement (EIS) was prepared in July 1982. Due to the geological characteristics of the aquifer, a decision was made to extract uranium using a method not employed previously in Australia, that of *in situ* leaching (ISL). Beverley would later become the site of Australia's first commercial ISL operation. At Beverley, uranium mineralisation is leached from the Mount Painter region using the acid ISL method rather than the alkaline ISL method.

3.44 Plans to mine Beverley using the ISL technique were shelved in 1983 when the newly-elected State Labor Government indicated that mining lease applications containing proposals for ISL extraction would not be approved. Four reasons were given for this decision: numerous unresolved economic, social, biological, genetic, safety and environmental problems associated with the nuclear industry; broad community support for the government's position; a greater commitment by the government to the Roxby Downs uranium project; and considerable community disquiet about the ISL process.⁴⁰

3.45 In 1990, the Beverley mining lease was purchased by the USA's General Atomics Inc, whose Australian affiliate, Heathgate Resources Pty Ltd, has since secured approval to operate the mine. The then State Liberal Government approved the holding of acid ISL Field Leach Trials (FLT's) at Beverley in November 1997. Between January and December 1998, successful FLT's took place under the terms of a Declaration of Environmental Factors (DEF). The trials established the proposed venture's commercial viability. A new draft EIS was released for public comment in June 1998 and a Supplement to it appeared in September 1998. Environmental approval was granted for the project to proceed in March 1999. Other approvals necessary to enable mining to begin, mainly the granting of a mining lease, followed in April. In July 1999, the final report on the trials was presented to the South Australian Government. Commercial mining of uranium at Beverley commenced in November 2000.

The Approval Process

Table 3.1: Overview of the Beverley Uranium Mine Approvals Process

	Action	Date
1.	Draft EIS produced but plans to mine abandoned in 1983 owing to the ALP's	1982

40 *The Advertiser* (Adelaide), 23 March 1983, p 3; Dr Matthews, *Submission 16*, p 13.

	'three mine policy' and the South Australian Governments declaration that approval would not be granted	
2.	Formation of Heathgate Resources Pty Ltd	1990
3.	Heathgate Resources began reassessing Beverley Project	1996
4.	Permission granted by South Australian Government to conduct field leach trials	November 1997
5.	Beverley field leach trials commenced	January 1998
6.	Draft EIS released for public comment	June—August 1998
7.	Supplement EIS released	October 1998
8.	Environmental approvals granted by Commonwealth Minister for Environment and Heritage	March 1999
9.	South Australian Mining Lease (No. 6036) granted and mine construction commenced	April 1999

3.46 The adequacy of the assessment and approval procedures for the Beverley mine, whereby Planning SA undertook an EIS level assessment under South Australian legislation, have been the subject of considerable disagreement amongst stakeholders. The ACF, for example, describes the approval and assessment processes as being 'compromised' from the outset. In its view, the responsible Commonwealth Minister erred in failing to ensure the mining trials were subject to a thorough public environmental assessment process and in giving permission on 15 October 1997 for uranium extraction and processing to be conducted at Beverley outside the terms of the *Environment Protection (Impact of Proposals) Act 1974* (EPIP Act).

3.47 The ACF also argues that reports on the outcome of the Beverley trials (including the Groundwater Monitoring Summary) were not prepared by Heathgate Resources until July 1999, after the EIS process had been completed and following the granting of mining approvals.⁴¹ Mr Noonan informed the Committee that 'the guidelines of the federal government EIS for Beverley had not even been completed and made public at the time the trial mine started operations on 1 January 1998'.⁴²

41 Australian Conservation Foundation, *Submission 74*, p 14.

42 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 184.

3.48 Dr Matthews also raised this issue stating that:

According to both Heathgate and the South Australian Government the 4 to 12 month trials were a key step in providing information for an EIS, but one month after the trial started it was announced (*The Australian* February 12 1998) that the EIS would be released in March, that is less than three months after trials began.

The final report on the trials was submitted to the SA Government in July 1999, three months after the Government has given the go-ahead for commercial operation of the Beverley mine.⁴³

3.49 Dr Matthews also noted that Heathgate Resources' final report on the Field Leach Trial (FLT) was dated July 1999—thirteen months after the EIS was submitted (June 1998), and ten months after the EIS Supplement appeared (September 1998).⁴⁴ In the FoE's view, 'approval of the [Beverley] project was made despite significant uncertainties remaining about potential groundwater contamination and liquid waste disposal'.⁴⁵ According to Mr Thompson, decisions for approval were made which ignored 'the basis of scientific uncertainty'.⁴⁶ Mr Noonan, and the ACF in its submission, go even further, asserting that the Commonwealth allowed a mine to be conducted at Beverley without fully observing the requirements of a federally supported EIS and, in effect, separate from federal legislation governing the operation of trial mines.⁴⁷

3.50 Heathgate Resources rejects claims of a compromised approval process. In response to the statement that the Beverley EIS was released six months after mining began and one year before the final report of the trials was submitted to the government, the company claims that:

The Field Leach Trial was not a commercial operation as implied by this claim. It was a small-scale trial designed to identify optimum chemical balances et cetera, and to establish a mining process that would develop the resource to its potential without undue detriment to the environment. While the final report was not released until after the FLT concluded, all relevant government agencies had prior access to information contained in it.⁴⁸

3.51 In responding to the assertion that the trial had been in place for a full year before the Federal Minister authorised further studies to be undertaken of the nature

43 Dr Matthews, *Submission 16a*, p 3.

44 Dr Matthews, *Submission 16*, p 28.

45 Friends of the Earth, Australia, *Submission 69*, p 3; Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 279.

46 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 285.

47 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, pp 183-184; Australian Conservation Foundation, *Submission 74*, p 17.

48 Heathgate Resources Pty Ltd, *Submission 70a*, p 33.

and connectivity of the Beverley aquifer, Heathgate Resources argues that experiments that were conducted on the aquifers proved that the aquifer was ‘isolated and confined’.⁴⁹

3.52 Owing to the degree of public concern about uranium mining and its potential to have significant environmental impacts, there is a need to ensure that government assessment and approval processes are open and transparent. It is also vital that all aspects of uranium mining operations undergo an environmental assessment before they commence. In this instance, it appears that none of these fundamental requirements were met. These failings have generated a considerable amount of distrust in the community. This trust can only be rebuilt through greater public disclosure of the details of the operation of the mine and its impacts on both workers and the environment.

Monitoring

3.53 The Beverley Environmental Management and Monitoring Plan (EMMP)⁵⁰ sets out the reporting and monitoring regime to be followed by Heathgate Resources. The Plan outlines the objectives and program for the following:

- Surface Hydrology;
- Hydrogeology including the monitoring of groundwater, wells and the Great Artesian Basin;
- Vegetation and Landscape;
- Fauna;
- Meteorology;
- Waste Management;
- On site chemicals;
- Rehabilitation.

3.54 The objective of the EMMP is to fulfil the requirements of Heathgate Resources Corporate Environmental Policy (1998), and also the relevant State and Commonwealth legislation, Codes of Practice, and Australian Standards. The EMMP is revised and re-submitted for approval every three years.

Radiological monitoring

3.55 Mining Lease (No 6036) granted by the South Australian Minister of Mines and Energy to Heathgate Resources in 1999 stipulates in the Second Schedule that as

49 Australian Conservation Foundation, *Submission 74*, p 15; Heathgate Resources Pty Ltd, *Submission 70a*, pp 8-9.

50 Heathgate Resources Pty Ltd, Beverley Uranium Mine, Environmental Management and Monitoring Plan, 2000 EMMP.

part of the Environmental Management and Monitoring Plan (EMMP), the Company must establish 'a program for monitoring employee and environmental radiation'.⁵¹ Heathgate Resources is also required to carry out radiation monitoring in accordance with the *Code of Practice on Radiation Protection in the Mining and Milling of Radioactive Ores 1987*. The EMMP goes into detail as to what monitoring is to be carried out. Separate to the EMMP, Heathgate must also provide a Radiation Monitoring Plan which outlines the results of the radiological monitoring program carried out. The Radiation Management Plan has been designed to enable Heathgate Resources to critically review the radiological impact of the Beverley processing plant and associated wellfield. Radiological assessments of vegetation are undertaken as per the requirements of the Radiation Management Plan.

3.56 The Beverley radiation monitoring program is divided into three sections:

- Personal monitoring;
- Area monitoring; and
- Surface contamination monitoring.⁵²

3.57 Personal monitoring involves measuring external gamma exposure of wellfield and plant personnel by Thermoluminescent Dosimeters (TDLs).

3.58 Area monitoring includes measuring weekly external gamma doses at both the wellfield and plant. They also measure opportunistically throughout both areas. Area monitoring also involves weekly measuring of the Potential Alpha Energy Concentration (PAEC) of radon daughters. Airborne dust sampling is carried out to monitor long-lived alpha dust.

3.59 Surface contamination monitoring is carried out weekly at the wellfield and at both active and non-active areas of the plant.

3.60 Environmental radiological monitoring is carried out at the permanent Beverley camp as this is the closest human settlement to the mine site.

Implementation

Commonwealth and State Agencies

3.61 Heathgate Resources has indicated that it has established or is planning to establish monitoring in the following spheres: hydrology (surface and groundwater); fauna; flora; meteorological; waste management (radiological and general);

51 Mining Lease No 6036, Schedule 2, Clause 1.

52 Heathgate Resources Pty Ltd, Beverley Uranium Mine, Radiation Management Plan: Programs and Procedures, June 2000, p 7.

rehabilitation; radiation; and more focused occupational and environmental radiation monitoring.⁵³ However, Friends of the Earth submitted that:

Adequate effective monitoring of radioactive release into the environment remains an issue of debate. The physical nature of radiation and the mechanisms of release make monitoring a difficult task. However, steps can be made to expand present monitoring allowing for assessment independent of the mine operator.⁵⁴

3.62 Heathgate Resources argues that these assertions are false, contending that independent monitoring is already conducted by Commonwealth and South Australian agencies.⁵⁵

3.63 Mr Noonan, of the ACF, has described past and present Commonwealth and South Australian monitoring initiatives as ‘inadequate’ and ‘ineffective’.⁵⁶ The FoE criticises monitoring as being too periodic. It would prefer more continuous monitoring.⁵⁷ It is also convinced that the current monitoring arrangements fail to encompass the whole spectrum of possible radiological exposures and releases.⁵⁸ In response, Heathgate Resources argues that monitoring is conducted in accordance with Australian and international standards and benchmarks.

3.64 Dr Matthews claims that the details on radiation monitoring provided in the Beverley FLT reports are imprecise, with only estimates of average exposures being supplied.⁵⁹ In response, Heathgate Resources argues that operational experience at the mine over an eighteen month period in 2001-02 demonstrated that these estimates were accurate.⁶⁰

Industry

3.65 The FoE asserts that the location of monitoring stations at Beverley makes it difficult to assess ‘intermittent and accumulative impacts’ of mining on the

53 Heathgate Resources Pty Ltd (1998), *Beverley Uranium Mine Environmental Impact Statement: Main Report*, Adelaide, pp 12 (2)-12 (13); Ms Paulka, *Committee Hansard*, Adelaide, 4 October 2002, p 255.

54 Friends of the Earth, Australia, *Submission 69*, p 4.

55 Heathgate Resources Pty Ltd, *Submission 70a*, p 51.

56 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 179.

57 Friends of the Earth, Australia, *Submission 69*, p 4.

58 Friends of the Earth, Australia, *Submission 69*, p 4.

59 Dr Matthews, *Submission 16*, p 28

60 Heathgate Resources Pty Ltd, *Submission 70a*, p 46.

surrounding environment.⁶¹ In response, Heathgate Resources argues that FoE representatives have no knowledge of the Beverley site beyond the mine gate.⁶²

3.66 However, Heathgate Resources' response to FoE's claims about the location of monitoring stations only highlights the validity of the concerns raised by many people about the lack of publicly available information on the operation of the mine. There is no doubt that a greater willingness on behalf of Heathgate Resources and relevant Commonwealth and State agencies to disclose information about the operation of the mine to the public would enhance the quality of debate about the regulatory processes and, in doing so, improve regulatory outcomes.

3.67 The 62,000 litre spill at Beverley on 11 January 2002 led South Australia's Chief Inspector of Mines (CIM) to direct that a Hazard and Operability Study (HAZOP) be conducted to enable Heathgate Resources to review its risk control apparatus and procedures. The study, the third of its kind, which was undertaken by QEST Consulting Engineers Pty Ltd, was completed on 15 April. It contained 73 recommendations that Heathgate was required to implement at Beverley by 15 September 2002 in order to secure HAZOP compliance. QEST found that:

Documentation, maintenance, testing and control of changes to safety critical alarms and trips are the most important items identified for action in the Hazop study. The current functionality of the plant trip systems has been confirmed on site giving a high degree of confidence that the trip systems are functioning as intended and would act to prevent spills. However, to maintain this confidence in the longer term, it is recommended that ongoing monitoring and control of safety critical alarms and trips should be upgraded.

The Hazop study identified possible changes in the following areas:

- drawing updates to bring documentation in line with the plant;
- a series of small engineering reviews;
- the Distributed Control System (DCS);
- minor plant modifications; and
- maintenance and Operating Procedures.

The study concluded that 'none of the areas identified for attention currently pose an unacceptable risk to personnel or the environment'.⁶³

61 Friends of the Earth, Australia, *Submission 69*, p 4

62 Heathgate Resources Pty Ltd, *Submission 70a*, p 51.



Senators at the Beverley processing plant. The site of the January 2002 spill is in the background.

3.68 Heathgate Resources regards the HAZOP study document as a proprietary one, which should remain ‘commercial-in-confidence’. The ACF, however, argues that in order to evaluate the degree of compliance achieved, the HAZOP findings must be made public.⁶⁴

3.69 Following a further two reportable spills in May 2002, a task group was appointed to investigate mine management. It comprised representatives of the following South Australian agencies: the Environment Protection Authority (EPA); the Department of Human Services (DHS); Workplace Services within the Department for Administrative and Information Services (DAIS); and the Office of Minerals and Energy within Primary Industries and Resources South Australia (PIRSA). After visiting the mine on 10 May, the group tabled a document later that month entitled *Report on Activities and Operations at Beverley ISL Uranium Mine*. Of its ten recommendations, the following dealt with monitoring:

63 QEST Consulting Engineers Pty Ltd (2002), *Beverley Uranium Mine: Report on Hazard and Operability Studies for Heathgate Resources*, Attachment 1: Executive Summary and Recommendations, Melbourne, p 1.

64 Heathgate Resources Pty Ltd, *Submission 70a*, pp 16, 69; Australian Conservation Foundation, *Submission 74*, pp 27-28; Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, pp 193-194.

- the findings of the hazard and operability study on the ISL plant undertaken by the company must be implemented by 15 September 2002 and be subject to scrutiny by the EPA, DHS, Workplace Services and PIRSA. The company had set itself a target date of September 2002;
- no new plant to be installed or modifications to the existing plant to be made without being reviewed by a hazard and operability study;
- no new plant to be installed or modifications to the existing plant to be made without being reviewed by PIRSA in consultation with the EPA, DHS and Workplace Services. Where new plant may lead to an increase in radiation exposures, it must be approved under the radiation protection code of practice;
- incidents involving loss of processing fluids due to mechanical failure of equipment or control system malfunction to be considered in detail by the independent review group on spills, with consideration of such spills being reported to the EPA and other regulatory agencies;
- increased input of the EPA in monitoring and evaluation of environmental performance; and
- the Beverley Environmental Consultative Committee (on which the EPA is represented) which meets 6 monthly, is to review and monitor the implementation of these recommendations.⁶⁵

3.70 On 18 September 2002, the Chief Inspector of Mines, Mr Greg Marshall, inspected the mine site in order to determine if the recommendations of the HAZOP Study and the May 2002 task group report had been implemented. He found that Heathgate Resources had complied with the terms of both studies cooperatively and satisfactorily.⁶⁶ He also identified two matters for special attention: secondary containment construction around the processing plant and the wellfield; and the management of soil affected by spills of radioactive material.

3.71 These monitoring exercises suggest there is a need for a greater level of independent monitoring of the operation of the mine. The public response to these exercises also demonstrates the need to ensure that monitoring results are available to members of the public.

65 Environment Protection Authority *et al*, *Report on Activities and Operations at Beverley ISL Uranium Mine*, Adelaide, May 2002.

66 Chief Inspector of Mines, South Australia, *Report on Inspection of Beverley Mine—18 September 2002*, Adelaide, September 2002; CIM, Mr Greg Marshall, Letter to Mr Mark Chalmers, General Manager, Heathgate Resources Pty Ltd, 2 October 2002.

Recommendation 17

The Committee recommends a greater level of independent monitoring of the Beverley mine.

The Committee recommends the public release of all data and reports relating to monitoring and incidents.

Monitoring – spills and leaks

3.72 FoE provided the following information on known leaks and spills at Beverley.⁶⁷

Beverley

Adapted from PIRSA Public notice below and recent media.

(www.pir.sa.gov.au/pages/minerals/uranium/bev_incident_report.pdf)

Surface Spills

2002

- May 5 14,900 litres of water containing 0.0018% U (18,000 ppb).
- May 1 6,600 litres of *Evaporation Pond* ('brine solution') containing some U due to over-filling of tank.
- March 16 20-50 litres of acid water which came into contact with hydrogen peroxide resulting in a small ignition.
- March 12 400 litres of *Extraction* fluid.
- March 3 900 litres of *Extraction* fluid.
- February 21 400 litres of *Extraction* fluid.
- January 19 500 litres of *Extraction* fluid.
- January 11 61,000 litres of *Groundwater (Extraction?)* containing acid and U, after pipe rupture.

2001

- July-Sept.[#] 1,000 litres of *Evaporation Pond* water (41,000 ppb U) from an overhead pipe failure.

⁶⁷ Friends of the Earth, Spills & Leaks: Accountability at Uranium Mines in SA, July 2002, Appendix 1, p 8, in Friends of the Earth, Australia, *Submission 69*.

July-Sept. [#]	880 litres of <i>Injection</i> fluid from a loose bolt in a gasket on an injection flange.
July-Sept. [#]	600 litres of <i>Injection</i> fluid from a filter skid overflow.
July-Sept. [#]	600 litres of <i>Injection</i> fluid from a vent valve failure.
July-Sept. [#]	759 litres of <i>Extraction</i> fluid from a poly weld failure.
July-Sept. [#]	400 litres of <i>Injection</i> fluid from a well head filter lid failure.
July-Sept. [#]	1,300 litres of <i>Injection</i> fluid from a well head filter lid failure.
July-Sept. [#]	200 litres waste water from laboratory due to sump pump failure.
July-Sept. [#]	Trace quantity of <i>Process</i> fluid due to bund leak.
July-Sept. [#]	1,900 litres of <i>Extraction</i> fluid at the well house.
Nov.27	3,500 litres of <i>Process</i> fluid contained in bund and returned to circuit.
Nov.13	5,000 litres of <i>Process</i> fluid contained in bund and returned to circuit.
Sept.9	5,000 litres of <i>Extraction</i> fluid contained in bund and released to sump.
July 30	5,800 litres of <i>Injection</i> fluid due to oxygen fitting failing on injection well.
July 6	5,700 litres of <i>Injection</i> fluid as well-head tagged incorrectly.
June 22	1,500-2,500 litres <i>Injection</i> fluid spill due to blown gasket on inlet flange.
June 1 ⁽¹⁾	600-800 litres of <i>Extraction</i> fluid from injection well due to joint leak.
April-June	50 litres to 2,000 litres of <i>Injection</i> fluid spills due to butt joints & vent valve leaks. 11 minor spills in total.
February 9	1,200 litres of <i>Groundwater</i> due to joint failure at pipe in wellhouse.
<u>2000</u>	
May 4	6,000 litres of <i>Groundwater</i> during bore well construction.

1999

May 21⁽¹⁾ Trace moisture detected under storage pond.

1998

March 12 500 litres of *Extraction* fluid from split return line.

No date given, only date reported (December 7, 2001).

⁽¹⁾ No date given, only date reported.

3.73 Heathgate Resources claims that the:

... operational standards at Beverley are equal to or higher than those applying at any other ISL uranium project in the world ... the incident rate is below that at many mines and certainly within industry norms.⁶⁸

3.74 However a comparison between the number of spills at Beverley (acid ISL) and those which occurred in seven USA mines (alkaline ISL) for a similar time period indicates a higher incidence of spillage and leakage at the Australian mine.⁶⁹ This may be due to the experimental nature of the ISL process used at the mine. However, it does raise questions about the effectiveness of the current regulatory regime and the management practices currently being employed at the mine.

Recommendation 18

Owing to the risks posed by the mine to the environment and the level of public concern, the Committee recommends that the Commonwealth and the South Australian Government play a more active and assertive role in assessing and regulating ISL mining at Beverley.

Regulation

3.75 As discussed in Chapter 1, once mining is approved, supervision of the operations of the mines in South Australia is currently left to State agencies. However, the Commonwealth does have the power to regulate the operation of the mine. Further, as uranium mining is a matter of national environmental significance, the Commonwealth has a legitimate role in regulating the activities at Beverley.

3.76 Heathgate Resources has expressed general satisfaction with the present regulatory role of the South Australian and the Commonwealth authorities in the following terms:

68 Heathgate Resources Pty Ltd, *Submission 70a*, p 24.

69 Friends of the Earth, Australia, *Submission 69*, pp 8, 11-13.

... the existing regulatory protocols are working as they were designed to [and they] will only continue to improve over time with experience. It is a dynamic process that has been built into the protocols. The agencies that we deal with, both at the federal and state levels, are first class.⁷⁰

3.77 Environment Australia argues that the Beverley mine's safety record has been basically sound, while welcoming a recent South Australian Government-inspired strengthening of regulation. However, Environment Australia suggested that it was likely that it would have a greater role in auditing and management in the future.⁷¹

3.78 The ACF rejects the idea of self-regulation by the uranium mining industry, claiming that it has not been a success. In its place it calls for the establishment of a more independent regulatory scheme—'a transparent, independent, genuine watchdog'.⁷² The ACF has also advocated an increased role for Environment Australia in regulating South Australia's uranium mining.

3.79 The ACF would also prefer to see greater Commonwealth participation in this respect, since:

... the Commonwealth has points of intervention now within its existing framework which it could effect to improve the situation. [It] has a range of regulation and law ... which it could apply.⁷³

3.80 The ACF also advocates closer Commonwealth involvement in regulation via the Beverley Environmental Consultative Committee (BECC), suggesting that Environment Australia, rather than PIRSA, should be the lead organisation in the BECC.⁷⁴

3.81 In evidence to the Committee, an ACF representative summarised its position as follows:

The issues in South Australia are different from the issues in the Northern Territory. Because the Territory is a territory there is a much stronger Commonwealth legislative role there. The Commonwealth owns the uranium in the Northern Territory, whereas the state government owns the uranium in South Australia. That leads to fundamental changes of direction in what the appropriate legislation and regulatory regimes are. Essentially, the problem in South Australia is the minimal overlap of Commonwealth legislative obligations with uranium mining in South Australia. It is not a problem of needing to standardise or limit the amount of Commonwealth application. It is a matter [of investigating] why there is such a limited

70 Mr Graham, *Committee Hansard*, Adelaide, 4 October 2002, p 243.

71 Environment Australia, *Submission 86*, pp 19-20.

72 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 298.

73 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 298.

74 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, pp 292, 297-298.

Commonwealth role in terms of the uranium mines in South Australia. The ACF sees that there should be a fundamental Commonwealth role in regard to uranium mining wherever it is conducted in Australia.⁷⁵

3.82 The ACF's perception of what greater Commonwealth Government regulation of uranium mining would involve is as follows:

... Environment Australia should have an ongoing legislative privity to the operations of any uranium mine in Australia. They should be allowed to set conditions and vary conditions and intervene in the management of a mine if it fails to properly meet that standard of conditions ... Environment Australia should have a direct role to set, vary and change conditions and judge compliance with the environmental operations and the radiological related operations of all uranium mines in Australia.⁷⁶

3.83 This blueprint derives mainly from:

... the evidence of the years of failure of the South Australian government to properly exercise a control in that way. In terms of uranium issues ... uranium mining is always fundamentally a Commonwealth matter. That is accepted in legislation; it is only the Commonwealth government that can ever authorise the export of uranium in Australia ... The Commonwealth should be more engaged in the actual operations and the actual impacts of the uranium mining that are consequent to their approvals for uranium export licences.⁷⁷

3.84 The ACF considers the EMMP to be 'the appropriate document under the Commonwealth authorisations to deliver the proper regulatory regime to the operation at Beverley'.⁷⁸ However, the ACF believes that the process should be reviewed more frequently than once a year. Environmental groups' principal concerns about current regulatory arrangements have been summed up by the FoE as follows:

Given the repeated, and at times, chronic incidents, the present regulatory structure fails to enforce environmental protection. Regulation requires independence and potency to deliver effective control over mining operations ... Further [in order] to have measurable impacts on operators practice, regulators must have active powers of enforcement. Given the nature and repetition of these incidents, there needs to be a stronger use of financial penalties combined with the suspension or revocation of operating licences.⁷⁹

3.85 A representative of the ACF told the Committee:

75 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 201.

76 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 201.

77 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 201.

78 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 191.

79 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 282.

We are not asking for massive regulatory or legislative change ... we are asking that the existing laws be applied rigorously and not in a sense of letting us facilitate further dialogue with the company and to have a self-monitored outcome.⁸⁰

3.86 The ACF, however, speaks for many environmental groups in overview seeking more marked clarification of Commonwealth and State responsibilities and a Commonwealth presence, which is ‘on the ground ... active ... interactive and effective’.⁸¹ In this respect, the ACF has expressed support for the creation of a modified Office of the Supervising Scientist (OSS) in the State despite the fact that the Supervising Scientist has only advisory and research functions.⁸² However, it opposes a transfer of the existing OSS model from the Northern Territory to South Australia, asserting that the OSS has increasingly become a ‘hands-off’ and ‘desk-based’ operation.⁸³

3.87 Environment Australia clearly favours a light-handed regulatory approach. Mr Early described one regulatory option—the revocation of the company’s export permit—as a course which might appear to be ‘a bit heavy-handed’,⁸⁴ while Mr Malcolm Forbes told the Committee:

The option we have is always to apply peer pressure, if you like. We apply peer pressure to our South Australian government colleagues and clearly they also apply pressure to us if they believe we are not being as open as we should be, either. But peer pressure within and between governments is an important issue in actually moving positions.⁸⁵

Regulatory conflict of interest

3.88 An apparent regulatory conflict of interest constitutes one of the chief criticisms of current arrangements. The FoE argued that the current organisational arrangements institutionalise a conflict of interest on the part of regulators. Mr Thompson put it this way:

In South Australia, regulation remains primarily with the Department of Primary Industries and Resources. This department is responsible for facilitating mining exploration and project development by private companies. This relationship fails to provide the independence or disinterest required to establish firm regulation.⁸⁶

80 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 298.

81 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, pp 298, 301.

82 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 282.

83 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 297.

84 Mr Early, *Committee Hansard*, Canberra, 18 October 2002, p 314.

85 Mr Forbes, *Committee Hansard*, Canberra, 18 October 2002, p 314.

86 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p. 282.

3.89 The ACF's Mr Noonan referred to 'the political support for uranium mining in the current Commonwealth political regime'⁸⁷ as an important factor handicapping proper regulation. Dr Matthews described this aspect of current regulatory arrangements as 'the regulation-promotion nexus':

...the government departments, both state and federal, which are promoting the mining industry are also the major regulators. There are a number of major regulators, but they are the lead regulator and yet their chief business is to promote industry. That conflict of interest is behind a lot of the problems in the industry in Australia.⁸⁸

3.90 Mr Sweeney, of the ACF, told the Committee:

We further welcome the move that is currently happening in South Australia away from PIRSA - Primary Industries and Resources South Australia - having regulatory oversight and towards a dedicated focus of South Australian EPA. We believe that makes more sense; we believe it breaks the connection, the perception and the reality of the regulator being too close to what they regulate.⁸⁹

3.91 Nevertheless, the EPA's new role is a narrow one, the result of a transfer of the Radiation Protection Branch from the Health Commission to the EPA, and its jurisdiction over uranium mining is limited to matters falling within the Radiation Protection and Control Act. In the ACF's opinion, this reform does not go far enough:

It does not even mention the environment, for instance. So the ACF does not in any way find it acceptable for the EPA's role in regard to uranium mining to be restricted to the aspects that are addressed through the Radiation Protection and Control Act, which is really designed to deal with occupational health and safety issues rather than the management of radioactive wastes.⁹⁰

3.92 The ACF asserts that the EPA is still excluded from most aspects of regulation since the South Australian Environment Protection Act does not apply to uranium mine waste. The ACF therefore argues that the South Australian government should amend the EPA Act to:

... make uranium mining wastes fully the privy of the Environment Protection Act and that it should be a specific regulatory role for the EPA to manage the safe storage and ongoing management of radioactive wastes from uranium mining.⁹¹

87 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 202.

88 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 166.

89 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 293.

90 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 199.

91 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, pp 198-199.

3.93 In relation to the suggestion of a regulatory conflict of interest, SXR claimed that any conflict is lessened by the separation of tasks within PIRSA, and the fact that other departments are also involved in facilitating the development of mining projects and regulating their operation.⁹²

3.94 In considering the potential for a conflict of interest within PIRSA and the associated arguments for an expanded role for the South Australian EPA, the appropriateness of the responses depends on whether it is accepted that uranium mining should be treated differently to other types of mining. In South Australia, mining is the regulatory responsibility of PIRSA. However, as noted above, uranium mining is a matter of national environmental significance under the EPBC Act. This was recognised in the Council of Australian Governments (COAG) Heads of Agreement on Commonwealth/State Roles and Responsibilities for the Environment (November 1997), which states:

The Commonwealth has a responsibility and an interest in relation to the assessment and approval of mining, milling, storage and transport of uranium and the development and implementation, in consultation with the States, of codes of practice as provided under the *Environment Protection (Nuclear Codes) Act 1978* for protecting the health and safety of the people of Australia, and the environment, from possible harmful effects associated with nuclear activities.⁹³

Recommendation 19

The Committee is of the view that uranium mining presents unique hazards and risks to both human health and the environment. Accordingly, its regulation at both the Commonwealth and State levels should be primarily the responsibility of environment agencies rather than agencies whose principal concern is with the advancement of mining interests.

Reporting, consultation and communication

Reporting

3.95 The legislative instruments and machinery governing uranium mining are diverse in character and wide-ranging in application. An overview of the industry reporting regime was provided in Chapter 1. In this section the reporting apparatus and its specific implications for the Beverley mine will be examined in detail.

3.96 The company is required to submit two quarterly and two annual reports on its operations. It reports to South Australia's Chief Inspector of Mines every quarter on groundwater monitoring and waste management, and quarterly to the State's

92 Southern Cross Resources Australia Pty Ltd, *Submission 28a*, p 20.

93 COAG, Heads of Agreement on Commonwealth/State Roles and Responsibilities for the Environment, November 1997, Part 1, Section 6. www.ea.gov.au/epbc/about/agreement.html

Environment Protection Authority (Radiation Protection Branch) on radiation monitoring (occupational and environmental). Under the terms of the EMMP, Heathgate must also provide an annual report on environmental matters to the South Australian Minister for Mines and Energy, and another, also on environmental aspects, to the State Minister for Environment and Conservation.

3.97 There are several other reporting procedures. These include: incident reports; the BECC; the Radiation Review Committee (ISL); the EMMP process; a Radiation Management Plan; a licence to mine and mill radioactive ores; production and shipping reports; a pipeline licence; PIRSA's requirements; the Adnyamathanha and Kuyani Advisory Committees; meetings with pastoralists; discussions with local Aboriginal communities; and a variety of public awareness initiatives.

Incident reports

3.98 The company is obliged to observe South Australian Government written and oral reporting requirements on matters such as solution releases and occupational health and safety. The FoE has called for a higher level of detail in future reporting procedures, such as clearer identification of the source of leaks and spills, as well as better quantification and improved analysis of chemical and radiological concentrations. Heathgate Resources argues, however, that this information is already included in incident reports that form part of an existing process of regular and transparent reporting.⁹⁴

3.99 The submissions and evidence provided to the Committee reveal a widespread concern about the public availability of reporting documentation. According to Dr Matthews, the secrecy surrounding mining operations and the concomitant delay in allowing public access to documents constitute a serious impediment to effective monitoring.⁹⁵

3.100 The ACF describes the need to ensure that all uranium industry reporting material is publicly accessible and able to be scrutinised as 'a fundamental Commonwealth responsibility'. It points out that this is not happening in relation to requirements placed on ISL operations by Commonwealth Codes of Practice on Radioactive Ore Mining and Milling, specifically, the *Code of Practice on Radiation Protection in the Mining and Milling of Radioactive Ores* (1987); the *Code of Practice on the Management of Radioactive Wastes from the Mining and Milling of Radioactive Ores* (1982); and a series of nuclear codes developed pursuant to the *Environment Protection (Nuclear Codes) Act 1978*.⁹⁶ The ACF refers to the constraints on the monitoring of Beverley that derive from this low level of

94 Friends of the Earth, Australia, *Submission 69*, p 5; Heathgate Resources Pty Ltd, *Submission 70a*, p 54; *Submission 70*, p 11.

95 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 166.

96 Australian Conservation Foundation, *Submission 74*, pp 34-5; Senator Wong, Mr Early, Mr Forbes and Mr Kahn, *Committee Hansard*, Canberra, 18 October 2002, pp 312-13.

disclosure.⁹⁷ Although South Australia's Chamber of Mines and Energy (SACOME) produces an annual, public environmental management and monitoring assessment, a monthly report would provide a better basis for evaluation.⁹⁸

3.101 Dr Matthews is also concerned about the alleged late reporting, for example, of the spill that occurred at Beverley in March 1998, the details of which were supposedly revealed only in response to public pressure. Heathgate Resources disputes this, claiming that the spill was minor and any requests for information about it were met in a timely manner.⁹⁹ The company also rejects the ACF's claim that a number of Inspection Reports and other documents relating to leaks at Beverley have been kept secret. It asserts that all such documentation is assessed by government agencies under the terms of 'mandated reporting protocols', release and access decisions being made in accordance with Freedom of Information guidelines and procedures.¹⁰⁰

3.102 Public disclosure of incident reports would assist in ensuring the public are able to make an informed assessment of the environmental impacts of the operation. The failure to disclose this material merely serves to generate greater suspicion of the impacts of the mine.

Beverley Environmental Consultative Committee (BECC)

3.103 The Beverley Environmental Consultative Committee (BECC), comprising officers of Commonwealth and South Australian Government regulatory agencies, and two representatives of Heathgate Resources, meets every six months. Its primary purpose is to enhance understanding between government and mining company.

3.104 The present regulatory arrangements applying to the operations of the Beverley project whilst not preventing a large number of leaks and spills, have, it is argued, avoided serious environmental problems. However, as discussed, there are a number of shortcomings in the present regulatory system, particularly with regard to the monitoring and reporting mechanisms.

3.105 However, the narrowness of its membership base and its reporting record has prompted FoE to describe its 'public accountability' record to date as 'effectively zero'.¹⁰¹ The ACF criticises the BECC, chiefly on the grounds that its responsibility to report orally rather than to produce written reports lessens its already small degree of accountability. To address this situation, the ACF recommends that the BECC be required to undertake public reporting of all reviews of environmental performance at

97 Australian Conservation Foundation, *Submission 74*, p 18.

98 Mr Yeeles, *Committee Hansard*, Adelaide, 4 October 2002, p 207.

99 Dr Matthews, *Submission 16*, pp 60-61; Heathgate Resources Pty Ltd, *Submission 70a*, p 39.

100 Heathgate Resources Pty Ltd, *Submission 70a*, p 12; Australian Conservation Foundation, *Submission 74*, p 22.

101 Friends of the Earth, Australia, *Submission 69*, p 6.

Beverley; monthly provision of information to the public and stakeholders; and the creation of a website-based public register to enable prompt, mandatory reporting of all incidents. It also insists that the BECC should be responsible to Environment Australia, rather than to PIRSA.¹⁰²

3.106 Heathgate Resources does not question the validity of these concerns, conceding that there is a need for some improvement of its disclosure machinery.¹⁰³ In the Committee's opinion, the publication of regular written reports on Beverley's environmental performance can only broaden public understanding of both the mine and BECC's operations,¹⁰⁴ and improve BECC accountability.

Recommendation 20

The Committee supports the ACF recommendation that BECC be made responsible to Environment Australia and that BECC publicly report all reviews of environmental performance at Beverley.

Radiation Review Committee (ISL)

3.107 The Committee, which was formed in August 1998 with a general brief to review mining operations and radiation monitoring, has no formal tasks or membership. It split into two parts in August 2001 to permit separate meetings to be held for the Beverley and Honeymoon operations. Heathgate representatives meet quarterly with committee members (officials of the EPA, PIRSA, and Workplace Services within the DAIS). Information on spillage or leakage is communicated orally at these gatherings. The ACF asserts that, in contrast to present practice, radiation management issues affecting the Beverley project (including, impliedly, the outcomes of these meetings) should be included in Heathgate Resources' publicly available annual environment reports.¹⁰⁵

102 Australian Conservation Foundation, *Submission 74*, pp 33-34.

103 Mr Chalmers, *Committee Hansard*, Adelaide, 4 October 2002, p 250.

104 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 188.

105 Australian Conservation Foundation, *Submission 74*, p 24.

Environmental Management and Monitoring Plan (EMMP)

3.108 Under the terms of South Australia's *Mining Act 1971*, Heathgate Resources is required to submit to the responsible Minister a plan for protecting, managing and rehabilitating the environment affected by the Beverley mine. This plan encompasses waste management, flora, fauna, groundwater spills and air emissions. The company is also obliged to furnish a publicly available annual report to the relevant South Australian regulatory agencies.

3.109 The ACF objects to the fact that certain categories of spills are exempt from reporting requirements, and recommends that such procedures be amended so as to remove all current exemptions relating to leak and accident reporting. Heathgate opposes this suggestion on the grounds that any mandatory requirement to report on small leaks is unnecessary and unproductive.¹⁰⁶ The ACF also advocates replacing oral reporting requirements with written ones when reporting on certain types of spills and leaks.¹⁰⁷

Recommendation 21

The Committee recommends that mining companies be required to prepare written reports (as opposed to verbal) on incidents.

The Committee recommends that all serious leaks and spills be investigated by Environment Australia and that minor leaks and spills be scrutinised by South Australia's Chief Inspector of Mines in collaboration with EA. Given that different regulatory requirements attach to different categories of incidents, the Committee also recommends that the definitions as to categories of incidents be the subject of public consultation and be publicly available. A regulatory response, publicly available, should be provided following the investigation of an incident.

Radiation Management Plan

3.110 A South Australian Government-approved Radiation Management Program (RMP) and a Radioactive Waste Management Program (RWMP) are required under the provisions of four codes devised by the Commonwealth with the intention of ensuring uniformity of uranium mining regulation throughout Australia: the *Code of Practice on Radiation Protection in the Mining and Milling of Radioactive Ores* (1987); the *Code of Practice on the Management of Radioactive Wastes from the Mining and Milling of Radioactive Ores* (1982); *Codes of Practice for the Safe Transport of Radioactive Substances* (1982); and the National Health and Medical Research Council Recommendations for limiting exposure to ionizing radiation

106 Australian Conservation Foundation, *Submission 74*, p 26; Heathgate Resources Pty Ltd, *Submission 70a*, p 14.

107 Australian Conservation Foundation, *Submission 74*, pp 25-26.

(1995). The company is required to submit both quarterly and annual reports on its compliance with these codes to the relevant South Australian government agencies.

3.111 The ACF advocates greater public disclosure of radiation management findings, in particular the release of the Beverley *Radiation Management Plan* (October 2000).¹⁰⁸

3.112 Again, the Committee believes disclosure of these materials is essential to ensure the public is able to accurately assess the benefits and disadvantages of the mining operations. Increasing public access to information should assist in the achievement of regulatory objectives.

Licence to mine and mill radioactive ores

3.113 Heathgate Resources is obliged to report annually to the EPA's Radiation Protection Branch on the licence conditions under which it operates. These licence conditions are contained in codes of practice, which are set out above in the section entitled 'Radiation Management Plan'.

Production and shipping reports

3.114 The company must report six-monthly to the Australian Safeguards and Non-Proliferation Office (ASNO) and the Commonwealth Department of Industry, Tourism and Resources (DITR) on its production statistics and shipments.

Pipeline licence

3.115 Natural gas pipeline licence conditions require Heathgate Resources to produce an annual report outlining its compliance in this sphere.

Primary Industries and Resources South Australia (PIRSA)

3.116 PIRSA and the Radiation Protection Branch of the EPA collaborate closely on the application and enforcement of the regulatory codes described in the section above headed 'Radiation Management Plan'. PIRSA reporting requirements necessitate monthly progress reports by the company on: wellfield and plant operations; exploration/retention leases; water monitoring; and occupational health and safety incidents.

Adnyamathanha and Kuyani Advisory Committees

3.117 At meetings held quarterly Heathgate Resources provides information to, and addresses questions raised by, the principal native title claimant groups affected by the Beverley operation—the Adnyamathanha and the Kuyani peoples—as represented by their respective advisory committees. However, concerns remain among some of the

108 Australian Conservation Foundation, *Submission 74*, p 24.

Adnyamathanha people, such as Ms Jillian Marsh, about the extent and effectiveness of Heathgate-Aboriginal interaction.¹⁰⁹

3.118 It must be stressed, though, that indigenous people themselves, chiefly the Adnyamathanha, are in disagreement over some issues, including the payment of mining royalties. The Port Augusta-based Adnyamathanha Traditional Lands Association (ATLA) has threatened to sue the company if payments are made to trusts established by the Adnyamathanha claimants. This matter was understood to be before the Federal Court at the time of finalising this report.

Meetings with pastoralists

3.119 The company reports to local pastoralists, notably the lessees of Wooltana Station, on the operation and progress of mining and its ramifications for these remote rural landholders at informal gatherings held every six months.

Discussions with local Aboriginal communities

3.120 Heathgate reports at six monthly intervals to the representatives of local Aboriginal communities, such as those at Nepabunna, Iga Warta and Leigh Creek. Issues discussed include employment training, current job opportunities at Beverley, cross-cultural awareness programs, and royalty and community payment matters. Mr Michael Anderson, Chair of Wartali-Owie Inc., and Ms Jillian Marsh, informed the Committee of difficulties with the company's alleged 'top-down', non-consultative business culture; its lack of preparedness to train younger members of the indigenous community for mine work through apprenticeships; and its apparent reluctance to include skilled local Aboriginal people in the Beverley work force, preferring to import higher skilled labour from elsewhere.¹¹⁰ Mr Stephen Middleton, a Vice-President of Heathgate Resources, disputes these claims and points to the creation of several company training and employment initiatives for the local indigenous population.¹¹¹

Public awareness initiatives

3.121 Heathgate Resources maintains a website and publishes a newsletter entitled *In Situ* that contain information about its operations.

3.122 The ACF has called for the creation of a website documenting all mine related events.¹¹² While Heathgate Resources currently has a website that provides

109 Heathgate Resources Pty Ltd, *Submission 70a*, pp 16, 17-18, 67-8; Ms Marsh, *Committee Hansard*, Adelaide, 4 October 2002, p 350; Australian Conservation Foundation, *Submission 74*, pp 28-30.

110 Ms Marsh and Mr Anderson, *Committee Hansard*, Adelaide, 4 October 2002, p 350.

111 Mr Middleton, *Committee Hansard*, Adelaide, 4 October 2002, pp 256-257.

112 Australian Conservation Foundation, *Submission 74*, p 34.

information on its activities, this website is incomplete. Further, as the company maintains the website, it is unlikely members of the public will trust that the information provided is accurate and that all relevant information has been disclosed. Consequently, an independent website could clearly assist in the timely dissemination of information about the mining operations.

3.123 Heathgate Resources stated that company officials make many public addresses and attend numerous community gatherings to provide information on its mining activities. The FoE labelled these exercises: ‘A public relations attempt to manage perceptions of corporate governance of the nuclear industry’.¹¹³

3.124 The company has established a Visitor and Aboriginal Heritage Centre at the Beverley mine to expand community knowledge of the project and to enhance understanding of indigenous issues. However, Mr Michael Anderson, a Beverley Advisory Committee member, has referred to the paucity of material on indigenous subjects in the Centre; the company’s alleged unresponsiveness to suggestions about what to include in it; and Heathgate’s apparent failure to consult adequately with, and report to, local Aboriginal people on the Centre.¹¹⁴

Summary

3.125 The Commonwealth, specifically Environment Australia, sees a continuing role for itself in uranium mining reporting and oversight. As the EA states in its submission:

While much of the decision-making process affecting the environment rests largely in local or State hands ... there is a legitimate national dimension to environmental policy in relation to uranium mining ... Environmental impact assessment by the Commonwealth provides for a degree of reassurance and certainty in the public’s perception that environmental protection measures for all proposals are rigorous, fully transparent, open and consistent.¹¹⁵

3.126 SACOME is certain that, despite some duplication, present Commonwealth and South Australian reporting arrangements are adequate; that current public reporting machinery will assist in dealing with future incidents at Beverley; and that no need exists for extending Commonwealth participation in reporting and scrutiny.¹¹⁶ The Chamber argues, too, that agencies are performing their reporting functions fairly and efficiently, and that industry has been assiduous in meeting its obligations.¹¹⁷

113 Friends of the Earth, *Submission 69a*, p 1.

114 Mr Anderson, *Committee Hansard*, Adelaide, 4 October 2002, p 352.

115 Environment Australia, *Submission 86*, p 5.

116 South Australian Chamber of Mines and Energy, *Submission 39*, p 8.

117 South Australian Chamber of Mines and Energy, *Submission 39*, p 6.

3.127 However, in its submission to the Bachmann Review of Reporting Procedures (August 2002), SACOME supported the idea of revised reporting arrangements, notably, the establishment of a single reporting point to Government; the adoption of a standard form for such reporting; the formulation of spills reporting procedures that recognise factors other than volume, material and location; industry and government developing a publicly accessible web-based reporting system for notifiable incidents; and each uranium mine maintaining an up-to-date spills incident register.¹¹⁸

3.128 The Bachmann Review made eight recommendations aimed at updating and strengthening reporting procedures. They include the maintenance of a register of incidents at each site; revised secrecy/confidentiality clauses to ensure anonymity for concerned individuals; closer reporting liaison between the CIM, EA and the DITR; all agencies to be informed of incidents at the same time; the adoption by relevant agencies of a common incident reporting form; and the identification of a lead Minister and agency to deal with a significant incident as soon as it occurs.¹¹⁹ These proposals, which constitute a significant advance on present practice, should be incorporated into any revised reporting arrangements. The Committee understands from an officer-level informal source that six of the eight recommendations made by Bachmann have been implemented and the remaining two, dealing with legislation and protocol are in progress.

3.129 Mr Sweeney set out the ACF's preferred reporting and regulatory reforms:

We believe the South Australian model is an appropriate state model whereby the state agency is a dedicated environment protection agency. The role of the Commonwealth would be to work with that agency to also play a role to ensure that all Commonwealth frameworks, guidelines and codes of practice were applied rigorously and made public. It would be in the provision of performance based and clear conditions on export licences and other regulatory tools that the Commonwealth has. It would also be to ensure that there is an increased and heightened transparency and understanding. There needs to be a delineation of the roles so that there is not confusion—and I believe the term has been used—of 'regulatory competition'. There needs to be a delineation so that competition is not there, and there is in fact enhanced regulatory cooperation and enhanced regulatory transparency and effectiveness.¹²⁰

3.130 The absence of a compulsory obligation to report to any responsible Commonwealth authority confirms the view that there is an over-concentration of regulatory power in South Australian Government hands. The Committee believes

118 SACOME, Uranium Standing Committee, Submission to the *Report of Independent Review of Reporting Procedures for the SA Uranium Mining Industry (Bachmann Inquiry)*, Adelaide, July 2002, p 8.

119 Hedley Bachmann, *Report of Independent Review of Reporting Procedures for the SA Uranium Mining Industry*, Adelaide, August 2002, p 1.

120 Mr Sweeney, *Committee Hansard*, Canberra, 18 October 2002, p 297.

that the Commonwealth should pay a more active role in the regulation of the mining activities and that there is an urgent need for greater clarity in the division of regulatory responsibilities between the Commonwealth and South Australia. In addition, the Committee believes that public interest would be served by greater disclosure of information about the mining operations and increased transparency in government regulatory processes. This matter is discussed in greater detail below.

Recommendation 22

The Committee supports the recommendations of the Bachmann Review aimed at updating and strengthening reporting procedures, viz:

- **Maintenance of a register of incidents at each site.**
- **Revised secrecy/confidential clauses to ensure anonymity for concerned individuals.**
- **Closer reporting liaison between the CIM, EA and the DITR.**
- **All agencies to be informed of incidents at the same time.**
- **Adoption by relevant agencies of a common incident reporting form.**
- **Identification of a lead minister and agency to deal with a significant incident as soon as it occurs.**

Consultation and communication

Beverley Environmental Consultative Committee (BECC)

3.131 The BECC consists of representatives of Commonwealth agencies (one each from EA and the DITR); South Australian bodies (the Chairperson of PIRSA, one from the Department of Human Resources and one from the Department of the Environment and Heritage); and two from Heathgate Resources Pty Ltd. The BECC has been described by Heathgate's President as 'an important mechanism for effective liaison and exchange of information between the Commonwealth government, the state government and Beverley'.¹²¹ The company stresses that BECC's role is 'to provide a link between Heathgate Resources and State and Federal agencies in regulating uranium mining. It does not have a role in dispersing information to the community'.¹²²

3.132 Its chief functions are to review the mine's environmental performance and to disseminate information (chiefly, that relating to leaks) to all affected stakeholders. An ACF Campaign Officer told the Committee that BECC has done neither; he

121 Mr Graham, *Committee Hansard*, Adelaide, 4 October 2002, p 251.

122 Heathgate Resources Pty Ltd, *Submission 70a*, p 21; Australian Conservation Foundation, *Submission 74*, p 33.

claimed, in fact, that it has kept secret all of the data it holds on the continuing leaks at Beverley.¹²³

3.133 The BECC, as presently structured, does not satisfactorily communicate with, or take into account the information needs of, a number of key stakeholders such as indigenous groups and the general public. Its only regularly released information—a report based on the proceedings of its six-monthly meetings—is published once a year. Mr Mark Chalmers, of Heathgate Resources, informed the Committee that the BECC was considering how to improve its disclosure mechanisms.¹²⁴ It is obvious that more regular communication to all stakeholders, not primarily to government agencies and the company, is necessary. As Mr Malcolm Forbes, of Environment Australia, told the Committee:

There has been a bit of discussion within the [BECC] itself in relation to the need to release information. [Environment Australia has] been advocating for some time that annual environmental reports must be released to the public ... It would be better for [Heathgate Resources] and the South Australian authorities to be a little more open than they have been in the past. There is a general move now within South Australian authorities to be a little more open. The Beverley Environmental Consultative Committee is also privy to some commercial-in-confidence information. Some of that information would clearly be difficult to release. The company and PIRSA are quite keen to try and release other information. The issue of transparency is one which has been put on the table and discussed quite openly within the committee. There is a need to be more transparent than it has been in the past. That has certainly been a position which has been taken by the Commonwealth.¹²⁵

3.134 Mr James Graham, President of Heathgate Resources, pointed out that the information provided by the BECC on its activities is contained in its annual report and publicised through other mechanisms. He stresses that ‘the BECC ... does not have the belief that we do not report to the public’.¹²⁶ Heathgate Resources’ Mr Middleton told the Committee that the BECC consults quarterly with native title claimant groups in the forum of advisory committees (specifically, the Adnyamathanha, Kuyani, Nepabunna and Iga Warta communities), as well as local pastoralists, the National Parks and Wildlife Service, and the Arkaroola tourist resort.¹²⁷

3.135 The four indigenous advisory committees recently merged their functions into a single consultative committee. Mr Michael Anderson, a committee member,

123 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 188.

124 Mr Chalmers, *Committee Hansard*, Adelaide, 4 October 2002, p 250.

125 Mr Forbes, *Committee Hansard*, Canberra, 18 October 2002, p 314.

126 Mr Graham, *Committee Hansard*, Adelaide, 4 October 2002, p 252.

127 Mr Middleton, *Committee Hansard*, Adelaide, 4 October 2002, p 252.

criticised the company's degree of disclosure about leaks and spills, pointing out that, not only has the provision of written information to Aboriginal people about incidents almost invariably been delayed, but committee members have, as a rule, not been orally notified immediately after individual incidents.¹²⁸

Declaration of Environmental Factors

3.136 Questions have been raised about consultation and the consultative machinery at every stage of Beverley's history. In this regard, the ACF was highly critical of the Declaration of Environmental Factors (DEF) process, arguing that the DEFs were not released for public comment and that the trials did not adequately inform the EIS process. It stated that:

... Minister Hill decided to allow the conduct of trial uranium mining at Beverley through an entirely non-public process and separate from the EPIP Act EIS process.¹²⁹

3.137 In response to these claims, Heathgate Resources argues that:

The small scale and minimal potential impact of the Beverley [FLT]s meant the interests of the community and the environment could be protected through the DEF process, which is well recognised as being an effective way to manage developments when they reach this stage. There was full public participation in the subsequent EIS process, including: public comment on the terms of reference; an invitation to make submissions on the draft EIS; and the opportunity to participate in public meetings.¹³⁰

3.138 The Committee strongly believes the failure to subject the DEF process to an open and transparent environmental assessment process has undermined public confidence in the project. In future, all aspects of proposed uranium mining should be subject to an open and transparent environmental assessment process that enables members of the public to contribute to relevant decision-making processes.

Industry-Aboriginal group negotiation

3.139 A major consultation issue relates to mining industry-indigenous community interaction. The ACF argues that good faith negotiations were not carried out with the Adnyamathanha people prior to the commencement of operations and that relevant information concerning leaks from the mine was not disclosed to the native title claimants. In this regard, the ACF stated:

128 Mr Anderson, *Committee Hansard*, Adelaide, 4 October 2002, pp 352, 360.

129 Australian Conservation Foundation, *Submission 74*, p 17.

130 Australian Conservation Foundation, *Submission 74*, pp 16-17; Heathgate Resources Pty Ltd, *Submission 70a*, p 10.

ACF consider that the legislative obligation on the proponent “to negotiate in good faith” with the NT claimant groups was not met by General Atomics, in that:

- During negotiations General Atomics, through their 100% owned subsidiary Heathgate Resources, would not negotiate an agreement with the Native Title Claimant group representing the main Adnyamathanha community on terms which differed from poor terms that were signed earlier on with another Native Title claimant group; and
- General Atomics held out to use the ERD Court process to seek a mining agreement, knowing that community would lose their future options to royalties should General Atomics win the case against Adnyamathanha community opposition to their terms; and
- In that they failed to properly inform the main Adnyamathanha Native Title claimant group of a radioactive leak which had occurred at the trial mine.

Adnyamathanha people were duly concerned over environmental impacts of acid ISL uranium mining and had a right to be fully informed about impacts of trial mining on their traditional lands. This was not the case in practice.¹³¹

3.140 In response to the ACF’s contention that negotiations with Aboriginal communities must be conducted in ‘good faith’, Heathgate Resources stresses that this is occurring and that the company-Aboriginal relationship has proved ‘a mutually rewarding one’.¹³² Yet the ACF claims that, in comparison with their fellow Australians, at every stage of the process of attempting to reach a native title mining agreement with the company, the Adnyamathanha people were at a disadvantage. Mr Noonan stressed to the Committee that the agreement process and the agreement itself were:

... fundamentally inadequate ... under South Australian legislation ... the Adnyamathanha community did not have a right to seek conclusion of the environmental impact statement before they were legally forced into an agreed outcome with the company. While all other Australians had a legal right to make a submission to the Beverley EIS to see the outcomes of that submission in the government assessment and response, the Adnyamathanha community were not given that privilege that was extended to every other Australian. They were, through legal means under the acts and by the company, forced to come to an agreed outcome with the company ... before

131 Australian Conservation Foundation, *Submission 74*, p 29. Emphasis in original.

132 Australian Conservation Foundation, *Submission 74*, p 28; Heathgate Resources Pty Ltd, *Submission 70a*, p 16.

they even had access to the public documentation as to what the impacts of the mine may be.¹³³

3.141 Ms Jillian Marsh, a member of the Flinders Ranges Aboriginal Heritage Consultative Committee (FRAHCC) and of the Adnyamathanha community, led the opposition to the proposed Beverley mine, which is located on community land. She told the *Green Left Weekly* in 1999 that:

In 1997, Heathgate Resources approached the two registered native title claimants. At that stage Heathgate was not legally bound to enter into negotiations ... When they found the claimants were receptive, they put forward a proposal.

Many months of pressure [by the company] resulted in both claimants signing exploration agreements, without the consent or knowledge of the rest of the Adnyamathanha community.

... Heathgate has used the content of the original agreements ... as a template for how they conduct their business with the rest of the community. When the final agreements on the commercial lease were signed by other registered claimants last year [1998], the chairperson of the Adnyamathanha Native Title Management Committee said, “we were forced into signing this agreement”.

Under the state Aboriginal Heritage Act, FRAHCC operates as an independent body, separate from the native title claimants. When FRAHCC opposed the mine, it was immediately cut out of the consultation process.¹³⁴

In evidence to the Committee, Ms Marsh stated that as 1998-99 advanced, intimidation rather than collaboration became the hallmark of indigenous-Heathgate relations. She concluded that ‘it was not what you would ideally describe as a public consultation process’.¹³⁵

3.142 Heathgate Resources rejects the suggestion that the Adnyamathanha people were in any way coerced into reaching an agreement; rather, the company argues that the former Chairperson of the now defunct Adnyamathanha Native Title Management Committee, Mr Vincent Coulthard, made it clear that he had followed his people’s wishes in signing, and was not forced by Heathgate Resources to do so.

Recommendation 23:

In view of evidence of inadequate consultation in the past, the Committee recommends that Heathgate Resources should encourage and strengthen

133 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 189.

134 *Green Left Weekly* (Sydney), 24 March 1999, Media Release, ‘Indigenous People Oppose Beverley Uranium Mine’: www.greenleft.org.au/back/1999/354.

135 Ms Marsh, *Committee Hansard*, Adelaide, 4 October 2002, p 349.

relations with the local Indigenous community through improved and open communications.

Committees and forums

3.143 The approval machinery for the Beverley mine stipulated that stakeholders, among them environmental organisations like the ACF, the FoE, and the Conservation Council of South Australia (CCSA), as well as pastoralists and indigenous groups, should participate in a Community Consultative Forum. In the FoE's view, consultative *committees*, which were formed in conjunction with these consultative *forums*, have become ineffective—in fact, a one-way dialogue—the mining interest eclipsing environmental, pastoral and indigenous interests in their deliberations. In order to address this, the FoE recommends the creation of two Commonwealth-funded positions on each committee (including the BECC) and the provision of greater scrutiny and disclosure requirements for committees and forums.

3.144 Heathgate Resources, however, dismisses such objections on the grounds that consultative committees were established primarily to facilitate information exchange between mining companies and Commonwealth and State monitoring agencies in the public interest. The company argues that 'anti-nuclear groups have retreated from the consultative process because the committees are not the forums for espousing anti-nuclear sentiment that they attempted to make them'.¹³⁶

3.145 The Committee believes consultative committees and forums have a legitimate role to play in disseminating information and encouraging discourse between stakeholders. However, in order to be effective, they must contain independent community representatives and their activities should be open and transparent. In the absence of these elements, there is the potential for these committees and forums to be seen as vehicles for the advancement of the company's interests.

Disclosure

3.146 Dr Dennis Matthews has described the 'very heavy cloak of secrecy over anything to do with radioactivity'¹³⁷ as a significant difficulty bedeviling the uranium debate. The ACF, too, is highly critical of what it calls the atmosphere of 'extensive secrecy' surrounding uranium industry operations in Australia. As an example of this, it cites approximately 30 'routine and secret' uncontrolled surface leaks which occurred at Beverley prior to the major leak of 11 January 2002. The ACF also claims that, contrary to clear Ministerial and Environment Australia directions, Heathgate has failed repeatedly to address radiation management issues in a public EMMP, doing so only in a separate, non-public Radiation Management Plan. In order to redress this apparent reluctance to communicate essential data on mining and environmental

136 Heathgate Resources, *Submission 70a*, pp. 55-56

137 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 166.

performance, and this seeming unwillingness to better inform monitoring agencies and the public, the ACF recommends that all reports regarding ISL operations at Beverley, particularly the relevant Radiation and Waste Management Plans, be made public.¹³⁸

3.147 Heathgate Resources rejects both of these criticisms, arguing that ‘there are no secret surface leaks—routine or otherwise ... No spills have been “kept secret”. Indeed, they are posted on departmental and company websites on a voluntary basis’. It emphasises also that ‘radiation management details are considered confidential since it would be a simple matter to identify individuals, which is not considered to be in the interests of the public or the individual’.¹³⁹

3.148 Another serious claim made by the ACF concerns the status and release of Heathgate Resources’ reports on the Beverley FLTs, including the Groundwater Monitoring Summary. The ACF states that release of these reports under the Freedom of Information Act was delayed by company claims of commercial-in-confidence for more than two years. A successful ACF appeal to the South Australian Ombudsman finally secured the release of some of these reports, the Ombudsman finding that in no case was a commercial-in-confidence claim justified. In response, Heathgate Resources claims the ACF was undertaking an information trawling exercise. It also claims these actions are evidence of a continuing vendetta against uranium mining companies and their activities.¹⁴⁰

3.149 The ACF identified a lack of communication and the maintenance of secrecy as major issues:

We believe that there was full knowledge between state and Commonwealth regulators and the company [Heathgate Resources] about [the Beverley] leaks ... throughout really lengthy periods when those leaks were not in the public realm and should have been, and through really important decision making processes, such as the environmental impact statement and the further studies ordered by [the responsible Commonwealth Minister] ... That is a failure of those regulators and of those political systems for not informing the public of those leaks.¹⁴¹

3.150 The company disputes these statements, calling them ‘a gross reflection on the integrity of Heathgate Resources and the professionals who represent the various regulatory authorities responsible for oversight of uranium projects’. However, it does

138 Australian Conservation Foundation, *Submission 74*, pp 23-25.

139 Heathgate Resources Pty Ltd, *Submission 70a*, p 13.

140 Australian Conservation Foundation, *Submission 74*, p 14; Heathgate Resources Pty Ltd, *Submission 70a*, p 8.

141 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 188.

not seriously address the substance of the South Australian Ombudsman's findings or the ACF's claims.¹⁴²

3.151 The matter of the public availability on websites of information about acid ISL is also a contentious one. In its submission, the FoE refers to a 'best practice' feature of communication and information transfer in the state of Wyoming, USA, where details of spillage and leakage in ISL mines are entered into a regularly updated online database. The Wyoming Department of Environmental Quality recently redesigned its associated website. The FoE advocates the creation of an Online Database on this pattern to be administered by South Australia's Environment Protection Authority. However, Heathgate Resources argues that the South Australian Government's website already contains such information.¹⁴³ The adequacy of the present website is obviously a matter for debate, a subject which could be examined by an Environment Australia-led investigation of current arrangements.

3.152 The Committee recognises that greater consultation and more frequent release of information is a double-edged sword for both the company and the regulators. They find themselves subject to criticism based on the material they disclose, and condemned for engaging in a 'cover-up' when they seek to protect commercial-in-confidence and personal data. This is hardly unique to the uranium mining industry.

3.153 The Committee strongly believes there is a need for greater transparency and public accountability in the operation of the Beverley mine. If Heathgate Resources, the South Australian Government and the Commonwealth want to resolve disputes concerning the legitimacy of Beverley and the adequacy of the management and regulation of the mine, this can only be achieved by ensuring members of the public are fully informed of relevant mining and regulatory activities. The failure to ensure transparency will only generate further resentment and suspicion.

Rehabilitation

3.154 Mining Lease 6036 stipulates in the First Schedule that Heathgate Resources:

... shall ensure that land disturbed by mining and exploration activity is rehabilitated to achieve a stable and regular land-formation and to return the area to grassland, suited to a grazing after-use.¹⁴⁴

3.155 The Second Schedule of the Lease sets out *inter alia*, what rehabilitation related work is to be included in the EMMP. It includes progressive rehabilitation of the land and borefields and the methods to be used. Elsewhere it outlines requirements

142 Australian Conservation Foundation, *Submission 74*, p 14; Heathgate Resources Pty Ltd, *Submission 70a*, p 8.

143 Friends of the Earth, Australia, *Submission 69*, p 6; Heathgate Resources Pty Ltd, *Submission 70a*, p 55.

144 Clause 7, First Schedule, Mining Lease 6036.

in more detail.¹⁴⁵ Clause 24 refers to the monitoring of fluid migration which is a major concern to many interest groups and witnesses.

3.156 Notably, unlike the Mining Lease issued to Southern Cross Resources for the Honeymoon project, the Heathgate Resources lease does not specify that a Rehabilitation Bond must be lodged.

3.157 The Beverley EMMP states that:

The objectives of the rehabilitation program will be to rehabilitate disturbed areas and to ensure the long-term viability of rehabilitated areas.

The process of achieving these objectives includes:

rehabilitating areas disturbed by operational related activities, once they are no longer required for these activities;

conducting a monitoring program to quantify the effectiveness of rehabilitation.¹⁴⁶

3.158 Beverley is required to abide by the EMMP. The Plan outlines the methods to be used, the procedures for both long-term and continual rehabilitation, monitoring and management strategies, and accountability. Table 5¹⁴⁷ in the EMMP outlines the suggested scaling and timing for rehabilitation and subsequent closure.

145 Clauses 1, 6, 11, 14, 17, 22 and 24, Second Schedule, Mining Lease 6036.

146 Heathgate Resources Pty Ltd, Beverley Uranium Mine – Environmental Management and Monitoring Plan, 2000, p 27.

147 Heathgate Resources Pty Ltd, Beverley Uranium Mine – Environmental Management and Monitoring Plan, 2000, p 29.



Injection well I-395 – site of 5 May 2002 spill

3.159 The FoE has expressed a general concern about the uranium mining industry's 'failure to rehabilitate'.¹⁴⁸ The ACF claims that the operators of the Beverley mine were the first Australian mining industry group in the modern era not required to pursue either subterranean or surface rehabilitation. As a result, it argues, serious environmental problems have ensued, especially in the areas of liquid waste disposal and groundwater rehabilitation.¹⁴⁹

3.160 In response, Heathgate Resources argues that it lodged a bond of more than \$1 million to meet rehabilitation costs and that the mining lease is being progressively rehabilitated.¹⁵⁰

3.161 The FoE has stated that Heathgate should be required to rehabilitate groundwater.¹⁵¹ The ACF was also highly critical of the fact that Heathgate Resources is under no obligation to rehabilitate the aquifers that will be affected by the mining operations. In this regard, it stated:

The Beverley uranium mine is the first mine in the modern era in Australia to be granted approvals to not require rehabilitation of the main impacts of

148 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 285.

149 Australian Conservation Foundation, *Submission No. 74*, p. 30

150 Heathgate Resources, *Submission No. 70a*, p. 18

151 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 282.

the mining operations on the environment. There is no requirement to rehabilitate ISL impacts on groundwater. In addition the approvals allow discharge of all liquid mine wastes into a near surface aquifer of acidic, radioactive and heavy metal waste discharge on groundwater quality and composition.

Federal Minister for Environment did not recognise any inherent or intrinsic value to this part of the Australian environment. Nor did he recognise and value traditional owners cultural right and expectation to protect their country including groundwater. Approvals were given on economic grounds alone.

... These two adverse precedents of ISL practices at Beverley impose a liquid pollution plume moving through groundwater with potential to impact on and pollute any connected aquifer. The Beverley aquifer is adjoined by a major fault line and the Great Artesian Basin is only some 100 metres below.¹⁵²

3.162 The company dismisses the need for the groundwater to be rehabilitated arguing that the mining waste that is discharged into the relevant aquifers ‘represents material that originated in the aquifer’.¹⁵³ Heathgate Resources also argues that ISL mines in the US also discharge their mine wastes into aquifers of ‘comparable standards’ to the Beverley aquifer.¹⁵⁴

3.163 Environment Australia referred to overseas evidence of natural attenuation of groundwater plumes following ISL mining. Similarly, Heathgate Resources cites the alkaline ISL example of Nine Mile Lake, near Casper, Wyoming, USA, to illustrate successful post-trial aquifer rehabilitation, and refers also to post-mine regeneration in Konigstein, Germany, where rehabilitation is taking place with the assistance of a Heathgate Resources affiliate company.¹⁵⁵

3.164 However, several stakeholders, including Dr Matthews, raised concerns about the persuasiveness of the evidence regarding rehabilitation of groundwater following ISL mining.¹⁵⁶ Most evidence concerning rehabilitation of affected aquifers relates to alkaline ISL mining. The ACF confirms this, asserting even more strongly that no evidence exists of successful aquifer rehabilitation after acid ISL mining or acid ISL mining trials.¹⁵⁷

152 Australian Conservation Foundation, *Submission 74*, p 30.

153 Heathgate Resources Pty Ltd, *Submission 70a*, p 18.

154 Heathgate Resources Pty Ltd, *Submission 70a*, p 18.

155 Heathgate Resources Pty Ltd, *Submission 70a*, p 70.

156 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, pp 176-177.

157 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, pp 199-200.

3.165 Owing to the absence of evidence concerning the rehabilitation of aquifers polluted with ISL mine wastes, Dr Matthews advocated the evaporation of liquid wastes and the management of the resulting solid wastes. In this regard, Dr Matthews stated:

Unlike most mining projects in developed countries where liquid wastes are evaporated and the resulting solid wastes are responsibly managed, the liquid wastes at Beverley are disposed of by pumping back into adjoining and mined-out aquifers. This is a practice that should be rejected by responsible governments.

An environmentally responsible government would:

Not allow discharge of liquid wastes into the underground water but would evaporate the liquid wastes and properly manage the solid residue.

Require restoration of the aquifer to its original quality by flushing with clean water, evaporating the polluted water and properly managing the solid residue.¹⁵⁸

3.166 Heathgate Resources disagrees with Dr Matthews' position. It argues that it is acceptable to dispose of mining waste in the aquifers because the material being disposed of derived from the aquifer. The company also rejects Dr Matthew's assertion that the Beverley aquifer should be restored to its original quality by flushing it with clean water, evaporating the polluted water and more effectively managing solid residue. Heathgate Resources argues that 'using clean water to restore an unusable aquifer to its unusable pre-mining condition represents an unjustified waste of the very resource Dr Matthews wishes to preserve'.¹⁵⁹

3.167 The views of Aboriginal stakeholders toward rehabilitation were expressed by Ms Jillian Marsh, who stated that:

On the point of rehabilitation: for us as Aboriginal people, culturally, rehabilitation really has a limited application. For us, once something has been disturbed and damaged or once something like a uranium orebody has been extracted, that is it—it is gone. It has been removed, it has been disturbed, it has been damaged and it is not whole anymore, so rehabilitation is something that cannot be done.¹⁶⁰

158 Dr Matthews, *Submission 16a*, p 5.

159 Heathgate Resources Pty Ltd, *Submission 70a*, p 38; Dr Matthews, *Submission 16*, p 20.

160 Ms Marsh, *Committee Hansard*, Adelaide, 4 October 2002, p 351.

Research

Future directions

3.168 Controversy continues regarding the quantity and quality of research undertaken by Heathgate Resources and other interested groups and individuals into acid ISL's appropriateness as a uranium extraction technique, both in general and specifically at Beverley. Certainly, Heathgate Resources and several concerned organisations conducted extensive hydrological research and testing at the Beverley site prior to, and since, the granting of a mining lease in April 1999. Three principal issues have emerged relating to research: the adequacy of data collection and the maintenance of records; the nature and accuracy of key modelling exercises; and the expertise of authors and the objectivity of their studies of the acid ISL method.

Data collection and record-keeping

3.169 The FoE is concerned with the questions of data collection and record-keeping as they affect mine workers' potential exposure to radiation. As it argues in its submission:

Current practice in assessment of human exposure continues to use 'risk' analysis with 'acceptable' worker and accident doses above general population. There remains no government collection of records to assess long term health impacts on workers. Given the health impacts now recognised with asbestos mining long term health assessment should be a public duty of care ... health records should be maintained independently to assess cumulative effects on workers.¹⁶¹

Modelling

3.170 More sustained research is needed to determine the accuracy of present modelling as a tool for evaluating the environmental implications of acid ISL mining. The contrasting approaches employed to assess natural attenuation, for example, are still the subject of considerable debate. Dr Matthews questions the modelling used by Heathgate Resources to justify its adherence to the principle of natural attenuation, wherein the liquid waste residue left from the ISL process supposedly returns to its solid underground state within upwards of ten years. In fact, he brands the theory of natural attenuation 'a fraud'.¹⁶²

3.171 Officers of Environment Australia took a cautious view with regards to modelling, calling the process 'satisfactory' while insisting on the need for further scientific inquiry.¹⁶³ Heathgate Resources, which has no such concerns, argues that

161 Friends of the Earth, Australia, *Submission 69*, pp 5-6.

162 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 167.

163 Mr Early, Mr Davies and Mr Kahn, *Committee Hansard*, Canberra, 18 October 2002, pp 310-13.

evidence from the Beverley FLTs and samples taken some two-and-half years after the trials confirm the presence of naturally occurring attenuation and, therefore, the accuracy of the modelling used by the company.¹⁶⁴

Analysis of ISL mining

3.172 As discussed, FoE and several other environmental groups expressed considerable concern about the environmental impacts of ISL mining. There is concern that ISL mining has been allowed to occur when the safety of this procedure has not been satisfactorily proven.

3.173 Heathgate Resources rejects these criticisms, claiming the concerns of environment groups are based on flawed research.

3.174 There is clearly considerable disagreement amongst stakeholders about the validity of the research used to support their respective positions. The disagreement amongst experts and the problems associated with perceptions of bias can only be resolved through more active involvement of government in researching the environmental issues associated with uranium mining. Greater public access to materials concerning the operation of the mine and increased transparency in regulatory processes may also assist in bridging the gaps that have developed amongst members of the community.

164 Heathgate Resources Pty Ltd, *Submission 70a*, p 65.

Recommendation 24

The Committee recommends that a more comprehensive research effort be made based on better organised and more systematic information collection and greater rigour in analysing data. Such research should be undertaken both individually and collaboratively by mining companies, the responsible Commonwealth and South Australian agencies, and independently funded scientists, both in Australia and abroad.

Honeymoon Uranium Mine

Introduction

3.175 As is evident from the discussion in both Chapter 1 and above, the Beverley and Honeymoon uranium mines have much in common in relation to the approval and regulatory frameworks under which they operate as well as their use of the acid ISL extraction method. Having already addressed these general issues, the Committee focuses on issues and evidence relating specifically to the Honeymoon mine.

Location and geological overview

3.176 The Honeymoon Uranium Project comprises a number of exploration and mining tenements located on arid plains approximately 400 kilometres north-east of Adelaide and 75 kilometres north-west of Broken Hill, between the Olary Ranges and Lake Frome. Naturally occurring concentrations of uranium minerals lie in buried Tertiary-age river channel (palaeochannel) sediments in several parts of the project area including the Honeymoon and East Kalkaroo ore deposits. The uranium is present predominantly within coarse grained sands of the Basal Sands Aquifer. The palaeochannel, which is incised into rock 100-120 metres below the surface, consists of three interconnected aquifers (upper, middle and basal) with a depth of around 50 metres. The aquifer is covered by a layer of clay around 70 metres deep, known as the Namba Formation, which is itself overlaid by about 30 metres of sand and clay. The naturally occurring groundwater is of poor quality, with high total dissolved solids (TDS) of between 10,000 and 20,000 mg/litre as well as high concentrations of radionuclides.

Historical development

3.177 The operator of the Honeymoon project is Southern Cross Resources Australia Pty Ltd (SXR), which is a wholly owned subsidiary of a Canadian company, Southern Cross Resources Inc. SXR acquired the title to the majority of tenements in early 1997. Ore-grade uranium was discovered there in 1972, but early feasibility studies determined that the deposit was too small to be viably mined using contemporary open-cut or underground mining techniques. This situation altered with the development of the *in-situ* mining method and in 1982, following government approval of an Environmental Impact Assessment (EIS), a demonstration ISL operation at Honeymoon was established. Subsequent changes at both State and Commonwealth government levels signalled changed policy approaches to uranium

mining and in March 1983 the final Approval to Mine was deferred, and the following June the project was placed under ‘care and maintenance’. Demonstration plant and equipment was also removed. However, SXR received a conditional approval to conduct a Field Leach Trial (FLT) in 1998 following a review of the Declaration of Environmental Factors (DEF).

3.178 As detailed below, between November 2001 and February 2002, SXR obtained several key approvals necessary to commence operations. It also signed agreements with two native title claimant groups. According to Mr Thomas Hunter, Project Executive with SXR:

Since that time, we have been undertaking engineering, financial and marketing work of various kinds, with the aim of formally committing to the project early in the new year.

There have been a number of factors that have made that process a bit more protracted than we ideally wanted—namely, a uranium price which has stalled just below the \$US10 a pound level and the implosion of the equity markets in North America—but we are presently moving down that track on those three fronts. We have recently organised our bank financing side and we are moving ahead on the equity side.¹⁶⁵



165 Mr Hunter, *Committee Hansard*, Adelaide, 4 October 2002, pp 222-223.

Honeymoon Trial processing plant.

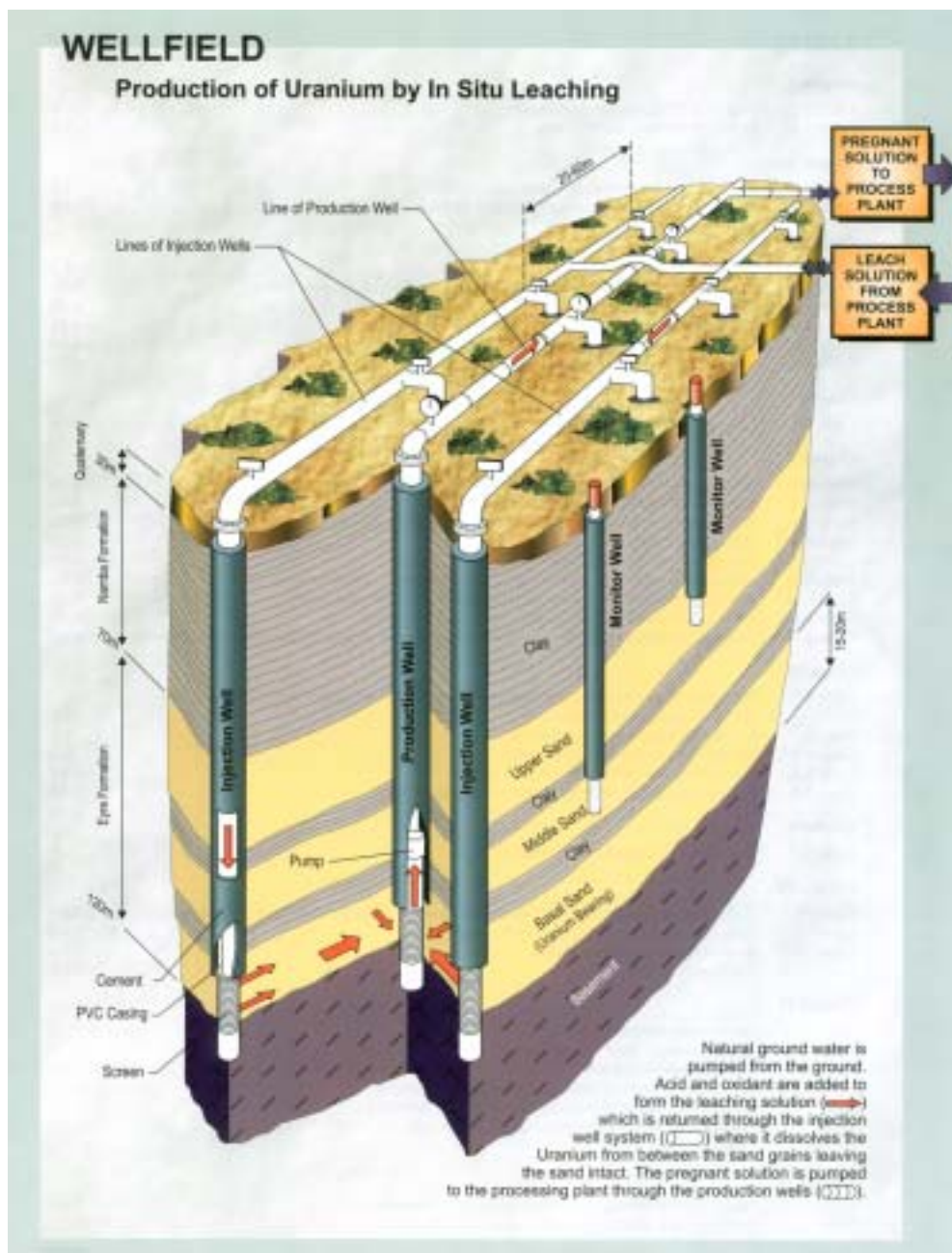
Methods of extraction

3.179 The acid ISL extraction technique used at Honeymoon is described in detail in the section above entitled *The ISL technique*. The process used at Honeymoon differs from that at Beverley only in the exchange process used. Use of ISL at Honeymoon, as at Beverley, has attracted considerable criticism, focusing on four points:

- the underground disposal of mining wastes;
- the resulting danger of widespread pollution of groundwater through interconnected aquifers (based on differing assessments over the connectivity of the aquifers);
- disagreement over the effectiveness of the natural attenuation process; and
- the use of acid ISL (instead of alkaline).

3.180 These issues are essentially common to both Beverley and Honeymoon and, having already been discussed in detail above, will not be repeated here. However, some issues specific to Honeymoon have been raised.

Figure 3.2 Schematic wellfield showing production lines and stratigraphy.



Source: Southern Cross Resources Pty Ltd.

3.181 A key area of disagreement that is specific to the Honeymoon site is the nature of the aquifer and the potential for the reinjected mine wastes to travel beyond the basal aquifer into either the middle or upper layers, or beyond the aquifer itself. Many submitters have, of course, raised general concerns about the danger of groundwater contamination at both the Beverley and the Honeymoon sites.

3.182 SXR representatives argue that there is minimal danger of this occurring, based on the knowledge of the aquifer system built up during the exploration and approval processes. With regard to movement between the aquifer layers, Dr Bush explained:

The geological formation at Honeymoon, as explained in the environmental impact statement ... is a series of sand layers and clay layers. The clay layers are not continuous; they are discontinuous. They pinch and swell. In other words, they vary in thickness through their extent. That thickness is zero in some locations and from five to 10 metres in other locations. There is not a single lens or layer of clay above the sand. They are numerous. They will overlap one another. They are interwoven. It is a very complex system. There is not a single clay layer. It is likely that from time to time there will be some vertical movement of leach solution which will be detected in the middle aquifer—as was the case with that particular incident in the field leach trial. But, ... the opportunity for vertical movement is restricted by a number of factors, including the decreasing grain size of the sand as one goes vertically within each of the three sand layers and also the decreasing average sand size going from the bottom sand layer - the basal sand - through to the top sand. So the rate of movement of solution in the basal sands is significantly higher than in the other two sands, and it is significantly higher in a lateral direction than in a vertical direction. So there will be the odd occasion when you will get some solution appearing above some of these thin clay layers, where it is pinched out.¹⁶⁶

3.183 He continues:

... on completion of leaching operations, all those pressures would be relieved, because you would no longer be injecting solution. So there would be no pressure in the system to encourage those solutions to migrate into the middle aquifer. The second point is that the basal aquifer and our leach solutions have a higher concentration of dissolved material—in other words, we are looking at 15,000 to 20,000 milligrams per litre as opposed to 12,000 to 15,000 milligrams per litre in the middle aquifer—and so the solution in the basal aquifer is more dense than the solution in the ground water in the middle aquifer. So the more dense ground water is going to stay in the bottom and, unless the laws of physics change, there is no way that that dense solution would of its own accord decide to move, without some driving force, into the middle aquifer.¹⁶⁷

3.184 The potential for contaminated water to leak out of the basal aquifer and into the more widespread groundwater is also a source of concern to many of those making submissions to the inquiry. Mr David Noonan, representing the ACF, argued that Honeymoon is not a confined aquifer, as water both enters and leaves the area at a rate of some 15 to 20 metres per year, and uncertainty remains over the exact location of these recharge and discharge areas:

We understand that the discharge area is said to be underground near Lake Frome, to the east side of Lake Frome, into what is said to be unconsolidated sands underground. We understand the company does not

166 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 225.

167 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 237.

know exactly where the discharge point is for that aquifer. We understand the company does not know exactly where the recharge areas are for that aquifer. ... but the company cannot map for you where they are.¹⁶⁸

3.185 The representatives of SXR reject these criticisms. Dr Bush described the Honeymoon aquifer in these terms:

... the aquifer is confined vertically by the 70 metres of clay that is above the aquifer and the impervious basement that is below the aquifer. These contact on the side. It was one of the prime focuses of the work last year to establish that there was a good seal along the sides of the aquifer. It has always been acknowledged that there was a degree of recharge into the system somewhere to the south of Honeymoon and that the aquifer flows at 12 to 15 metres per year in an overall north-south direction—although at Honeymoon it actually flows north-east to south-west, because of a dog leg in the aquifer. It is recognised that this palaeo-channel continues to the north and dissipates into a blanket sand. In other words, it is like a giant delta that was formed, with the sands discharging out over a lake floor or bed or something like that in the time it was formed. There is a very slow movement of water through the aquifer. It is correct to say that we do not know the precise recharge location. It is likely that there are numerous small locations where there is an inflow of water on the occasions when it rains. They have never been detected. There is no single identifiable location, to the best of our knowledge, where it discharges into the blanket sands away to the north of the site.¹⁶⁹

3.186 The need to clarify the geology of the aquifer, and the extent of confinement was a major motivation for the additional research work required in 2001 by Senator Hill, the then Minister for the Environment. Generally, Dr Bush is confident that the material will stay within the local confines of the mineral leases for at least 100 years.¹⁷⁰ Mr Tim Kahn, of Environment Australia (EA), observed in relation to SXR's and earlier EA evidence to the Committee on this subject:

We were giving the worst possible scenario that it would move along with the flows. The evidence is that it is more likely not to move at that speed. As well as physical, natural attenuation—physical dilution—there are also chemical processes which tend to lock up the system, slow down the flow and also precipitate some of the elements that might be of concern—the heavy metals and so on.¹⁷¹

Recommendation 25

168 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 197.

169 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 231.

170 Mr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 232.

171 Mr Kahn, *Committee Hansard*, Canberra, 18 October 2002, p 312.

Given the seriousness of potential risks to the environment, the Committee recommends that mining operations at Honeymoon not proceed unless and until conclusive evidence can be presented demonstrating that the relevant aquifer is isolated.

The approval process

3.187 Approval for the Honeymoon mine, as outlined in Chapter 1, required a number of approvals from both the South Australian and Commonwealth governments which are set out below.¹⁷²

Table 3.2: Overview of the Honeymoon Uranium Project Approvals Process

	Action	Date
1.	SA Minister for Mines and Energy directed that an EIS be prepared.	25 June 1997
2.	The Commonwealth Minister for the Environment and Heritage determined that an EIS be undertaken jointly, with South Australia taking the lead role. [Guidelines prepared jointly by Cth and SA governments, based on the requirements of the EPIP Act and the Development Act SA.]	2 August 1997
3.	Draft EIS Guidelines released for public comment.	7 October–3 November 1997
4.	Final EIS Guidelines released.	August 1998
5.	EIS released for public review by SXR.	7 June–2 August 2000
6.	Public meetings held at Cockburn and Adelaide.	5–6 July 2000
7.	EIS; Public Comments on the EIS; and Response and Supplement to the EIS, provided to the Commonwealth Minister for the Environment and Heritage.	20 November 2000
8.	Assessment Report on the EIS released by	January 2001

¹⁷² For further detail, see Environment Australia, *Addendum to the Assessment Report on the EIS*, pp 1-3.

	Environment Australia.	
9.	Commonwealth Minister for the Environment and Heritage indicated that additional information was required.	1 February 2001
10.	Terms of Reference for Additional Evaluation of Aquifer released by the Commonwealth Minister.	22 February 2001
11.	Honeymoon Uranium Project, Further Characterisation of the Yarramba Palaeochannel Report released by SXR (Summarising three technical reports commissioned by SXR.)	July 2001
12.	EA commissioned 3 expert assessments of the above reports, by the Australian Geological Survey Organisation (AGSO), the Bureau of Rural Sciences (BRS), and Dr Mark Pirlo.	2001
13.	Addendum to the Assessment Report on the EIS released by EA.	November 2001
14.	Minister for the Environment and Heritage announced his approval of the EIS.	21 November 2001
15.	Minister for Industry, Science and Resources issued an Export Licence for the project. Environmental Requirements are contained in Schedule A.	24 November 2001
16.	Mining Lease for Honeymoon approved by the South Australian Minister for Minerals and Energy. Environmental Requirements are contained in the First and Second Schedules.	20 February 2002

3.188 The approval process for the Honeymoon operation has been criticised on the following grounds:

- the standards set by the Commonwealth and South Australian governments were too low, and are predicated upon a concept of mining operations that will cause routine environmental damage;
- key information was not made available to the public;
- Environment Australia relied on the assessment of a scientist with a pro-uranium bias;
- the conclusions drawn from the EIS process were based on flawed computer modelling, leading to inaccurate and uncertain conclusions in relation to the movement of ground water within the aquifers and the associated rates of attenuation; and
- account was not taken of data from the original 1982 test site.

3.189 In evidence to the Committee, SXR disputed these claims. Mr Hunter emphasised the high standards attained and the ‘technical and procedural zeal’ displayed by the Commonwealth and State agencies in charge of the EIS process.¹⁷³ To the extent that criticisms were directed at the use of ISL, he also claimed there was increasing international acceptance of, and growing interest in, the ISL technique.¹⁷⁴

Basic standards

3.190 A basic issue underpinning the criticisms of the approval process is the question of different definitions of what constitutes acceptable damage to the natural environment. The ACF queried in particular the approval philosophy governing the discharge of liquid mine wastes and the failure to insist on the rehabilitation of aquifers:

ACF considers that Commonwealth EIS approvals granted to ISL operations are characterised by unacceptable environmental standards and set adverse precedents for environmental standards in mining in Australia in general.¹⁷⁵

3.191 It further stressed that:

Through the Honeymoon EIS process EA had put in place approvals and standards for acid ISL operations characterised by routine radioactive pollution of connected aquifers as well as the mining aquifer.¹⁷⁶

Dr Matthews stated that channeling the waste into the aquifer, even if that waste remains immobile, still sacrifices the aquifer.¹⁷⁷

173 Mr Hunter, *Committee Hansard*, Adelaide, 4 October 2002, p 221.

174 Mr Hunter, *Committee Hansard*, Adelaide, 4 October 2002, pp 232-233.

175 Australian Conservation Foundation, *Submission 74*, p 30.

176 Australian Conservation Foundation, *Submission 74*, p 31.

177 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 173.

3.192 Mr Bruce Thompson, of the Friends of the Earth, Australia (FoE) stated:

We believe that recent approvals tend to ignore environmental impacts or assume that this is a reasonable consequence, given the perceived benefits of mining. However, we believe that environmental protection is not just a matter of principle; the impacts of the processes have consequences for communities in these regions and may prevent utilisation of resources, notably water supply, in the future. For example, about 10 kilometres from the Honeymoon mine ... there is ... water [which] could be used [for watering stock] in the future; it is actually being used at the moment. If there is increased accumulation of radioactive material due to the process in those connected aquifers, that will clearly prevent that water being used.¹⁷⁸

3.193 These arguments led to calls for the company to be required to lodge a bond, with repayment contingent on the rehabilitation of groundwater; the prohibition of liquid disposal of the mine waste; and a reappraisal of the project under the EPBC Act.¹⁷⁹

3.194 Environment Australia's view on this issue was presented by Mr Kahn, who argued that:

The important thing is to protect the environment, and the most important parts of the environment are the biosphere—that is, the living parts of the environment. It becomes a philosophical debate as to whether you consider ground water to be a sacrosanct thing that you can never touch or do anything with, or whether it is something that is already unusable in its natural state so that when you have finished mining it goes back to that state and after a number of years will go back to a very similar state to the original ground water.¹⁸⁰

Failure to disclose key information in the EIS

3.195 Several submitters criticised the paucity of relevant information in the EIS which made it difficult for the public to make an informed decision on the project. Dr Matthews, for example, told the Committee that a major deficiency of the Honeymoon EIS process was 'the absence of information on radioactivity [which] ... should be central to any EIS on uranium mining', since the mines deal, not only with uranium, but with other radioactive materials such as radium and radon gas that are included with the uranium.¹⁸¹

3.196 Mr Noonan, representing the ACF, alleged that:

178 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 280.

179 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, pp 285-286. See also for example, Mr Birch, *Submission 31*, p 2.

180 Mr Kahn, *Committee Hansard*, Canberra, 18 October 2002, p 307.

181 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 167. See also Dr Matthews, *Submission 16A*, p 6.

... the South Australian regulators and the federal regulators made their own decisions to keep from the public, to keep secret, the evidence of the substantial leaks that occurred at the Honeymoon trial. They were kept secret through the EIS process.¹⁸²

As a result:

... the public were prevented from the knowledge of what had gone wrong at the Honeymoon mine with the surface leaks and therefore could not exercise an informed view on environmental protection at that site.¹⁸³

3.197 SXR refutes this arguing that, in relation to the last incident, the matter was reported to authorities as required and included in the Honeymoon EIS. SXR stated:

A change in ground water chemistry was observed in a monitor well adjacent to an area of leaching. The established recovery plan was followed to remove leach solution from the area and to restore the ground water baseline chemistry.¹⁸⁴

3.198 FoE also claimed that the approval process ‘fundamentally failed to openly assess one of the key environmental issues—groundwater impact.’¹⁸⁵ In reply, SXR refuted this claim, arguing that the EIS supplement:

...contained additional detailed analyses of ground water samples associated with the disposal system.

The additional studies conducted in 2001 comprising stratigraphic and test pumping field tests were aimed at determining the hydraulic boundaries of the palaeochannel (Water Studies 2001a). Relevant ground water data were contained in the reports prepared and made available to the public. There was no detailed analysis of the basal ground water pumped in these tests.¹⁸⁶

Evaluation of the 1982 test site data

3.199 Conservation groups also criticised the EIS for not taking into consideration data on the environmental effects of the original test site at Honeymoon in 1982. Both regulators and SXR argued that this was not possible for two reasons. First, according to EA’s Mr Davies and Mr Kahn, the relevant information could not be located. Secondly, Environment Australia argued that even if this data had been found, it would only be useful if they ‘had known exactly what fluids were being injected and

182 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 187.

183 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 188.

184 Southern Cross Resources Australia Pty Ltd, Honeymoon EIS, Appendix 10, p A10-4.

185 Friends of the Earth, Australia, *Submission 69*, Attachment: Undermining Environment Protection, p 6.

186 Southern Cross Resources Australia Pty Ltd, *Submission 28b*, p 4.

what the background levels were at that time in the past'.¹⁸⁷ Dr Bush stated that SXR had:

... only been involved in the project since 1997. We had no association with any work carried out in 1983¹⁸⁸. ... We had no history on exactly what was in those wells nor on what might be found as a result of sampling those wells. So we have never gone back into those wells, because we do not know what the meaning of the data would be.¹⁸⁹

Independence of research

3.200 In its submission, the FoE also sought to discredit research done by Dr Mark Pirlo, describing him as a pro-uranium PhD student with limited industry experience and no peer-reviewed and published scientific work, and whose academic study was facilitated by SXR. As such, the FoE argued, 'there are serious issues over the independence of his work'.¹⁹⁰

3.201 Dr Pirlo provided a detailed rebuttal of this statement. Addressing these claims, he argued that he was commissioned by Environment Australia to do the work because he had no links to the industry. He also stated that SXR's facilitation of his work was limited to allowing access to the mine site to collect groundwater samples from the monitoring bores, permitting him to gather limited analytical data from various ISL process points, and accommodating him on site for four nights. This activity, which is usual for doctoral candidates, took place during his doctoral research. Dr Pirlo stresses that the sources of all data are clearly acknowledged and:

At no stage have I ever received any money, gifts or favours from Southern Cross Resources.¹⁹¹

3.202 He also referred to the publication of several of his refereed papers.¹⁹²

3.203 Dr Pirlo's statements are supported by Southern Cross Resources.¹⁹³

187 Mr Davies and Mr Kahn, *Committee Hansard*, Canberra, 18 October 2002, pp 308-10.

188 Work carried out in 1982 as clarified by Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 225.

189 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, pp 225-226.

190 Friends of the Earth, Australia, *Submission 69*, Attachment A, p 5.

191 Dr Pirlo, *Submission 85*, p 2

192 Dr Pirlo, *Submission 85*, p 2.

193 Southern Cross Resources Australia Pty Ltd, *Submission 28a*, p 9.

The adequacy of computer modelling

3.204 Environmental groups also expressed doubts over the reliability of the computer modeling done to predict the effects of the mine waste on the aquifer, and the rate at which the groundwater moves through the aquifer.

3.205 Dr Matthews criticised the thermodynamic modeling process, which he asserted cannot reveal the rate at which the attenuation will occur:

The results of the modelling are highly suspect. ... I suspect that what was put into these models—although it has not been available for the public to look at what was put in—was rubbish and we have got rubbish out.¹⁹⁴

3.206 This is disputed by Dr Pirlo, who submitted that the modeling methods ‘were adequately discussed in the various research reports and/or referenced for discussion on other sources’.¹⁹⁵

Final approval for Honeymoon to operate

3.207 At the time of the Committee’s public hearing in Adelaide in October 2002, the approval process for the Honeymoon mine was not yet complete, because a Commercial Uranium Mining and Milling Licence under the *Radiation Protection and Control Act 1982* was still required in order to enable commercial operations to commence. As the ACF stated:

The company is actually legally prohibited from recovering any uranium from the Honeymoon deposits. ... they will now have to apply for that licence to a new Labor government in South Australia.¹⁹⁶

3.208 SXR also clarified that additional approvals are required before commercial operations can commence. In this regard, it stated that:

A licence to mine radioactive material was applied for prior to the field leach trial commencement. It was issued in February 1998. That covered the operation of the field leach trial and the production and handling of uranium yellowcake as a result of that trial. These licences have a duration of 12 months and so a new licence was applied for in 1999 and subsequently in the year 2000 while we were continuing that work. For 2001, a modified licence was applied for, because we had finished the field leach trial but we were still handling some uranium yellowcake material and drumming the final amount of product that was produced during that trial.

194 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 172. See also Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, pp 286-287.

195 Dr Pirlo, *Submission 85*, p 3.

196 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 182.

We currently have a licence to cover the work that we are doing at the moment and that we intend to do during this 12-month period, which is the continuation of environmental and radiation monitoring. It is quite correct that that licence does not allow us to produce any uranium. We have no intention of producing any uranium during this period. We also did not apply for a licence to produce any uranium during this period, because the field leach trial has been completed.

We are not in a position—and we certainly were not in a position last year—to apply for a commercial licence to mine and mill radioactive materials, because we have not finalised our engineering work. We have not finalised our monitoring and management programs, which are required as part of the submission for that licence. That work will be done at the appropriate time, and the company will be applying for a commercial licence when it is appropriate. So that is where we stand with licences at the moment.¹⁹⁷

3.209 The ACF argued that the Labor Government of South Australia was unlikely to grant the necessary licence to enable the commercial operations to commence lawfully. It stated:

The new Labor government as well as the federal ALP platform, which applies to the ALP across Australia, states they shall oppose the development of any new uranium mines ... We think it is absolutely clear policy of the new SA Labor government that they will not support the establishment or development of new uranium mines.¹⁹⁸

3.210 Mr Hunter, however, informed the Committee that if the commercial operating licence were refused, SXR would explore legal options to appeal the decision. SXR already possessed the three key licences:

The three important approvals that the project required for commercial status were the Commonwealth environmental approval; the Commonwealth export licence; and the issuing of the state mining lease. I understand that rejection on unreasonable grounds of any of our licences or plans—in other words, rejection on a political basis—allows us to look at some legal options and appeal relevant decisions. Certainly, after having expended some five years and more than \$Can30 million to reach this stage, the company would be expected to take the full range of legal options open to us.¹⁹⁹

3.211 The Committee notes that there appears to have been inadequacies in the EIS process. One of the more serious flaws appears to have been the failure to include information on leaks, spills and other incidents that occurred during the preliminary stages of the Honeymoon project in the EIS. This amounts to a significant flaw in the

197 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 223.

198 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 182.

199 Mr Hunter, *Committee Hansard*, Adelaide, 4 October 2002, p 223.

EIS, as it should have contained all relevant information to enable the public to make an informed judgement on the risks and likely environmental impacts of the proposed development. By failing to disclose this information in the EIS, SXR has jeopardised the integrity of the environmental assessment and approval process and undermined public confidence in the project.

3.212 The Committee is not in a position to make a judgment in relation to the reliability of the modelling processes that were used.



Honeymoon wellfield as used during the field leach trial

Monitoring

3.213 The monitoring program at Honeymoon is not as extensive as that at Beverley because the mine is not currently operational. Exact details of the monitoring regime for the Honeymoon mine will be set out in the Environmental Management and Monitoring Plan (EMMP). This is not expected to be finalised until the mine begins operating. However, the general principles underlying monitoring are contained in the EIS.²⁰⁰

3.214 In the meantime, SXR is required to submit quarterly and annual workplace and environmental monitoring reports in accordance with the Declaration of Environmental Factors and Radiation Licence Supporting Documentation.

200 Southern Cross Resources Australia Pty Ltd, Honeymoon EIS, pp. 12-21.

3.215 Workplace and Environmental Radiation monitoring was carried out during the field leach trial (FLT).²⁰¹ This monitoring program will recommence as soon as Honeymoon becomes active.

3.216 Workplace Radiation Monitoring includes:

- Gamma surveys;
- Radon decay product measurements
- Long lived Alpha radiation in dusts; and
- Alpha surface contamination.

3.217 Environmental Radiation Monitoring includes:

- Releases of leach solution
- Long lived Alpha radiation dusts
- Radionuclides in dusts
- Continuous Radon monitoring
- Wellfield groundwater monitoring
- Operation of disposal well
- Retention pond monitoring
- Surface water run off monitoring
- Regional bore water monitoring

3.218 SXR carries out radiation monitoring similar to that described above in its current care and maintenance status, and provides quarterly and annual reports to the regulators.

3.219 The monitoring undertaken for the Field Leach Trial attracted criticism from the FoE:

Monitoring in general remains periodic rather than continuous and does not cover the spectrum of potential radiological exposures/release. The location of monitoring stations in most cases is not sufficient to assess intermittent and accumulative impacts.²⁰²

3.220 Submitter Mr Adam Beeson noted events which took place during a 1998 tour of the Honeymoon uranium mine site:

During the tour I asked the guide (who was the site manager I believe) about the effects of in-situ leaching on the ground water of the area. I asked about

201 Southern Cross Resources Australia Pty Ltd, Honeymoon Uranium Project – Radiation and Environmental Monitoring Annual Report, January – December 2000.

202 Friends of the Earth, Australia, *Submission 69*, p 2.

the potential impacts tens or hundreds of kilometres from the site. The response was that he didn't know and could not know because such monitoring was not undertaken. I have paraphrased this conversation. Video and audio tapes were made of the entire tour. Should the committee be interested in seeing it I am sure I can contact those people in possession of them.

In relation to the terms of reference, a monitoring system which elicits such a response is inadequate.²⁰³

3.221 SXR made the following comments concerning this issue.

Work carried out in 1982 demonstrated that the ground water in the Yarramba Palaeochannel moved at a rate of approximately 12 m/y (Southern Cross Resources 2000a). Consequently, it was necessary to determine the impacts more locally than at the distances asked. Subsequent studies (Coffey 1999, Southern Cross Resources 2000a, Water Studies 2001b) demonstrated that there would be little effect on the ground water less than 2000m from the operation after 100 years under a worst case scenario. Clearly, monitoring of the ground water tens or hundreds of kilometres from Honeymoon would show no effect.²⁰⁴

Reporting, consultation and communication

3.222 The reporting, consultation, and communication regime for the Honeymoon mine was described in general terms in Chapter 1. SXR is required to provide the following reports:²⁰⁵

- Annual Environmental Report (to the Mines Minister, as required by the EMMP);
- Annual Environmental Report (to the Minister for Environment and Conservation, as required by the Licence to Mine or Mill Radioactive Ores (1987));
- Quarterly Reports (to the Chief Inspector of Mines, covering groundwater monitoring and management of hazardous chemicals); and
- Quarterly Reports (to the Manager, Radiation Protection Branch, Environment Protection Authority (EPA), containing occupational and environmental radiation monitoring data).

3.223 SXR also participates in ISL Operators' Meetings, which are held quarterly to discuss the results of environmental and radiological monitoring, and attended by company representatives and representatives of the South Australian (PIRSA) and Commonwealth agencies.

203 Mr Beeson, *Submission 43*, p 2.

204 Southern Cross Resources Australia Pty Ltd, *Submission 28a*, p 3.

205 South Australian Government, *Submission 84*, Appendix 2.

3.224 If the mine becomes operational, SXR will be obliged under the terms of the EMMP, to establish the Honeymoon Environmental Consultative Committee (HECC), which will meet twice yearly ‘to consider environmental data and discuss relevant issues’.²⁰⁶ This group will ‘include representatives of local stakeholders and key local organisations’.²⁰⁷ Its work is additional to a general commitment to ‘maintain and improve relationships with pastoral, local and wider community’ which will be achieved through initiatives like the establishment of a visitors centre at Honeymoon.²⁰⁸

Criticisms of accountability regime

3.225 Environmental groups have argued that the accountability of the Honeymoon mine is limited by the lack of accessible information. According to the ACF:

... lack of public availability of a range of key documentation on ISL operations seriously constrains an informed assessment of the adequacy, effectiveness and performance of existing monitoring and reporting regimes and regulations at both State and Commonwealth levels.²⁰⁹

3.226 A common view expressed in submissions is the need for greater transparency and independence of the regulatory regime.²¹⁰ Criticisms focused on the unavailability of key regulatory documents; secrecy provisions in South Australian legislation, and claims of commercial-in-confidence.

3.227 According to the ACF, while the licences and associated ERs for the mine are public documents, the detailed plans that are required (for example, the EMMP) are not, nor are the resulting mandated reports. The ACF argues that it should be a fundamental Commonwealth responsibility to ensure that all regulatory documentation is available for full public scrutiny.²¹¹ The ACF also seeks the release of several documents dealing with groundwater monitoring and aquifer studies, including:

- Honeymoon Uranium Project - Groundwater Flow and Quality Monitoring (July 2001);
- Honeymoon Uranium Project - Further Characterisation of Yarramba Palaeochannel (July 2001);
- Radiation and Environmental Monitoring Annual Reports (1998 to 2000); and

206 South Australian Government, *Submission 84*, Appendix 2, p 2.

207 Southern Cross Resources Australia Pty Ltd, Honeymoon EIS, pp 12-13.

208 Southern Cross Resources Australia Pty Ltd, Honeymoon Environmental Impact Statement, pp 12-25.

209 Australian Conservation Foundation, *Submission 74*, p 18.

210 Mr Browning, *Submission 54*; People for Nuclear Disarmament, *Submission 57*, p 4.

211 Australian Conservation Foundation, *Submission 74*, p 35.

- Radiation and Environmental Monitoring Quarterly Reports (July-September 1999, January-March 2000 and April-June 2000).²¹²

3.228 The ACF singled out for special attention the secrecy provisions in the relevant South Australian legislation that exempt ISL uranium mining documentation from public release, notably, section 19 of the *Radiation Protection and Control Act 1982* (RPC Act) and section 9 of the *Mine Works and Inspection Act 1920*. Referring to the provisions of the RPC Act, Mr Noonan representing the ACF, stressed that:

... all uranium mining operations and the reports and the plans under that Act are kept secret due to the secrecy provision of that act. In comparison, other mining operations in South Australia are not in any way covered by any such secrecy provision. So in the mining industry there is a unique secrecy in South Australia given to the uranium mining industry.²¹³

3.229 The FoE also points out that the recent *Bachmann Report of Independent Review of Reporting Procedures for the SA Uranium Mining Industry* (August 2002) recommended changes to the Act:

Recommendation 2

In order to allow the release of information about incidents which may cause or threaten to cause serious or material environmental harm or risks to the public or employees, the Government should revise and appropriately amend the secrecy/confidentiality etc. clauses in the legislation referred to in Appendix B ...

This recommendation came following public controversy over undisclosed spills and accidents at Beverley, Honeymoon and Roxby. To date there have been no moves to repeal this clause in the Indenture Act.

Fulfilment of basic public relations obligations does not equate with 'leadership of industry' in transforming 'a culture that wishes to hide something'.²¹⁴

3.230 The Committee notes that the new South Australian Labor Government has introduced amendments to rectify this,²¹⁵ which will replace the secrecy clause in the RPC Act with a standard confidentiality provision related to trade processes or financial information.

3.231 Mr Noonan told the Committee:

212 Australian Conservation Foundation, *Submission 74*, p 19.

213 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 198.

214 Friends of the Earth, Australia, *Submission 69a*, p 2.

215 These reforms are contained in the Statutes Amendment (Environmental Protection) Bill 2002 (SA).

... ground water monitoring and waste disposal reports have been contended for years to be commercially privileged, and radiation management plans for uranium mines and the radiation monitoring and the reporting under those management plans have been said to be secret under secrecy provisions of state acts.²¹⁶

3.232 The ACF also points to the difficulties involved in gaining access to a range of documents under South Australian Freedom of Information legislation:

For 2 years SXR and the SA government refused public release claiming “*commercial-in-confidence*”.

In early 2002 ACF won an Appeal with the SA Ombudsman finding that the PIRSA refusals had not been properly based and rejecting claimed grounds of commercial-in-confidence in every case. PIRSA responded by introduced [sic] new claims of exemption for certain key reports on the ISL trial mines which included the evidence of the leaks. Citing “secrecy provisions” of the *Mine and Works Inspection Act 1920* and the *Radiation Protection and Control Act 1982* as over-riding the FOI Act 1991.

In his final report dated 6 June 2002 on the ACF Appeal the Ombudsman Mr E Biganovsky states in regard to PIRSA that:

“It is not unreasonable to conclude from this that the agency appears to have adopted an anti-disclosure position with respect to the application from the outset.”²¹⁷

3.233 Accordingly, the ACF calls for all documentation pertaining to ISL mining projects to be made subject to South Australian and Commonwealth Freedom of Information legislation.²¹⁸

3.234 Neither SXR nor representatives of the mining industry accept these criticisms. According to Mr Hunter, of SXR:

... it would certainly be Southern Cross’s intention that we would put on our web site, or inform the public in some other way, basically all the information that was reported to government, as far as incidents or spills or whatever are concerned. We would put that on our own web site.²¹⁹

216 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, pp 179-180.

217 Australian Conservation Foundation, *Submission 74*, p 20. Emphases in original.

218 Australian Conservation Foundation, *Submission 74*, p 18.

219 Mr Hunter, *Committee Hansard*, Adelaide, 4 October 2002, pp 238-239.

3.235 Mr Richard Yeeles, of the South Australian Chamber of Mines and Energy (SACOME), after emphasising that the main reasons for non-disclosure are the privacy of individual health records and commercial-in-confidence,²²⁰ stated that:

... in my view, there is nothing kept from the public about radiation that would stop the public making an assessment about whether or not we operate safely.²²¹

3.236 If SXR is prepared to put all relevant information concerning leaks and spills on its website, the question arises why it is reluctant to allow members of the public to have access to formal documents concerning these issues. If SXR's concerns are associated with privacy of individual health records and commercial-in-confidence, it seems reasonable that those aspects of the relevant documents that disclose this information could be omitted. In any case, it is difficult to envisage circumstances where documents concerning leaks and spills would contain information that is commercial-in-confidence.

3.237 The Committee stresses the fundamental importance of ensuring full accountability and transparency for the operations of the mine. It is necessary to maintain public confidence in both the mine and the regulatory process. Accordingly, the Committee supports the statements of the mine operators that they intend to ensure that all key information is available on the company website, as well as recent reforms to the secrecy provisions in the South Australian legislation. However, despite these initiatives, the Committee believes there is a need for the Commonwealth to play a more active role in ensuring all relevant information concerning the operation of the mine and the regulatory process is publicly available.

Response to incidents

3.238 For critics, the greatest indicator of the ineffectiveness of the regulatory regime is the series of incidents (leaks, spills and excursions) that occurred at the Honeymoon site during the trial.²²² According to the ACF, in 2002 PIRSA released a Spill Incident Summary listing the following incidents:

- on 19 February 1999, 1,000 litres of 'barren' solution was spilled in the plant area and 200 litres of acid injection fluid spilled over into the wellfield;
- on 7 May 1999, 360 litres of acid injection fluid spilled from the wellhead;
- on 3 October 1999, 9,600 litres of process fluid spilled into the plant area;
- on 4 July 2000, 2,000 litres of injection fluid spilled in the wellfield; and
- on 22 May 2000, 30,000 litres of basal groundwater spilled into the wellfield.

220 Mr Yeeles, *Committee Hansard*, Adelaide, 4 October 2002, p 214.

221 Mr Yeeles, *Committee Hansard*, Adelaide, 4 October 2002, p 214.

222 Australian Conservation Foundation, *Submission 74*, pp 20-21; Friends of the Earth, Australia, *Submission 69*, 'Spills and Leaks', p 9.

3.239 It was also submitted that an underground excursion of radioactive mining solution polluted a connected aquifer during the Honeymoon trials.²²³ An FoE representative informed the Committee that:

On 5 December 2001, only one week after receiving final government approval for the mine, Southern Cross Resources confirmed an asset excursion that occurred in 1999. The leach acid solution—a solution which is injected into a bottom aquifer at the mine site to dissolve uranium ore—escaped into an overlying middle aquifer.²²⁴

... Friends of the Earth contend that the repeated spills, leaks and incidents and the failures of the principal environmental regulator, the Mines Department (now PIRSA) demonstrate that the long-term impacts of operations and incidents are not being taken seriously.²²⁵

3.240 The FoE also insists that the regulatory and investigatory response of PIRSA (and its predecessor) to incidents has not been adequate. They give as one example, the leak which occurred on 3 October 1999, which contained high radon gas:

Spills of this material would have to involve short-term radon exposures which are extremely high due to degassing. Based on the available reports and media to date, there was no radon monitoring data or testing done ... nor any post-spill estimate of potential radon exposure to workers and the environment.²²⁶

3.241 Mr Noonan referred to the delayed response by the Chief Inspector of Mines (CIM) to reports of leaks:

We believe there is ample evidence of a lack of proper exercise of responsible management by the SA regulators. A good example is the office of the Chief Inspector of Mines. There was a major leak at the Honeymoon trial mine, for instance, in October 1999. It was a leak that I have referred to in my submission to you. It was a leak of 9,600 litres of what are called process fluids. This is the most concentrated fluid involved in acid in situ leach uranium mining. We understand it involved a quantity of uranium somewhere between 15 and 20 kilograms. The company lost control of that solution.²²⁷

The Chief Inspector of Mines had the responsibility to assess what had gone on in that instance. It is evidenced in our submission that the Chief Inspector

223 Friends of the Earth, Australia, *Submission 69*, 'Spills and Leaks', p 9.

224 Mr Thompson, *Committee Hansard*, Canberra, 18 October 2002, p 280; Friends of the Earth, Australia, *Submission 69*, p 4.

225 Friends of the Earth, Australia, *Submission 69*, 'Spills and Leaks', p 4.

226 Friends of the Earth, Australia, *Submission 69*, 'Spills and Leaks', p 4.

227 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 202.

of Mines visited the site to assess what had occurred at that leak but the visit was some six months after the event.²²⁸

3.242 The ACF recommends that all radioactive leaks be reported by the company and that the regulator be required to demonstrate its capacity to react in a timely manner to reports of leaks and spills:

At present, none of the categories require any public report. We would think it should be an obligation ... to have a full and public reporting of all radioactive leaks at [the] Beverley and Honeymoon sites, both surface leaks and ground water excursions and other underground leaks, and for that to be through a government-funded web site. It could be attached to the Environment Australia web site, for instance. They should have to immediately and publicly report the leaks, the type of leaks, the solutions involved, the proposed remediation measures and the impacts and the extent of the issue involved.²²⁹

And:

... the regulator should have to be able to demonstrate that they are either making an immediate response or, for some other reason, that they do not have to. It almost happens in reverse in South Australia in that the company often does not have to report the leak to the regulator for some time. The regulator is not under any obligation to demonstrate to anyone else that they are meeting the appropriate scrutiny of what has gone wrong at the leak incident. The regulator is not required to make any public report of what had gone wrong.²³⁰

3.243 In addressing these deficiencies, the FoE emphasised the importance of a number of principles and procedures already applicable to Northern Territory uranium mines, which in its view should apply to incident reporting at all Australian mines - direct and immediate notification of leaks to the appropriate regulatory authority must occur where there exists a significant risk to ecosystem health; where people living or working in the area may be harmed; and where probable or actual concern is caused to Aboriginals or the broader public. The FoE argued that more specific reporting requirements, providing greater detail on leaks, must also be introduced.²³¹

3.244 The current reporting arrangements at Honeymoon are in a state of flux, due to the mine not being operational (as a result the EMMP is not in place), and also because of the review of incident reporting procedures by Mr Hedley Bachmann.²³²

228 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 202; Australian Conservation Foundation, *Submission 74*, p 21.

229 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 189.

230 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, p 203.

231 Friends of the Earth, Australia, *Submission 69*, 'Spills and Leaks', p 5.

232 Southern Cross Resources Pty Ltd, *Submission 28a*, p 4.

Notwithstanding this situation, SXR representatives still reject many FoE and ACF criticisms on the grounds that the principles proposed by the FoE 'are already in place and have been operating since the start of the Field Leach Trials'.²³³ The company also argues that the leaks were relatively minor in nature; that they caused no environmental damage, and that they were responded to adequately. On the subject of the May 2000 leak, Dr Bush stated:

Southern Cross Resources was requested by the federal Minister for the Environment and Heritage to carry out additional hydrological test work last year to examine the boundaries of the aquifer. As part of this work, a number of test pumping runs were held. This involved pumping water out of a well which had been placed into the basal aquifer and depositing that water in excess of a kilometre away in another well, also placed in the basal aquifer. I should point out that this was some three to four kilometres east of where we were yesterday and it had no connection with or impact on, nor was it impacted on, by any of the work that had been done in the field leach trial. The water was being transferred at as high a rate as possible to maximise the draw-down effect on the aquifer. This rate was of the order of 30 to 35 litres per second. It was being pumped through what is known as 'lay flat' pipe, which is a composite, canvas type of pipe that can be flattened and rolled up for transport. At approximately 2 o'clock one morning a coupling on this line parted, and the ground water discharged onto the surface. The test was being monitored and readings were being taken around the clock. But, by the time this break in the line was detected, in excess of 30,000 litres of ground water had been discharged onto the surface.²³⁴

... It was just natural ground water being pumped out of the basal aquifer.²³⁵

3.245 Dr Bush also made the following comments concerning the October 1999 spill:

... earlier this morning it was stated that we lost control of the system and some 9,000 litres of material was spilled and seeped away. For the record, I would like to correct that. When it was built in 1982, the plant was built with a concrete floor with concrete bunding. It had a sump with a pump in it, for the very point of collecting anything like this and preventing it from contaminating the outside area. In other words, that was so it could be controlled. While this did occur through a breakage of a valve, the spill was controlled because it was contained within the concrete bunded area. It drained into the sump as designed, and the operators were able to pump the solution back into the process and repair the valve and continue. At the time it happened, there was no operator standing adjacent to the valve or under

233 Southern Cross Resources Pty Ltd, *Submission 28a*, p 4.

234 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, pp 227-228.

235 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, p 228.

the valve, and so there was no injury to personnel and no damage done to the environment, nor to the facility—other than a broken line.²³⁶

Rehabilitation

3.246 The Honeymoon Mining Lease granted by the South Australian Government outlines the rehabilitation and closure requirements and acts as the main authority until the development of the company's Environmental Management and Monitoring Plan (EMMP). Southern Cross is required by Clause 7 of the First Schedule of Mining Lease 6109 to:

... ensure that land disturbed by mining and exploration activity is rehabilitated to achieve a stable and regular land-formation and to return the area to sustainable managed pastoral property.²³⁷

3.247 Clause 1 of the Second Schedule stipulates that the 'lessee shall, prior to the commencement of mining operations, lodge a Rehabilitation Bond to ensure land disturbed by mining operations will be rehabilitated'.²³⁸

3.248 The Company must 'ensure that areas compacted or disturbed land are progressively rehabilitated when practicable to do so and in accordance with seasonal conditions, to achieve a grazing after-use. The land is to be spread with available topsoil, ripped and sown, with a self sustaining floristic community, using species local to the area that is compatible with pastoral utilisation, to the satisfaction of the Chief Inspector of Mines'.²³⁹

3.249 As part of the proposed EMMP requirements²⁴⁰ the following must be provided:

- an ongoing survey program to monitor the impact of mining on native biological communities and measurements of the success of rehabilitation;²⁴¹
- techniques to be implemented for the progressive rehabilitation of land and borefields and methodology to quantify the progressive extent of impact and completed rehabilitation.²⁴²

3.250 The detailed requirements for the closure and rehabilitation of the Honeymoon Mine will be set out in the EMMP, once the mine becomes operational, although the general principles are to be found in the EIS. The principal area of

236 Dr Bush, *Committee Hansard*, Adelaide, 4 October 2002, pp 228-229.

237 Mining Lease 6109, First Schedule, Clause 7.

238 Mining Lease 6109, Second Schedule, Clause 1.

239 Mining Lease 6109, Second Schedule, Clause 20.

240 Mining Lease 6109, Second Schedule, Clause 2.

241 Mining Lease 6109, Second Schedule, Clause 2.4.

242 Mining Lease 6109, Second Schedule, Clause 2.6.

concern for many members of the public is the need to include a requirement to rehabilitate not just surface areas, but also the aquifer and groundwater. In Dr Matthews' view, this would require:

... flushing it through with fresh liquid, taking the polluted liquids, evaporating them and doing that until you get back to something close to where you started before the mining operations started.²⁴³

3.251 According to Mr Noonan, of the ACF, this would not be easy to achieve:

In terms of the use of acid ISL, I am not aware of any successful rehabilitation of the aquifers post the mining operations or even post trial mining operations that used acid ISL. ... Acid ISL was commonplace in the former Soviet bloc countries. But in Eastern Europe, for instance in East Germany at the Königstein and other acid ISL mines there, now that Germany has been reunited even the best of West German technology cannot remediate the impacts of the use of acid ISL in those former mine sites.²⁴⁴

243 Dr Matthews, *Committee Hansard*, Adelaide, 4 October 2002, p 173.

244 Mr Noonan, *Committee Hansard*, Adelaide, 4 October 2002, pp 199-200.