IN SITU LEACH URANIUM MINING WITHOUT AQUIFER RESTORATION?: PRELIMINARY COMMENTS ON HEATHGATE RESOURCES' BEVERLEY URANIUM MINE ENVIRONMENTAL IMPACT STATEMENT - MAIN REPORT

Prepared
July 1998

by
Paul Robinson
Research Director
Southwest Research and Information Center
Albuquerque, NM 87106-4524 USA
phone 1-505-346-1455/fax 1-505-346-1459/email <sric@igc.org>

Prepared for
Australian Conservation Foundation and Friends of the Earth (Fitzroy)

A PUBLIC SUBMISSION ON THE PROPOSED BEVERLEY URANIUM MINE TO :
Manager, Environmental Impact Assessment Branch
Planning SA
136 North Tce
Adelaide SA 5000

BACKGROUND INFORMATION

Australian Conservation Foundation and Friends of the Earth (Fitzroy) have contracted with Paul Robinson, Research Director, Southwest Research and Information Center to prepared brief comments on selected aspects of the Heathgate Resources Pty Ltd (HRPL) Beverley Uranium Mine EIS - Main Report, June 1998 (the EIS). These comments are prepared to assist those organizations in their review of the proposal at this stage and in their efforts to provide information about the proposal to the public, including traditional owners or users of the proposed mine in South Australia. These comments are limited to the brief review provided in the consulting agreement with the Australian Non-Governmental Organizations (NGOs).

The preparer of these comments, Paul Robinson is an environmental analyst with twenty years of experience assessing the environment impacts of mining and their prevention at Southwest Research and Information Center on behalf of a wide variety of NGO and corporate clients. His professional papers have been have been published in Canada, Germany and the USA, as well as under contract to the European Commission. A substantial portion of his work has focussed on uranium mining, and includes analysis of in situ mining in the states of New Mexico, Texas and Nebraska as well as projects in Germany and the Czech Republic. His professional project for his Master of Community and Regional Planning (MCRP) Degree on "Planning for Reclamation of the Uranium Waste Sites in the Former East Germany" included a review of conditions and remedial options at the Koenigstein uranium mine, a large sulfuric acid-leach ISL mine.

These comments address the following areas:

I. "ADVANCES" IN INSITU LEACH URANIUM MINING AND THEIR RELATIONSHIP TO THE BEVERLEY PROPOSAL
I.A AQUIFER RESTORATION
I.B MONITORING EFFECTS OF ISL ON GROUNDWATER
I.C SURFACE DISTURBANCE AND RESTORATION

II. THE EIS PROVIDES NO DEMONSTRATED NEED FOR BEVERLEY URANIUM

III. LACK OF IDENTIFICATION OF FINANCIAL CAPABILITIES, RESPONSIBILITIES, OR OPERATIONAL EXPERIENCE OF BEVERLEY SITE PROPONENTS

COMMENTS ON BEVERLEY ISL PROJECT EIS

I. "ADVANCES" IN INSITU LEACH URANIUM MINING AND THEIR RELATIONSHIP TO THE BEVERLEY PROPOSAL

P. 2-2 at Sec. 2.1.3. indicates that, HRPL "acquired the [Beverley] property in 1990 and initiated new investigations into mining the deposit, taking advantage of advances in situ leach technology and extended USA operating experience. In the intervening 15 years between the SAUC proposals and the present, in situ mining for uranium has moved from a relatively new technique to one widely used and accepted in the USA and elsewhere."

The HRPL EIS does such a poor job of identifying any specific "advances" or other developments in ISL technology since the Beverley deposit was first explored other than to say it is "widely used and accepted", so as to leave an impression that the ISL process is somehow "perfected" and not subject to intensive review and analysis each and every time it is proposed. In actually, each of the USA mines where ISL has been accepted requires its own unique design for a unique site with extensive site specific modifications and license approval conditions. There are no ISL mine permits which were simply "its ISL so its an easy OK"-type decisions. The EIS fails to identify what it means by "advances", specific techniques which have been developed, or problems those techniques have developed, to an effective degree.

HRPL's provides an overly general view of the asserted "advances" and offers no information on either: 1) the performance of facilities similar to Beverley, 2) the regulatory framework within which the "advances" have occurred, or 3) any performance history from any ISL mines in the USA or other countries. As a review of the environmental performance of the USA ISL facilities which are licensed by the Nuclear Regulatory Commission or state authorities is not available for HRPL or other EIS reviewers to base its assertion of "advances" on such, general assumptions about the ease or simplicity of the operation of an ISL mine should bear some scrutiny.

To provide a current specific case as an examples rather general assertions of "advances" and "acceptance" is it appropriate to review a proposed an ISL facility in the USA. A good example for identifying specific conditions or "advances" in the USA uranium ISL industry as they may apply to the Beverley Proposal is provided by the Hydro Resources, Inc. (HRI) Crownpoint uranium ISL proposal. The plans for this facility are summarized an Environmental Impact Statement issued by the USNRC in February 1997, NRC document number NUREG-1508 (HRI EIS).

I.A AQUIFER RESTORATION

This HRI EIS demonstrates a range of basic requirements for an operation which are not apparent in the Beverley plan, the most striking of which is the lack of an aquifer restoration plan. The HRI EIS demonstrates that in the USA aquifer restoration is a fundamental part any uranium ISL project due to the federal requirement to "return water quality to maximum concentrations limits specified in EPA Regulations in 40CFR141 and 143.3". Beyond this federal requirement, arid states such as New Mexico have maintained regulations with standards to protect and abate damage to groundwaters with 10,000 mg/l or less for more than decades. The HRI EIS, at p. 2-20, states quite clearly:

"Consistent with current ISL practice, HRI proposes... that restoration criteria be established on a parameter by parameter basis, and the primary goal of restoration be to return all parameters to average pre-mining baseline conditions."

HRI's proposal includes 11 major constituents, 18 trace elements including heavy metals, uranium and radium, and physical parameters.

In alarming contrast, HRPL has not fully characterized the groundwaters it will be degrading (only TDS, uranium, and radium values are presented) and offers no aquifer restoration plan. The Beverley EIS does not mention aquifer restoration from a water quality perspective in Sec. 9 - "Environmental Impacts and Amelioration". Not only is the normal - for the USA - aquifer restoration plan not presented, HRPL attributes no future use value of any kind to the water supply it will degrade, asserting, at P. 6-68 that:

"The Beverley mineralisation is hosted in an aquifer which is not only more saline that other water supplies, but also heavily contaminated with naturally occurring radium and uranium, and as such, is totally unsuitable for use as potable water or for stock watering purposes."

The degree to which HRPL plans on leaving the waters it will be affecting severely degrading is demonstrated in Sec. 9 - "Environmental Impacts and Amelioration-Hydrological Impacts" at p. 9-4 - 9-7 which instead of aquifer restoration, indicated that HRPL plans, at p.9-7, to:

"Allow... for some remnants of mining water remaining in mined-out areas the resultant pH is expected to be lower than that of native water...a preliminary ...around 4.5 pH units.

HRPL plans on leaving the affected water much worse that its pre-mining condition, even though HRPL its has demonstrated that the water is: 1) higher quality than applicable standards; 2) comparable to water used in the area east of Mt. Painter; and 3) usable for high quality purposes including potable water with off the shelf treatment.

1) higher quality than applicable standards - The EIS discussion at P. 6-65 - Sec. Groundwater Quality at Beverley Site Aquifers - shows that the water in significant portions of the site, even in the mineralized portions of the Namba Formation, is within the range of water sources used in the very arid region of South Australia where the project is located. HRPL's conclusion of "totally unsuitable" is not support by a comparison of water data on site to the applicable standards.

The limited data presented in Fig. 6.18 "Site Groundwater Radionuclides and Total Dissolved Solids" shows TDS levels in the samples ranging from 3,300- 13,200 mg/l. Based on water quality criteria listed in the HRPL EIS at p. 6-65, the following conclusions are clear:

* 15 of the 23 of the borings are better than 10,000 mg/l TDS 'dry' cattle guideline and 3 were better that the 5,000-6,000 mg/l TDS lactating cow and calf guideline.
* 60% - 3 of 5 - of the wells in the North mineralized zone had water less that the 5,000-6,000 mg/l guideline.
* 100% f the north zone wells, and more than 90% - 12 of 13 - of the central zone wells had water better than the 10,000 mg/l standard for 'dry' cattle in the data cited on the EIS.
* only the south mineralised zone has no water quality samples which exceed applicable standards.

2) Comparable to water used in the area east of Mt. Painter - Many of the water quality samples from the Beverley site wells used in the area demonstrate water quality within the range of water supplies shown on Table 6-19 "Stock Wells and Springs" or Fig. 6-28 "Groundwater Salinity Distribution - Baseline Study Area".

Certainly the north zone wells with TDS in the 3000 mg/l are well within the range listed in the HRPL EIS sources. If the highest TDS used wells in EIS are considered - North Poontana Bore - listed at 6,661 and 8,700 mg/l; South Poontana - listed at 8,080 and 8,086 mg/l; or Ram Bore - listed at 6,504 and 6,300 mg/l exceed the three better north zone wells and six of the central wells listed. With rareness of the wells and springs - demonstrated by their spacing 3-5 kilometers apart - and arid climate so directly apparent, the water supplies identified as available on the lease certainly provide a potentially valuable water supply to supplement the few widespread and fair-poor quality sources now used in the area.

Radionuclide and heavy metal removal are readily accomplished on a routine basis using reverse osmosis and ion exchange treatment technology, at a scale available commercially for home and ranch applications in the USA and on the Interned, as HRPL has demonstrated at the Camp Bore.

3) usable for high quality purposes including potable water with of the shelf treatment - HRPL own water supply at the Camp Bore, which produces water with similar TDS and Radionuclide content problems demonstrates that water on of the quality found on site is readily usable for high quality purposes, when commonly available treatment systems are used. This use is described in the EIS at p. 6-68 which states:

"Camp Bore is below guideline values in both uranium and radium...Historic values exceed the limit for radium but current samples fall below the limit. Camp Bore water is used as camp water supply at the Beverley site after treatment in a reverse osmosis plant."

While the HRPL EIS fails to identify the degree of radium and other contaminants removed from the Camp Bore, a potable water supply assertion must include successful demonstration of more than TDS, uranium, radium or radon levels.

This successful treatment and use of the Camp Bore water shows, that waters with qualities similar to the Namba Formation - particularly the better north zone wells - is readily usable with conventional treatment and not "totally unsuitable" as HRPL states. While the Camp Bore is not in the Namba Formation it presents similar treatment challenges, with respect to TDS and Radionuclides, as the water found in that formation in the lease area.

Since HRPL chose to show only the data for the Namba Formation water within the mineralized zones on Table 6.18, p. 6-50, the potential for a valuable water supplies with lower radionuclide levels and salinity on the lease or in unmineralized portions of the paleochannels remains unaddressed. In an arid setting such as the Beverley site, the consistent and treatable water supplies in the lease and around the Beverley site should appropriately be considered an asset for conservation and use after mining, rather than "totally unsuitable" as proposed by HRPL.

For the USA licensing setting for HRI, the HRPL proposal which would the affected aquifer degraded by a pH drop of 2.0 to pH 4.5 and unrestored would not be likely to pass either the EPA or New Mexico regulatory criteria identified above. The proponent would be required to:

* identify baseline conditions for a full suite of constituents for the lease and near downgradient areas;

*identify specific baseline standards for specific portions of the affected areas;

*develop a full-scale aquifer restoration plan for its proposal to restore the water to specific pre-mining conditions;

*demonstrate the effectiveness of the restoration at the Field Leach Test prior to effectiveness of a commercial uranium production license; and

*provide financial assurance to guarantee that the restoration work will be effectively done.

It is not reasonable or accurate to understand the "advances" USA ISL technology acceptance as allowing for the permanent degradation of affected waters, even water of a quality only usable for stock watering without treatment, much less water whose treatment and use can be demonstrate by uses on site.

I.B MONITORING EFFECTS OF ISL ON GROUNDWATER

The monitoring of the Beverley project operations are poorly defined, and based on the dismissal of valuable attributes for the affected groundwater. The inappropriately brief reference to "Ore Zone Aquifer Monitoring" on p. 9-9 at Sec. 9.3.1. gives little usable detail as to the design or likely effectiveness of the monitoring well system. The EIS does not provide a description of how the monitoring wells will be constructed and tested, as opposed to the injection and production wells which are described. The EIS does not provide a location map as to where these monitoring wells will be located to provide the spacing indicated during the life of the operation. HRPL plans, at p. 9-9 appear to call for monitoring wells at 250 m spacing along the "channels edges" and "every 100 m at the northern and southern boundaries of the mining area" . This concept is not referenced to any work plan for the site. If this concept is compared to EIS Figure 6.4 at p. 6-7 Beverley Deposit Stratigraphy, the channels to which HRPL appears to refer are identifiable. Such channels are not identifiable on other water well location maps, such as Fig. 6.35 "Water Wells and Piezometers at the Beverley Site".

HRPL has not described a monitoring well array in sufficient detail to address the horizontal excursion problems to the level identified in the literature on ISL uranium mines or addressed in the designs for ISL uranium mines in the USA. Such a demonstration should clearly include reference to the locations where usable water is found, to assure that monitoring wells are located between ISL operations and those points of potential future use. The EIS should delineate monitoring well construction methods and locations, as well as development of appropriate background data levels to use for comparison with operational period samples. As with other aspects of the EIS, HRPL's plans for monitoring wells are too generally stated to provide a firm or verifiable commitment as a basis for approval or the operations.

I.C SURFACE DISTURBANCE AND RESTORATION

1) surface disposal of drilling wastes at each drill site - The HRPL EIS fails to assure than all contaminated material, including drilling muds and drill cutting, are removed from the site nor does its specify a vegetation rehabilitation plan to reestablish the pre-mining conditions at the site.

HRPL recognizes the significance of the drilling related disturbance associated with hundreds of well spaced 20-40 meters apart. At p. 9-18, the EIS states:

"The density of drilling and the necessarily associated movement of vehicles and personnel are likely to largely eliminate herbaceous and grass cover from install and operating line drives [of wells] for most of the period of construction, operation and cleanup."

In addition to the elimination of the plant community at the site, HRPL plans to leave most of the drilling wastes on site, as the EIS at p. 4-25 describes a plan which would leave most of the waste cutting and drilling muds generated at the drill sites permanently in backfill muds pits at each of the drill sites. HRPL's plan relies on the mixing of radioactive cuttings to "dilute" the cuttings to meet standards, the plan still relies on permanent relocating the radioactive materials to unprotected shallow locations without further treatment or disposal efforts.

This "dispose-in-the-soil" plan fails to incorporate advances in pollution prevention for management of well field wastes. More appropriate options to consider requiring at Beverley are a) portable, reusable mud tanks hauled by the trucks to be used at each drill site and b) collection and engineered disposal of contaminated cutting is a permitted facility. The use of mud tanks has become a standard practice in drilling projects in the southwest US to conserve mud and prevent evaporation, as well as reduce mud pit reclamation costs. Disposal of solid radioactive waste such as drill cuttings should be treated similarly to other radioactive solid wastes generated on site, along with the materials described in p. 4-33 "Solid Waste Handling - Radioactive Solid Wastes".

It is very unclear from the HRPL EIS if a acceptable radioactive waste landfill will be available either on site or in the region at the time radioactive wastes from the Beverley project begin to be generated. Demonstrated availability of such a site should be a prerequisite for future site activities, to prevent unprotected shallow disposal of radioactive wastes, such as the "dump-at-the-hole-and-dilute" approach to drill cutting management offered by HRPL.

The HRPL EIS identifies dispersion mechanisms which will be capable of redistributing these shallow wastes. The EIS discussion at Page 7-3 - Paragraph 4 of Sec. 7.3 "Aboriginal Archaeology" identifies how rapid changes at the surface can be at the site. P. 7-3 indicates that, one process, wind erosion - called "sand mobilization" in this context, has demonstrable changes over a 18 year period, resulting in noticeably reduced exposure of potential artefacts between 1979 and 1997 surveys.

A second, and perhaps more problematic dispersion mechanism which includes a human health exposure pathway related to shallow waste with radioactive content may be rabbit activity. if rabbits in the area, as the EIS says at p. 7-3, "completely disturbed... the entire artefact-bearing surface capping of loose sand" at one of the archaeological sites, they will also be able to disturb shallow drilling cutting and muds pits. If rabbits burrowing, or subsurface activities by ants or other iota, is capable of disturbing areas of shallow contaminated drilling muds or radioactive drill cuttings dumping, the materials would be brought to the surface for airborne dispersion and the species which disturbed then would become a potential source of ingestion risk for other animals or humans. Effects of burrowing animals at radioactive waste sites, and design options to address the problem, has a well developed literature in the USA, with Thomas Hakkonsen of the Colorado State University, and formerly with Los Alamos National Laboratory, a leading expert.

Though the solid waste generated by ISL is much lower volume than that from conventional mining, the solid drill cuttings are of similar radioactive and heavy metal content as conventional ore or mill tailings materials and should be disposed in permitted and monitored radioactive solids repository with the other identified ISL process radioactive wastes.

2) Regarding rehabilitation, HRPL provide only the most general concepts with a specific seed mix or biological performance criteria. They indicate only simple general ideas regarding rehabilitation performance, such as, at p. 9-3:

"return to a plant community similar to the pre-impact community. In most cases, this is a Mitchell grass or mixed Mitchell grass community, tall shrub or Chenopod shrub communities".

Neither Sec. 9 or 13 of the EIS supplement this discussion with a systematic rehabilitation plan. The potential to re-establish the impressive degree of plant diversity at the site demonstrated by HRPL EIS Appendix 7 -"Plant Species Known to be Present on or near the Beverley retention Leases" is not considered in either the rehabilitation program concepts or the establishment of the performance bond for rehabilitation listed in the EIS at P. 13-2.

HRPL appears, at P. 13-2 - Sec. 13.2 "Performance Bond" - to make a commitment to:

"by irrevocable bond, bank guarantees or other financial instrument, ensure that the State of South Australian would have the resources to accomplish the rehabilitation in the event it were needed. This estimate would be redone each year and update to include provisions for all existing requirements and all activities anticipated for the following one-year period."

The establishment such a bond, other guarantees should certainly require some specific and demonstrable rehabilitation plan, for which performance can be measured. Such a plan should be developed and accepted by the Agency responsible, under the bond, for its implementation prior to permitting. Such a requirement for financial assurance is necessary prior to start up as, upon the first well field construction, rehabilitation needs will begin.

II. THE EIS PROVIDES NO DEMONSTRATED NEED FOR BEVERLEY URANIUM

The EIS presents the "Need for the Proposal" - Sec. 3 solely in an international market context projected into the future, without addressing the potential to market the specific production from the site under realistic conditions.

Because this discussion is solely limited to the use of uranium for fuel cycle activities outside Australia, the discussion appears to be contradictory to the Beverley EIS Guidelines, included as Appendix 1 to the EIS, which states that:

"The scope of the EIS will also not include broader issues related to the use of exported uranium in the nuclear fuel cycle. Issues related to the use of exported uranium in the nuclear fuel cycle are beyond the control of the proponent and it would be impractical for HRPL to address these issues in the EIS".

As the discussion presented offers only a broad and nebulous view of "uranium need", it fails to identify any relationship of the global market to the "need for THIS proposal". Even more telling, the EIS discussion presents no indication that HRPL has any contracts, working agreements or other commitments to deliver uranium during this or the next century. Nor does it indicate the degree to which HRPL - or the General Atomics of the USA of which HRPL is some unspecified type of "affiliate" - are, or have been, active in the uranium market to any specific degree.

The proposed production is so small, on the level of the world market, as to make no discernable difference in the world uranium supply market at the level of detail presented in the EIS. Major growth in uranium supply is already coming from growth in current Australian uranium production and Canadian production. Use of uranium from Russian sources will dwarf the potential Beverley production, and maintain the uncertainty in the market which prevents growth in the USA ISL market, as shown below.

Some reality of price and production capacity demonstrates how minimal the potential need for the projected 1000 tons of uranium per year from Beverley - Stage 2 actual is in the world uranium market. 1000 tons, or 2,000,000 pounds, in the units used on EIS Fig.3.1 "Forecast Uranium Demand and Supply", representing less than one percent of either the "Scheduled Production" or "Estimated Requirements" on that Figure. Formal industry forecasts, such as the Engineering and Mining Journal, March 1998 Annual Market Review, show how small this production rate is compared to other market forces ignored or glossed over by HRPL.

World production from uranium mines as project by EMJ would rise from 95.95 million pounds in 1998 to 117.85 million pounds in 2002, with Australian production rising from 15.25 million pounds in 1998 to 22.20 million pounds in 2002. Australia's largest current producer, Ranger produced 9.2 million pounds in 1997, but it is projected to be a distant second best by 2008, when Olympic Dam would reach the 17 million pound range. And these giant producers, including extremely low cost producers such as Olympic Dam (where uranium is a mere by-product of copper production), still leave Australian production at less than 50% of the long-term uranium production capacity of Canada, the world's leader.

As large as those sources are, even larger source of uranium is currently depressing market prices and production rates. Non-production supply - uranium for reactor fuel derived from Russian supplies of highly enriched uranium -will continue for limit the need for new [uranium] production, as reported by EMJ and others in the trade press, the Russia supplies are "expected to account for almost 40% world [uranium] requirements during the next few years".

This market has already resulted in shutdowns of producing ISL and delay of ISL proposal due, according to EMJ, to poor market conditions. EMJ reports a 10% decrease in USA ISL production of between 1996 and 1997, a decrease greater than Beverley's proposed stage 1 production. Several ISL projects, notably Rosita and Kingsville Dome in Texas have cut back significantly, as their owner URI, Inc. while their owner met contract obligations for uranium from spot market purchases at cost below ISL production costs. EMJ indicates that even the Crownpoint Project - proposed by URI's wholly-owned subsidiary HRI, Inc. - which has completed its EIS and has many permits in place "has been classed as "uncertain" due to present market conditions".

EMJ indicates that the USA has potential for have larger production capacity from small-medium sized ISL operations, if the price rises to US$15-US$20/pound. These small to medium ISL projects are Beverley's competition and their product capacity is already in place. Actual uranium prices, on the spot market are in the US$10-US$11 range current, according to the Nuclear Fuel of June 15, 1998. The EIS fails to address the actual costs projected for the Beverley projects and its potential to enter the uranium market, only a potential for "producers who can achieve break-even production costs of US$14.30/pound (A$47.20/kg.) or less".

Sec. 3 of the EIS can only be considered a general uranium market overview and does not provide either an assessment of the "need" for the Beverley uranium, or a demonstrating that HRPL has the experience or capital to bring an ISL uranium mine into production in the market in the near future. Based on this existing framework of growing Canadian and Australian production, the long-term potential to use diluted Russian uranium in lieu of new production, and the already constructed ISL uranium capacity, Sec. 3 cannot be considered as a reasonable or accurate assessment of the need for the proposal, and the economic benefits extremely uncertain due to the lack of identifiable market or corporate "need" for the proposal.

As such, the project should be recognized as a speculative venture seeking to provide a corporate body with cash flow, if contracts at price level more than 33% higher than current market prices can be arranged. The lack of demonstrable need, undercuts the likelihood of the level of benefits identified in the EIS being realized on a reasonable timeframe.

III. LACK OF IDENTIFICATION OF FINANCIAL CAPABILITIES, RESPONSIBILITIES, OR OPERATIONAL EXPERIENCE OF BEVERLEY SITE PROPONENTS

EIS Page xxv - Executive Summary Sec. 1, provides the only identifiable discussion of any aspect of HRPL in the EIS. The firm is only described as "an Australian affiliate of General Atomics of the USA" in the Executive Summary and no background on the corporation, its operating structure, its financial structure or the experience and expertise of its staff or contractors in uranium mining or any kind, including ISL mining are provided or cited in the Main Report.

The EIS doesn't identify the experience of the firm or its staff P. 2-2, Sec. 2.1.3 Also provides no information on the financial resources, capabilities or organizational nature of the project proponent or experience in ISL or other uranium mining activity.

Among other uncertainties based on the overly general tone of this commitment, HRPL provides no indication that it is capable of providing such financial assurance, whether it has ever qualified for such financial assurance, and whether it has maintained the commitments it has made under such financial assurance. HRPL has made no effort to demonstrate that it has the financial resources or organization capability to acquire or maintain a collateralized financial assurance of any kind.

The sole reference to any actual HRPL employees in on P. A11-1 in Appendix 11
"Study Team". Only six individuals are identified as HRPL employees, with the majority of the list, including those identified as hydrogeology, radiation, metallurgy, market, management consultants and the "Insitu Leach Specialist", are consultants whose role during the operations are not specified. HRPL has provided no indication of the skills its will require, and how it will assure that those skills are attained and maintained in order to assure that the facility is operated as described in the EIS, or other commitments are kept.

HRPL has provided no indication of who will responsible, either individually or on behalf of the Corporation, for carrying out the commitments made in the EIS. No officers, shareholders or employees of HRPL are identified other that the Appendix 11 list. No representation of how any of those employees or contractors have been involved in the Beverley to date would be involved in the future is provided in the EIS.

As a result HRPL has failed to identify if it has the financial or organizational resources to comply with the EIS proposal, or a modified version, nor has it indicate how such a corporate commitment would be demonstrated. Without substantially more documentation of the financial and organizational structure of HRPL and any formal financial relationship with General Atomics, Inc, HRPL can not be shown to be anymore that a simple as speculative venture, staffed by temporary consultants, hoping to market a mining permit after it is issued, to a more substantial corporation with identifiable resources and experience, one capable of both making financial commitments by performance bonds and competing in the world uranium market.

Addendum to PaulRobinson (SRIC)
Beverley Uranium Mine EIS Submission

August 18, 1998

David Noonan - FAX 011-61-8-8-232-2490
Australian Conservation Foundation/Adelaide
120 Wakefield Street
Adelaide SA 5000
AUSTRALIA

RE: Response to questions concerning lixiviant release, groundwater restoration and financial assurance at proposed Beverley ISL Project

Dear David;

This letter responds to your questions provide by e-mail August 6, 1998. I have identified your questions by number "Q I." below, with inserted responses "R I." following each question. This analysis supplements the review of the Beverley EIS conducted at your request.

Q I. Last night I questioned the Heathgate Resources Project Manager, Chuck Foldenauer at a SA Government run public meeting on the Beverley proposal - they had to make their first public admission of a leak of in operation of the 'trial' mine, pregnant leachate' from rupture of a pipe between extraction wells and the processing plant, as known to me they failed to control the pumps and pump motors and in turning motors back on exceeded the capacity of the pipe (material unknown) which sprayed for 15 seconds before valve closure - (don't know volumes) here was no public notification by the Co or the Gov - a discretionary matter officially, and no reporting of the event in the DEIS, the spill was NOT remediated but only cordoned off from vehicle access.

August 10 update - The leak was on 12th March only acknowledged now! under force of questioning, it was some 500 litres of pregnant leachate in 'a fine spray' for up to 30 sec (so they say) before closure, they claim it is under Aust radiation safety standards and therefore they had no requirement to clean up or make a public notification - how would this have gone in the US?
Is there mandatory public notification and remediation requirements in the US or is it 'extent or degree' of event dependant?

R. I. To address your question, I have reviewed the NRC license as issued January 5, 1998 for the HRI Crownpoint Project - license SUA-1508/NRC docket number 40-8968.

This 12 page license has a "Section 12 REPORTING REQUIREMENTS". Section 12.4 states: "The licensee shall notify the NRC by telephone within 48 hours of any spill of source or 11.e.2 by-product materials, and all spills of process chemicals that might have a radiological impact on the environment. The notification shall be followed within 7 days by submittal of a written report detailing the conditions leading to the spill, corrective actions taken, and results achieved. This shall be done in addition to meeting the requirements of 10 CFR part 20 and 40."

So HRI would be required to provide, to the NRC, phone reporting within 24 hours followed by a written report within 7 days for "any spill of source material" - meaning uranium and therefore including pregnant lixiviant - and "all spills of process chemicals" with the only limitation being spills "that might have a radiological impact on the environment." A spill such as you describe would fit the requirements of this section because it has both uranium and process chemicals and was released to the environment.

This requirement is in addition to spill reporting requirements under State of New Mexico ground water protection regulations.

Significantly, the HRI reporting requirement requires reporting for spills which might have a radiological impact on the environment, not just those which exceed radiation standards (and which standards is HRPL referring to anyway). The impact does not appear to have to be significant, off-site, or substantial, just might have an impact. The report would also have address the cause of the spill, corrective action and results achieved. If HRPL just cordoned the site off, and there was uranium in the spray, it should still be detectable.

Of course, you can see that the phrase "that might have a radiological impact on the environment" could be understood as leaving wide discretion as to what might be reported or corrected. However, from an ALARA - "as low as reasonably achievable" - perspective, the spill you describe would have had an identifiable impact, in terms of materials released.So the spill should have been reported, as I read the rule, even with the discretion considered.

Q II. Can you clarify the requirements of the EPA Regulations, do they always require rehabilitation or is it baseline TDS dependant?

R. II. As stated in the HRI-Crownpoint EIS, p. 2-20, "the primary goal of restoration [is} to return all parameters to average pre-mining baseline conditions." It also states that, "In the event water quality parameters cannot be returned to average pre-mining baseline levels, through reasonable restoration efforts, the secondary goal should be to return water quality to maximum concentration limits specified in EPA regulations 40 CFR 141 and 143.3".

I believe this means that the primary goal of restoration is baseline, but if reasonable measures don't work, secondary standards can be used. For the New Mexico Ground Water Regulations, water quality is protected to the baseline levels, unless baseline exceeds the numerical standards in the Rules. The two systems, EPA and NMWQCC Rules, protect waters under different legal authority. The NM rule specifically protect waters of 10,000 mg/l or less of reasonably foreseeable use.

Identifying the potential users could be as important as identifying the potential use, if there are users who are willing to assert that interest.

Q III. HRPL is not providing data on other metals, claiming its not an issue in this case!

R. III. I'm sure they have generated detailed data for metals, whether they discuss it or not. For both the EPA and NMWQCC baseline a full suite of parameters would be a basic requirement. The HRPL approach is substantially "less advanced" in this area, and actually quite secretive, rather than transparent, from a disclosure and trust-building standpoint.

Q IV. HRPL claim the Ph of 4.5 is to 'stabilise' materials in the aquifer

R. IV. What specifically does HRPL say it will be stabilizing with a pH of 4.5, as in most cases low pH mobilizes, rather than stabilizes contaminants. Do they offer any geochemical data to indicate which chemical species would be "stabilized" and why they think so?

Q V. HRPL do not address this as a rehabilitation issue as they claim the concept is not relevant given the claimed generic TDS of the aquifer. They claim the Beverley aquifer would qualify as a US liquid waste disposal aquifer, is that claim supportable? Is it the same answer as HR misrepresenting the actual TDS readings across the aquifer by using single readings over 10 000 TDS.

R. V. There are no "US liquid waste disposal aquifer" programs, and any injection of waste for disposal must meet EPA underground injection control program standards at 40 CFR 146. These rules require, in general, that the injection zone be confined, not a drinking water aquifer and that the injected contaminate will not cause exceedance of any established site-specific groundwater protection standards among other criteria, according to "Draft Standard Review Plan for ISL Uranium Extraction License Applications", USNRC-1569, October 1997, p. D-6. There is no "automatic" designation of a "liquid waste disposal aquifer" that I am aware of.

Q VI. Can you state this aquifer in the US would require rehabilitation?

R VI. As I said in written comments on the Beverley EIS, groundwater which meets or is of higher quality than NMWQCC standards requires protection and restoration ("abatement" in the language of the rules) if the waters are of reasonably foreseeable future use. If the water is usable, and someone could use it, it would require restoration under the NMWQCC rules.

Q VII. HRPL appear to rationalise from the south mineralisation zone and then apply to the whole aquifer in the public meeting they claim they will only effect 1% of the Beverley aquifer. This seems like a new twist, what do they mean 1%? 1% of the water or 1% of the area? They claim the aquifer is confined and separate from any other while agreeing that they do not know its geographic course some 500 m off their retention leases.

R VII. The "paleo-channels" as described in the HREIS seem to show a flow direction off lease in a downgradient direction. They may be confined, or semi-confined, for vertical flow purposes, but the HREIS appears to show that they flow off site and therefore are not confined for a horizontal flow gradient.

Q VIII. Can you comment on the knowledge level or level of certainty required in the US before claims of confinement could be credible?

R VIII.Yes, but this is a complex area. A confinement demonstration is typically based on an aquifer pump test, where a well is pumped undercontrolled conditions and wells installed in formations above below and horizontal to the central well are monitored to observe the water level changes when the central well is pumped and after pumping. This pump test demonstration is a basic part of any ISL application in the US and several pump tests may be required for aquifers with variable conditions.

Q IX. HRPL also give no degrees of confidence for any values presented, are there US requirements for this?

R IX. The quality assurance and quality control requirements for NRC and EPA and NMED licensing are quite explicit. The lack of a statistical analysis by HRPL for its data is demonstrated by their lack of "degrees of confidence" reporting. The US, and other countries, have specific criteria and guidelines for the presentation of acceptable statistical data which are readily available.

Q X. HRPL claimed in the meeting that aquifer conditions would return to baseline within 7 years of cessation of mining anyhow (the claims in person are even more bizarre than the HREIS standard, and that only 1 % would be effected, and that they would pump the acidic waters out and reuse it for the next well field and therefore it was not a concern).

R X. From what you say, this claim does appear to contradict the HREIS statements.

Q XI. Regarding monitoring, are their specific US requirements for a credible monitoring system or is it a common sense approach? What are the weaknesses of their monitoring to be capable of recording excursions?

R XI. Briefly, one problem is that HRPL doesn't identify the monitoring pattern in sufficient detail in the EIS to know what is specifically proposed or how the wells would be constructed. A second problem is that the paleo-channels where the leaching fluid would be injected are likely to have "subchannels" in them which would be the likely pathways for flow if an excursion occurs. HRPL does no identify how flow across the whole "cross-section" of the paleochannel would be monitored. AS shown in the attachment below on financial assurance monitoring and ground water restoration are included in the financial assurance requirement for all NRC licensed ISL facilities.

Q XII. Regarding solid waste, does US EPA preclude shallow burial of solid radioactive waste on site at ISL mines as proposed here?

R XII. Burial at a site is only done at a specially licensed and permitted facility, and licensed by NRC for radioactive wastes and EPA for mixed hazardous and radioactive wastes. Few such facilities exist and none are licenses as an mere aside to another permit. Such proposal would needed to stand alone and perhaps receive its own EIS, if its use extended wastes beyond the ISL proposal.

Q XIII.Regarding a Performance Bond, the HREIS proposes only 1 year's rehabilitation requirement in advance, and that this figure would be reestimated and relodged annually, does US practice require the FULL estimated rehab cost as a surety in advance? and does include cost of groundwater rehab ie HR are getting away without that cost, what order of $ (ball park US experience?) would they have to provide for under US arrangements and would this then significantly affect the economics of the venture?

R XIII.Financial Assurance is specifically required for NRC licensing for full site decommissioning, as well as surface reclamation and aquifer restoration. The portions of "Draft Standard Review Plan for ISL Uranium Extraction License Applications", USNRC-1569 which describes the financial assurance review conducted by NRC - Appendix E - is attached to this memo.

I hope this addresses most of your questions effectively.

Sincerely,

Paul Robinson
Research Director

Enclosure