Friends of the Earth Adelaide
c/- The Conservation Centre
Level 1, 157 Franklin Street
Adelaide SA 5000
Telephone: +61 8 8211 6872
Email: alys.stevens@foe.org.au

Nathan Zeman
Assessment Officer
Mining Regulation and Rehabilitation Branch
Level 5, 101 Grenfell Street
Adelaide SA 5001

20th February 2009

Dear Mr Zeman,

As one of South Australia's foremost community campaign organisations, Friends of the Earth Adelaide (FoE Adelaide) works to address social and environmental justice issues through community action. In addition to campaigners working with on climate justice and urban issues, FoE Adelaide has two primary campaign collectives; the Clean Futures Collective and Reclaim the Food Chain. The Clean Futures Collective focuses on mining, energy and nuclear issues.

The collective is committed to creatively

- promoting sustainable, socially and ecologically conscious technologies
- supporting Indigenous communities adversely affected by the nuclear industry, particularly through uranium mining or nuclear waste dumping
- raising public awareness about mining and energy issues
- monitoring the activities of the nuclear industry

Passionate about justice and the health of South Australia's arid ecosystems, the collective coordinates Friends of the Earths' nuclear education tour: the Radioactive Exposure Tour as well as conducting twice-yearly volunteer community work trips to Aboriginal communities in northern South Australia and are a participant in the Australian Nuclear Free Alliance.

Our experience and ongoing involvement with the land and traditional owners makes us aptly placed to advise on this matter, and please find our submission below. We must take this opportunity to again highlight the inadequate period of public consultation given for review of projects in general. A proponent is allowed as much time as required to presumably give the development of key documents every opportunity to be of the highest quality. Following this logic, the public consultation period needs to allow for the public contribution to also be of the highest quality and utility. Often the members of the public that wish to provide input to government through this process have other employment and commitments, unlike a proponent where the development of the particular documents is (or should be) core business. This undermining of public contribution is not restricted to the State government. We do however urge the State government to show leadership and a true commitment to community consultation by providing longer public periods where discretion currently allows, and then pursuing adoption in the relevant legislation.

We hope that our concern and those of all others are given due and comprehensive consideration.

Yours sincerely,

Alys Stevens
Friends of the Earth Adelaide
alys.stevens@foe.org.au

Submission on the Public Environment Report for the Beverley Four Mile Mining Proposal

By Friends of the Earth, Adelaide

In analysis of the Public Environment Report for the Beverley Four Mile Mining Proposal (PER) we have found some significant deficits which do not allow the achievement of the core objective of the PER as stated the Guidelines for Preparation of a Public Environment Report (PER) under the Australian Government *Environment Protection and Biodiversity Conservation Act 19*99 and a Lease Proposal and Mining and Rehabilitation Program (MARP) under the South Australian *Mining Act 1971* (the Guidelines). According to the Guidelines the purpose of the PER is to

'*facilitate consultation across a wide stakeholder base to identify the risks inherent in the Proposal, and propose a set of credible outcomes that are likely to be acceptable to the majority of stakeholders, and at least demonstrate a net public benefit if the Proposal were to proceed. The focus of the assessments under the EPBC Act and Mining Act will be to ensure appropriate environmental outcomes are developed and these will form the basis of the approval conditions under the EPBC Act and the mining lease.'*

These core deficits include the absence of attention to a number of key guidelines, unsatisfactory fulfilment of other guidelines, a poor and ineffective stakeholder consultation process and therefore inadequate identification of issues and risk, a risk assessment process that falls short of that required by the Australian Standard for risk assessment (AS/NZS 4360), inadequate evidence with regard to the efficacy of natural attenuation and depauperate consideration of the indirect impacts of the activity. Without these key components, the objective laid out in the Guidelines cannot be achieved, and similarly a robust public review is not possible.

<u>Absence of attention to key guidelines</u>

The Guidelines listed below have not been addressed, and detailed analysis could reveal more.

8.5 Potential Impact/events

In particular the need to '*consider the cumulative effects of the event being repeated many times, possibly by other industries or operators in the area and the potential for some impacts to be unknown, unpredictable or irreversible'* have not been addressed. This is a serious and unacceptable deficit given the number of known and predicted deposits in the Frome Embayment and greater Lake Eyre Formation.

9.3 Completion risk assessment

There is not alternative remediation strategy put forward in the case of a failure of natural attenuation, or a failure to achieve consensus or a situation of adequate confidence with regard to this process.

<u>Unsatisfactory fulfilment of other guidelines</u>

The Guidelines below have been unsatisfactorily addressed, and detailed analysis could reveal more. Many of these issues could have been identified and addressed if the stakeholder consultation process was undertaken correctly.

4.1 Local community

4.2 Land use

4.14 Heritage (Aboriginal, European, Geological)

A comprehensive consideration of Aboriginal values is absent from these sections (see submission to this PER by Ms Marsh)

7 Stakeholder consultation

8.5 Potential Impact/events

As this project uses the insitu-leach (ISL) mining method, some specific requirements were made. In particular the proponent has not fully considered the environmental value of the groundwater which will be affected. Additionally, the evidence provided for natural attenuation is lab based, loses significant applicability when scaled up to mimic an aquifer system and significantly does not consider the inherent complexity of the aquifer system. This lack of consideration introduces a significant element of risk which is not addressed in the PER.

8.6 Control and management strategies

Strategies for controlling and avoiding the manifestation of particular risks are included; however there is not a clear and comprehensive program of emergency actions articulated for when a particular event occurs. For example, if a significant excursion of leachate solution occurs, what is the course of action? It is inappropriate to simply refer to 'that which occurs at Beverley'. In the very least reference to the relevant section could be made, however the PER is a stand alone document and Four Mile is a new project, and therefore the information provided must be comprehensive in this respect.

9.3 Completion risk assessment

Here in particular we find inadequate evidence to support the ability of the natural attenuation process to '*demonstrate with confidence that this attenuation will occur in this aquifer, and demonstrate that the attenuation will occur in an appropriate timeframe.* Additionally, there is not alternative remediation strategy put forward however is required '*Where attenuation cannot be demonstrated…. a contingency rehabilitation plan will need to be provided to achieve the outcome, should the research not provide confidence in natural attenuation'*. We provide further comment on the attenuation research and the ISL method below.

<u>Inadequate stakeholder consultation</u>

It would appear that a comprehensive process of stakeholder consultation has not occurred. This process would likely have highlighted and avoided some of the key issues identified in the sections above. The submission to this inquiry by Ms Marsh of the Anggumathanha Elders Group draws attention to a number of key groups who were not consulted including the Anggumathanha Elders Group, Adnyamathanha Traditional Lands Association and a number of groups holding heritage information. The submission by Ms Marsh highlights a number of key concerns such as the cultural significance of water resources, and anecdotal accounts of environmental damage arising from the current Beverley operation, yet these issues are not considered in the PER.

The PER recognises that different stakeholder groups may require different consultative processes. Given the low attendance of all public meetings held by the proponent, we put forward that additional methods of information sharing and consultation with community must occur. Rather than a 'come to us' approach with formal meetings, a 'we'll come to you approach' is required. This must also be undertaken with a necessary program of education for all relevant stakeholders such that they understand the process and what they need to be considering. High quality consultation with facilitation and capacity building is required.

Unsatisfactory risk assessment process

A core component of standard risk assessment is a comprehensive stakeholder consultation and participation process in not just the identification of risks, but also the management, mitigation and determination of outcomes/criteria. As stated above, the stakeholder consultation was limited and not participatory in nature, therefore key considerations such as the social and cultural implications of the proposed project have not been addressed.

Similarly, risk assessment requires the elucidation of a clear decision pathway at every point in the process. This is not evident in the PER. The determination of certain risks including both the magnitude of the potential impact and the likelihood of it occurring appear to be largely discretionary decisions made by the proponent. If this is not the case, what consultative process was engaged to reach these decisions? Why has this information not been included with the PER? Understanding the process and decision pathway would give greater confidence in the risk assessment.

Risk assessment involves a clear understanding of where information is inadequate, that in itself being a key risk. In particular we find that the unknown information regarding the potential future impacts to groundwater resources as a result of the operation of the mine and the injection of waste materials into and within a complex aquifer system pose significant risk to environment and cultural values of the region to our and future generations. The absence of such a fundamental consideration in the risk assessment is potentially dangerous.

The AS/NZ 4360 is internationally recognised as an outstanding risk assessment standard, with participatory consultation and transparency essential to its operation. We do not find that the PER has achieved the benchmark set by this standard.

ISL mining and unresolved issues

ISL mining is a notorious activity, both within Australia and internationally. Significant public and scientific debate is ongoing regarding the appropriateness of this activity in Australia, and indeed any other country.

A core requirement of a leachable uranium deposit is that it is isolated, usually bounded above and below by impermeable clay layers or *aquitards*. This allows the injected solution to be locally constrained to that aquifer, without contaminating surrounding, underlying or overlaying aquifers and subsurface environments, at least while operation maintains the appropriate hydraulic gradient. Assumptions of ‘closed systems’ and ‘isolated aquifers’ have proved erroneous both internationally and within Australia for both the Honeymoon and Beverley projects, where despite nine years of operation aquifer relationships and vertical connectivity have proven more complex than first anticipated and are yet unresolved (HR 1998; SC 2000). Additionally, evidence exists that through geological time, even an isolated aquifer is not actually isolated (Hendry & Wassenaar 2004; Ranville et al. 2007; Timms & Hendry 2007 and relevant references therein). Natural systems contain anomalies; indeed modelling and diagrammatic representation of subsurface conditions will always be simplifications of the true state, where minor irregularities can have serious implications and guarantees of no risk cannot honestly be given (Mudd 1998).

The effectiveness of this process of *natural attenuation* in neutralising all contaminants within the disposal solution is unresolved even by proponents of the process such as Solodov (1998). Indeed it may not be possible for the major element and heavy metal chemistry to return to uncontaminated levels (Mudd 1998) and has not yet been demonstrated for either the operational Honeymoon and Beverley mines (Mudd 2001a). In the United States, all projects using acid-leaching methods have had substantial problems with groundwater contamination and reduction in quality even after multiple attempts to restore the waters to near original conditions (summarised in Mudd 2001a,b). Much of the ground water in the Lake Eyre Basin is

of unsuitable quality for humans, and in many cases stock, which has been used as an argument against remediation. This is faulty logic, a developed environmental responsibility in the very least must attempt to return an ecological system to the natural state in which it was found.

The laboratory testing and modelling undertaken for the PER remains unfinished as per the admittance of the proponent. On this basis we put forward that inadequate evidence has been generated to guarantee the efficacy of natural attenuation. However, in addition to this we find that the modelling involving the upscaling of the laboratory data to an aquifer scale, with the addition of various components such as general flow pathways and speeds, is too simplistic for such a potentially hazardous issue. Aquifers are complex systems, and the palaeochannel system underlying the Frome Embayment is no exception, as illustrated in real life examples from both the Beverley and Honeymoon projects. It is highly likely that no modelling regime could fully account for all the potential pathways and dynamics of these systems. Given the magnitude of the potential repercussions we must question whether the risk is too great (a comprehensive risk assessment would have done this). Despite the unfinished and simplified nature of the research that is put forward, we still see a residual effect of the waste material in the aquifer after the cessation of mining activity, for example up to 800 years for pH (Appendix M, Fig. 4.8). With even low risk of this occurring an impact on this scale is unacceptable.

Indirect impacts

There is no consideration of obvious indirect impacts such as the expansion of other projects in the region (a consideration upheld the Nathan Dam case and incorporated into the *EPBC Act 1999*) or the full complement of social impacts of mining in the region (we again refer you to the submission made to this PER by Ms Marsh).

It is common to assessments of nuclear activities in Australia that no consideration is given to the offshore uses of uranium. As the environment assessment process requires consideration of largely uncontrollable forces such as market forecasting, then a consideration of the end use of Australian uranium and the risks associated with that use is completely within the bounds of such an assessment. Indeed in an increasingly globalised international community where environmental impacts do not adhere to national boundaries, our collective responsibility must also be globalised. Consideration of the increase in uranium into the global environment is a fundamental component of impact analysis, and must become common practice in our assessment of nuclear activities in Australia.

A comprehensive and participatory risk assessment process would have contributed to identifying the full complement of direct and indirect impacts of this activity.

Recommendations

The project must not commence until

1. **The proponent resubmits the risk assessment process and provides transparency regarding the decision making pathways. An adequate risk assessment process would contribute to addressing all of the recommendations below**

2. **The proponent addresses all of the guidelines determined by the State and Federal Governments**

3. **The proponent revisits and resubmits key guidelines that have been inadequately addressed**

4. **The proponent in conjunction with the Government (as the State government has a substantial responsibility in this respect as well) re-initiate a process of full**

consultation and consideration of indigenous concerns in a different and innovative manner

5. **The proponent is required to remediate groundwater to ambient levels once activity has halted to account for the unacceptable and unresolved risk associated with ISL mining**

6. **The full complement of direct and indirect impacts are considered including the offshore impact of an increase in global uranium stocks**

7. **The PER is reviewed by <u>independent</u> experts to reveal and detail further issues that must be resolved**

8. **The PER is amended with the above changes and released again for another period of public consultation**

References:

Hendry, M. J. & Wassenaar, L. I. (2004) Transport and geochemical controls on the distribution of solutes and stable isotopes in a thick clay-rich till aquitard, Canada. *Isotopes in Environmental and Health Studies* **40**(1): 3-19.

HR (1998) *Beverly Uranium Mine: Environmental Impact Statement*. Heathgate Resources, Adelaide, South Australia.

Mudd, G. M. (2001a) Critical review of acid in situ leach uranium mining: 1. USA and Australia. *Environmental Geology* **41**: 390-403.

Mudd, G. M. (2001b) Critical review of acid in situ leach uranium mining: 2. Soviet Block and Asia. *Environmental Geology* **41**: 404-416.

Ranville, J. F., Hendry, M. J., Reszat, T. N., Xie, Q. L. & Honeyman, B. D. (2007) Quantifying uranium complexation by groundwater dissolved organic carbon using asymmetrical flow field-flow fractionation. *Journal of Contaminant Hydrology* **91**(3-4): 233-246.

SC (2000) *Honeymoon Uranium Project: Environmental Impact Statement*. Southern Cross Resources Australia Pty Ltd, Queensland.

Solodov, I. (1998) The retardation of liquid radioactive wastes due to the geochemical properties of the zone of injection. In: *Groundwater contaminants and their migration.*, eds. J. Mather, D. Banks, S. Dumpleton & M. Fermor, pp. 265-280. Geological Society, London, Special Publications.

Timms, W. A. & Hendry, M. J. (2007) Quantifying the impact of cation exchange on long-term solute transport in a clay-rich aquitard. *Journal of Hydrology* **332**(1-2): 110-122.