



Response to the Tentative Findings of the Nuclear Fuel Cycle Royal Commission

Labor Environment Action Network – South Australia-
March 2016¹

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Executive Summary

The Labor Environment Action Network (LEAN) acknowledges that the Nuclear Fuel Cycle Royal Commission's (NFCRC) Report on its Tentative Findings aims to summarise its findings from the evidence it has reviewed, rather than to make and explain recommendations. Therefore, the purpose and scope of this submission are limited to providing comments on:

- the extent to which the Tentative Findings, taken as a whole, address the NFCRC's Terms of Reference in respect of the Management, Storage and Disposal of Nuclear and Radioactive Waste ;
- the implications that can be drawn from the Tentative Findings, taken as a whole, about the extent to which the NFCRC's inquiries have addressed the Terms of Reference in respect of the Management, Storage and Disposal of Nuclear and Radioactive Waste;

In providing those comments, LEAN additionally highlights some specific issues. These specific issues relate to:

- the timeframe considered;
- the economic impact of a nuclear accident;
- the market for nuclear waste;
- jobs and employment;
- the increased cost of insurance;
- environmental impacts; and
- the uncertainty caused by unpredictable weather arising from climate change.

Our comments deliberately do not

- address the technical correctness or otherwise of the NFCRC's Tentative Findings
- the adequacy or otherwise of the evidence used by the NFCRC in forming its Tentative Findings

For the reasons stated in this submission, LEAN considers that the Tentative Findings, taken as a whole, do not fully or adequately address the NFCRC's Terms of Reference in respect of the Management, Storage and Disposal of Nuclear and Radioactive Waste. LEAN also considers that, by implication, the NFCRC's inquiries have not fully addressed its Terms of Reference in respect of the Management, Storage and Disposal of Nuclear and Radioactive Waste. LEAN recommends this deficiency is rectified in the Final Report of the NFCRC. LEAN also considers that the Final Report needs to address the specific issues that are highlighted in this submission, more thoroughly and in more detail.

LEAN acknowledges the State Government's promise to undertake a thorough community consultation process to seek community consent once the NFCRC has released its final report. On behalf of its members, LEAN stresses the importance of true community consultation and consent for any specific propositions or plans for any components of a Nuclear Fuel Cycle Industry in South Australia.

LEAN considers that it is vital, if there is to be a thorough community consultation process in respect of the Management, Storage and Disposal of Nuclear and Radioactive Waste, that the

NFCRC’s inquiries, findings and recommendations must fully address all aspects of its Terms of Reference in respect of the Management, Storage and Disposal of Nuclear and Radioactive Waste. Furthermore, the NFCRC’s finding and recommendations must:

- **identify the range of issues, and challenges that such a consultation process is likely to encounter; and**
- **identify what are the essential components for the planning and conduct of that consultation process in order that it is thorough, and adequately addresses these issues and challenges**

The Extent To Which The NFCRC Has Addressed Its Terms of Reference

In the comments presented below, regard has been given to what could reasonably be considered a reasonable best practice standard for a high level, yet adequately detailed assessment by the NFCRC of the feasibility, risks and opportunities of establishing and operating a nuclear waste storage and disposal industry in South Australia.

It is concluded that the Tentative Findings Report has many gaps and deficiencies, and that by implication, so do the NFCRC’s inquiries upon which the Tentative Findings are based.

In consequence, we consider the Tentative Findings Report is not sufficiently informative to be useful for a) the Government of South Australia; and b) the people of South Australia in their further “detailed consideration and analysis” of the economic, social, political and environmental feasibility, risks and opportunities of a nuclear and radioactive waste industry in South Australia).

Unless these deficiencies are remedied in the Final Report of the NFCRC, that report will not be able to serve the purpose intended by the Terms of Reference.

Term of Reference:	Commentsⁱ
To inquire into and report on:	(These comments reasonably expect that the Tentative Findings Report and the Final Report are intended to be transparently evidence based and informative about all the issues affecting feasibility, risks and opportunities (of the transport, storage, disposal of nuclear and radioactive waste) and so useful for a) the Government of South Australia; and b) the people of South Australia in their further “detailed consideration and analysis” of the economic, social, political and environmental merits of a nuclear and radioactive waste industry in South Australia).
The feasibility of establishing facilities in South Australia for the management, storage and disposal of nuclear and radioactive waste from the use of nuclear materials in power generation, industry, research and medicine (but not from military uses)	<p>A high level yet complete inquiry by the NFCRC into feasibility of the transport, storage and disposal of nuclear wastes to / in South Australia – and inquiry that would be “fit for purpose” would assess and report on:</p> <ul style="list-style-type: none"> • The strategic context (<i>There are tentative findings on this</i>) • The technical issues involved, and the likely efficacy of technical solutions available and needed (<i>There are tentative findings on this</i>) • The legislation and institutional arrangements available and needed (<i>The tentative findings on this are incomplete, implying incomplete analysis and assessment</i>) • The environmental issues, risks and opportunities involved and what is available and needed to address these in line with best practice environmental management principles.

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To inquire into and report on:	<p>(These comments reasonably expect that the Tentative Findings Report and the Final Report are intended to be transparently evidence based and informative about all the issues affecting feasibility, risks and opportunities (of the transport, storage, disposal of nuclear and radioactive waste) and so useful for a) the Government of South Australia; and b) the people of South Australia in their further “detailed consideration and analysis” of the economic, social, political and environmental merits of a nuclear and radioactive waste industry in South Australia).</p>
	<p><i>(The tentative findings on this are incomplete, implying incomplete analysis and assessment)</i></p> <ul style="list-style-type: none"> • The community issues , risks and opportunities involved and what is available and needed to address these effectively, ethically and in line with stakeholder expectations <i>(The tentative findings on this are incomplete, implying incomplete analysis and assessment)</i> • The financial and socio-economic issues , risks and opportunities involved and what is available and needed to address these effectively and in line with best practice financial and economic management practice <i>(The tentative findings on this are incomplete, implying incomplete analysis and assessment)</i> • The assumptions and uncertainties in the assessments of the above and the sensitivities of the outcomes of the assessments to these assumptions and uncertainties. <i>(The tentative findings on this are incomplete, implying incomplete analysis and assessment)</i> <p>The NFCRC Tentative Findings report would have sections, supported by appendices of detailed information and analysis, on all of the above, contain a summary of findings, & contain a statement of limitations with guidance on how the report is intended to be used.</p> <p>Measured against these criteria, which are typical for major and complex projects in the mining, energy and infrastructure industries, the Tentative Findings Report is less than adequate and not of a best practice standard.</p> <p>It is difficult to see how the Government of South Australia or the people of South Australia could form well informed judgements about the merits or otherwise of the Tentative Findings concerning the feasibility, risks, and opportunities of a nuclear and radioactive waste disposal industry in South Australia</p>
The circumstances necessary for those facilities to be established and to be viable	<p>The first circumstance that is necessary (but not sufficient alone) is for the Final Report of the NFCRC to meet best practice standards for high level (yet sufficiently detailed) strategic assessments of feasibility, risks and opportunities as required in the Terms of Reference.</p> <p>The Tentative Findings Report contains no explanation or findings concerning the nature of the necessarily separate (in the interests</p>

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	<p>of best practice governance (with probity and no conflicts of interest) roles and responsibilities of Government, Permitting Authorities / Regulators (e.g., OHS, Environmental, Planning, Financial), and the entity responsible for Establishing and Operating the facilities.</p> <p>The Tentative Findings Report in fact makes a tentative finding that the Government should own and control the establishment and operation of the facilities (presumably including the facilities for transport, storage and disposal), and draw on private sector expertise for the operational activities. There is no explanation of how this avoids conflicts of interest between Government as owner / proponent; Government as Permitting Authority and Regulator; and Government as legislator for the laws for Permitting and Regulating the facilities.</p> <p>There is also no explanation or findings concerning the liabilities and risks that the Government (as owner / proponent) would be taking on and how these would be mitigated and managed. In this respect it would appear that the Report does not draw any lessons about liability minimisation from past South Australian extraction, milling and processing practices – especially when facilities are decommissioned and closed.</p> <p>The Tentative Findings Report contains no explanation or findings concerning:</p> <ul style="list-style-type: none"> • Any changes to or development of the institutional arrangements and resources and capabilities required for the Permitting Authorities / Regulators to discharge their roles in the different phases of the permitting, design, establishment, operation, decommissioning, closure of facilities needed • The commercial, technical, and management resources and capabilities that the entity responsible for Establishing and Operating the facilities would need to demonstrate in order to be considered suitable for that role • The measures and criteria for financial / economic, environmental and social viability that should be apply when Government is considering the strategic merits of establishing a Waste storage and disposal industry in South Australia
The risks and opportunities associated with establishing	The Tentative Findings Report contains no explanation or findings concerning:

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<p>and operating those facilities, considering, as appropriate, their future impact upon the South Australian:</p> <ol style="list-style-type: none"> a. Economy (including the potential for the development of related sectors and adverse impact on other sectors) b. Environment (including lessons learned from past South Australian extraction, milling and processing practices) c. Community (incorporating regional, remote and Aboriginal communities) including potential impact on health and safety 	<ul style="list-style-type: none"> • The uncertainties that might affect the findings • The sensitivity of the findings to these uncertainties <p>The Tentative Findings Report contains no findings about</p> <ul style="list-style-type: none"> • The approach and criteria used to assess risks and opportunities to the South Australian economy, environment, and community that might be posed different issues involved in all aspects of establishing and operating the facilities: <ul style="list-style-type: none"> ○ from planning and permitting to design to construction, then operation & maintenance, to decommissioning, closure and beyond) ○ for the port and land transport facilities, and for the storage and disposal facilities • Where this approach and these criteria come from and how they relate to: <ul style="list-style-type: none"> ○ South Australian and Commonwealth requirements in relevant planning and environmental approval legislation ○ Australian and International best practice standards and guidelines for feasibility studies for major projects ○ International and national guidelines and standards used by Governments and Financial Institutions to assess “bankability” of major projects • The overall list of issues that were considered to pose potential for risks or opportunities to the South Australian economy, environment, and community • The ratings (with reasons) of the importance of the issues in terms of the assessed risks or opportunities they could pose to the South Australian economy, environment and community. • The lessons learned from past South Australian extraction, milling and processing practices in respect of risks and opportunities for the South Australian environment • The risks and opportunities for the South Australian environment (other than the findings in respect of the potential for technological solutions to prevent undue radiation risks at the storage or disposal sites). Radiation risks are just one of many potential environmental risks associated with the establishment and operation of

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	<p>storage or disposal facilities. The long term effectiveness of technological solutions to prevent or mitigate environmental risks can be compromised by imperfect regulatory oversight and by imperfect implementation. There are also no findings in respect of the South Australian environmental risks and opportunities associated with establishing and operating facilities for the transport of the Waste to or within South Australia from overseas or from elsewhere in Australia</p> <ul style="list-style-type: none"> • The risks or opportunities for the South Australian community (other than those implied by the findings in respect of economic impacts).
The measures that might be required to facilitate and regulate their establishment and operation	The Tentative Findings Report (at Para 95) contains some indefinite and generalised finding on this issue; findings that are not particularly informative. One would have expected, given the resources available to it that the NFCRC could have reviewed the adequacy of the current relevant legislative and regulatory frameworks, and of the resources presently available to implement them to develop much more specific and concrete findings about improvements “required to facilitate and regulate their establishment and operation”.

Specific Issues Needing More Thorough and Detailed Consideration and Reporting

Below, LEAN additionally highlights some specific issues that should be addressed more thoroughly by the Royal Commission in order that its Final Report does and can be seen to have adequately addressed its Terms of Reference. These specific issues relate to:

- Community consent;
- Legislative Protections;
- The timeframe considered;
- The economic impact of nuclear accidents;
- The uncertain valuation of nuclear waste;
- Jobs and employment;
- The increased cost of insurance;
- Environmental impacts; and
- Weather and climate change.

1. Community Consent

A nuclear and radioactive waste legacy can last for over 200,000 years. This period is eight times longer than this continent has been occupied by humans. *It is inconceivable that in 2016 we can manage the risks associated with storing nuclear waste for that period of time.* To make responsible decisions and support a thorough consultation process to seek fully informed and durable community consent for the establishment of facilities for the transport, storage and disposal of nuclear and radioactive wastes, it is necessary to undertake a *full cost triple bottom line accounting over a 1,000 year period* (Department of Environment and Heritage 2003)ⁱⁱ.

Community consent or community permission is a very important process which normally involves:

1. Informed consent which takes into consideration the importance of community;
2. Community participation as a fundamental component of individual decision making; and
3. Ensuring “respect for community” and “collaborative partnership” is central to the process.

LEAN considers that for the purposes of the NFCRC, the term “community” must include both a) the people in whose areas the facilities for transport, storage and disposal would be built and operate; and b) the populations of South Australia and Australia as a whole because such facilities could have State-wide and Nation-wide economic, social and environmental impacts and benefits. They may also have implications for Australia’s international relations, reputation and adherence to international treaties and laws.

Despite the NFCRC emphasis on the need for community consent, LEAN has concerns in regards to how the NFCRC conducted itself in this space thus far, especially in relation to Aboriginal communities. These concerns are about the lack of adherence to best practice and, in particular, about not following the IAP2 spectrum of principles for consultation and engagement which is the international consultation and engagement benchmark currently followed by the Government of South Australia as part of its “Better Together” model.

In particular, LEAN is concerned that some of the most disadvantaged members of some Aboriginal communities are more vulnerable to being persuaded to consent to a future nuclear waste facility on their lands because of the socio-economic circumstances they find themselves in. Previous examples of community consent and arrangement brokered by the mining industry has led to

questions about the long term value of the economic and social outcomes achieved for or by the communities in question.

Adding to the lack of clarity and undermining of trust in the eventual process the NFCRC may recommend for obtaining community consent is the fact that questions directed to the NFCRC at its presentation on the 15 February 2016 regarding how the Commission and, subsequently, the State Government will undertake and determine Community Consent remain unanswered.

LEAN considers that the NFCRC Final Report must contain clear and well justified recommendations for the process by which the State Government should seek community consent.

2. Legislative Protections

In 2004 the Honourable Mike Rann, former Premier of South Australia, successfully blocked a nuclear waste proposal in the Federal Court. There is also legislation preventing a nuclear waste storage facility in South Australia. In addition, Section 13 of the *Nuclear Waste Storage Facility (Prohibition) Act 2000*, states:

“Despite any other Act or law to the contrary, no public money may be appropriated, expended or advanced to any person for the purpose of encouraging or financing any activity associated with the construction or operation of a nuclear waste storage facility in this State.”

LEAN suggests that this legislation has been put in place to protect our environment and repealing this legislation would be a step backwards not forwards.

3. The Timeframe

Not a single repository exists anywhere in the world for the disposal of high level waste from nuclear power reactors. Only a few countries to date have identified a repository site. A typical power reactor produces about 30 tonnes of spent nuclear fuel annually.ⁱⁱⁱ

Medium level nuclear waste has a half-life of 200-250,000 years. The key question is how the waste would be safely stored, when no human civilisation has lasted longer than a few thousand years in the case of China. China may have a long history but during this period there have been wars, rebellions and revolutions – all of which create risk and uncertainty.

Mechanical solutions such as walls, barriers, drainage ditches, will need to be adequate to control waste leakage at the site if wastes are interred onsite over long periods of time. There is a need for government and institutional continuity, adequate budget and personnel, and safe design of the control mechanisms and it is difficult to see how these could be created and operated flawlessly over the long time period required.

4. The Economic Impact of Nuclear Accidents

While much focus will be on the economic benefits of storing nuclear waste, equal consideration should be given to the economic impacts of nuclear accidents.

Large scale accidents can have long lasting consequences throughout the economy.

Uncertainty and anxiety can result from even small scale nuclear accidents. Uncertainty shocks may be one source of a loss of confidence generally in the domestic economy, which can have widespread macroeconomic consequences.

Fear of contamination and fear of contaminated products, whether well founded or not, can lead to a drop in export demand, especially for clean green food, which the State Government is claiming to be an economic opportunity.

An example of the impact of a nuclear accident is on tourist numbers coming to Japan, which dropped sharply after the earthquake and nuclear accident on 11th March 2011 (see Figure 1) and have been slow to recover. Indeed Japan may be suffering today from the Kazakhstan effect where people simply don't want to go near a county or an area with a nuclear legacy.

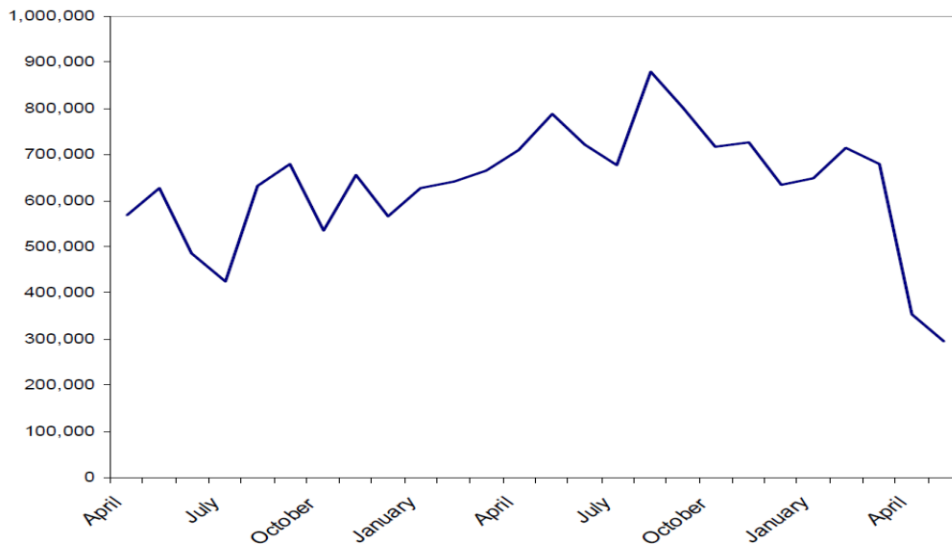


Figure 1. Visitor Numbers to Japan, 2009-2011 (Munro, A. 2001)^{iv}

LEAN considers that the NFCRC's Final Report should include careful modelling of the possible impact on the South Australian economy caused by an accident in the transport, storage or disposal of nuclear and radioactive waste that results in release of radioactivity. It is acknowledged that the probability of occurrence of such an accident may be low, but it is not insignificant given that the assessment period should be 1,000 years. Also given a) the long time frames over which the waste must be managed; b) the long timeframes over which any released radioactivity may persist; and c) the potentially widespread nature and duration of economic impacts (domestically and for exports) caused by loss of reputation or fear of contamination of products, the potential consequences could be large and long lasting – and certainly merit proper modelling in order for informed government and community decisions to be made.

Case Study: The Critical Situation in Germany

There is currently a critical situation in Germany regarding their previous Nuclear Waste Disposal solution. The article entitled *Radioactive waste dogs Germany despite abandoning nuclear power*, recently published in *New Scientist*^v, outlines this situation.

The German government bought the Asse salt mine in 1965 for the purpose of researching the suitability of salt domes for disposing of radioactive waste. Two years later, without waiting for a scientific report or without community knowledge, the government turned it into a cheap but permanent dump. The mine stores enough Plutonium-bearing waste to fill 20 Olympic swimming pools. In the 1970s engineers backfilled the chambers, holding 126,000 drums, thinking the waste was safe forever.

Currently the Asse mine is collapsing because of pressure from surrounding rocks and brine is seeping in at a rate of around 12,000 litres per day

Germany is now facing a situation where the authorities are wrestling with the need to dig it all up before the radioactive residue reaches the surface with many experts fearing that digging up the drums with consequent risks of radioactive leaks could create a much greater hazard.

“It is a disastrous situation”, says Jochen Flasbarth, State Secretary at the Federal Ministry of the Environment.

According to Ingo Bautz of the Federal Office for Radiation Protection, who oversees activities at the site, “There could be conflict between protecting future generations and creating risks for today”.

“Nothing will be moved until at least 2033”, says Bautz. “Meanwhile, the bills keep rising. It currently cost 140million Euros per year to just keep the mine safe for work to continue. The final bill will run into billions”.

This type of example illustrates how governments, with the best of intentions, can set up expensive and dangerous situations for future generations. Critically this situation was created only 50 years ago. When a nuclear legacy can last for over 200,000 it is inconceivable that we can manage the risks associated with the storage of dangerous waste over this period of time.

(Pearce, F. 2016)^{vi}

5. The Uncertain Valuation of Nuclear Waste

There would appear, from the information in the Issues Papers, and in the Tentative Findings Report, to be no reliable precedent on which to base an estimate of how much money might be made by taking nuclear waste from other countries.

There are many constraints, such as the fact that some countries with significant nuclear power programs – such as Russia, France, and India – operate reprocessing plants so would be unlikely to want to send spent fuel to Australia.

There are issues surrounding very long periods of time: continuity of governments and stewardship, language and warnings, ethical issues associated with leaving an enormous hazard and responsibility to future generations, and appropriately estimating and valuing future costs, as well as irreversible and irreparable harm.^{vii}

On the other hand, some nuclear proponents believe that spent nuclear fuel is a "multi-trillion dollar asset" because it can be processed for reuse as reactor fuel – and they also believe that countries will pay "tens of billions of dollars" to relieve themselves of this multi-trillion dollar asset.^{viii}

LEAN considers that the NFCRC’s Final Report should include a financially prudent and careful assessment of the uncertainties in the valuation placed on nuclear and radioactive waste.

It is understood that the Royal Commission is inclined to the view that "royalties" from the nuclear waste could be a prime incentive to establish a nuclear waste facility. The Nuclear Fuel Cycle Royal Commission issues paper 4 on page 7 stated that there is *USD\$28 billion set aside in their Nuclear*

and radioactive waste fund. This USD\$28 billion figure is not fully explained or referenced by the Royal Commission. Certainly the uncertainty range around this figure is not described or explained. LEAN is concerned that it could be seen to be misleading to use this unsubstantiated figure of USD\$28 billion.

LEAN is also uncertain from its reading of the Tentative Findings Report what provisions for potential future liabilities either have been or should be subtracted from this figure. For example to defray economic impacts caused by an accident that results in a release of radiation, or to cover uncertainties in the cost to clean-up contaminated sites that are or become a liability for the Government, and for which provision does not yet exist.

6. Jobs and Employment

LEAN considers that the Final Report of the Royal Commission, should contain a fuller, more detailed discussion and explanation of the uncertainties in the scope and value of the jobs and employment that could be created (directly and indirectly) by the transport, storage and disposal of nuclear and radioactive waste.

Moreover that discussion and explanation should reference a range of published or commissioned studies and assessments, and reflect on the appropriateness, and robustness of the assumptions and factual basis for those studies and assessments.

As an example, the Synapse Energy Economics study (2008)^x estimated that such a facility would require four full-time site managers. It estimates that 77 workers are required to support these four managers.^x This study estimated the cost of managing such a facility in USD is \$9.5 million (2005) per annum. This results in a cost per person of USD\$124,427 which when considered with on costs, cars and superannuation is a reasonable. When inflated to 2015 dollars and converted to Australia Dollars the wages bill is then estimated to be AUD\$15.4 million per annum, just to manage the facility safely.

7. The Increased Cost of Insurance

LEAN considers that the Royal Commission should include in its Final Report an assessment, based on an adequate economic model, of the need and cost for households and businesses to insure against loss and damage as a direct or indirect consequence of an accident that results in release of radioactivity. The costs considered should include both the direct cost of insurance and also the indirect costs, such as the impacts on property and business values, arising from the need for this insurance.

Zweifel, P., Schneider, Y. & Wyss, C. (2005)^{xi} conducted a 500 person contingent valuation study in Switzerland on willingness to pay for insurance against a nuclear disaster. Their major finding is that, residents were willing to pay (on average) \$2,280 for full insurance at zero distance from nuclear power plants, with mean willingness to pay estimates falling by \$24 per km to zero at a distance of 95 km.^{xii}

Port Augusta had a population in 2012 of 14,425^{xiii} and approximately 6,000 Households. Roxby Downs in 2012 had a population of 4,932^{xiv} and approximately 1,700 Households. Both towns had 827 businesses and a total of 7,700 households.

If it could be assumed that at least 25% of households and businesses take out insurance of an additional \$200 per year, to cover for the event of a small scale nuclear accident, most likely in the transportation of the waste, the direct cost of insurance would be over half a million dollars per annum. This has been factored into the economic model. There may also be a negative impact on property prices as proposed in the Swiss valuation analysis above. However, the potential negative impact on property prices has not been factored into the model.

8. Environmental Impacts

Prof. John Veevers from Macquarie University wrote in the *Australian Geologist*^{xv} in August 1999, an international high-level nuclear waste dump would pose serious public health and environmental risks: "Tonnes of enormously dangerous radioactive waste in the northern hemisphere, 20,000 kms from its destined dump in Australia where it must remain intact for at least 10,000 years. These magnitudes of tonnage, lethality, distance of transport, and time – entail great inherent risk".

There are social as well as technical dimensions to risk assessments. The "clean-up" of the Maralinga nuclear bomb test site in the late 1990s provides a test of Australia's capacity to safely manage nuclear waste. The "clean-up" was done on the cheap and many tonnes of debris contaminated with kilograms of plutonium remain buried in shallow, unlined pits in totally unsuitable geology.

Nuclear engineer and whistle-blower Alan Parkinson said: "What was done at Maralinga was a cheap and nasty solution that wouldn't be adopted on white-fellas land." An officer with the Commonwealth nuclear regulator said in a leaked email that the "clean-up" was beset by a "host of indiscretions, short-cuts and cover-ups".^{xvi}

Barely a decade after the Maralinga "clean-up", a survey revealed that 19 of the 85 contaminated debris pits had been subject to erosion or subsidence. The half-life of plutonium-239 is 24,100 years.^{xvii}

The propensity to "do things on the cheap in South Australia combined with the potential isolation of the facility, will lead to two high risks. Risk from poor construction standards at the facility and terrorism.

Australia is not the only country where nuclear waste dumping is promoted as the solution to the poverty and disadvantage experienced by Aboriginal people. North American indigenous activist Winona LaDuke told the 2006 Indigenous World Uranium Summit:

"The greatest minds in the nuclear establishment have been searching for an answer to the radioactive waste problem for fifty years, and they've finally got one: haul it down a dirt road and dump it on an Indian reservation".^{xviii}

The US state of New Mexico is host to the world's only deep geological repository – the Waste Isolation Pilot Plant (WIPP), which stores long-lived intermediate-level military waste. WIPP is currently closed because of a fire and radiation leaks earlier this year.

When WIPP opened in 1999, the DOE estimated the risk of a radiological contamination incident to be one chance in 10,000 per year or less. But there has already been a radiological contamination incident in the first 15 years of operation. At the current rate, there will be 670 radiological contamination incidents over 10,000 year period.^{xix}

LEAN considers that the NFCRC must assess and report on how, over the very long term, the legislative and administrative arrangements for the adequate and accountably robust governance of the transport, storage and disposal of nuclear and radioactive waste would be sustained and not be compromised or diluted in probity, standards or effectiveness. In reporting on this the NFCRC must identify what it regards as potential risks and uncertainties for that the adequate and accountably robust governance, and how such risks and uncertainties could be prevented or mitigated.

9. Weather and Climate Change

The northwest Australian coastline between Broome and Exmouth is the most cyclone-prone region of the entire Australian coastline, having the highest frequency of coastal crossings. On average about five tropical cyclones occur during each tropical cyclone season over the warm ocean waters off the northwest coast between 105 and 125°E. On average about two cyclones cross the coast, one of which is severe.^{xx}

In South Australia these large rain events often occur after a tropical low drifts over the northwest of the State. This event can bring a large scale downpour. In the event of a one in 50 or one in hundred year downpour, localised flooding could cause a spread of the nuclear waste. The Bureau of Meteorology note one such event this year when it stated “heavy falls of up to 120mm have already occurred in the north of the state, in what they have described as the state’s heaviest rainfall event in 30 years”.

We also know our climate is changing there will be unknown changes to our planet and weather systems. These changes may have unforeseen consequences for a nuclear waste storage facility in terms of the stability of the site.

LEAN considers that the NFCRC needs to conduct a more detailed assessment (likely probabilistic and multi-factorial in nature) of the potential economic, social and environmental risks that could be triggered by the impact of extreme weather events on the transport, storage and disposal of nuclear and radioactive waste. The time period to be considered in that assessment of risks must cover the establishment, operation, maintenance, decommissioning, rehabilitation and post-rehabilitation of the facilities and systems for the transport, storage and disposal of nuclear and radioactive waste. The purpose of such a risk assessment is to enable the NFCRC to make well explained findings and recommendations about the prevention, mitigation and management of the potential risks and the consequential potential liabilities they may cause.

ⁱ These comments have been informed in part by the following:

- <http://www.pdac.ca/docs/default-source/publications---papers-presentations---conventions/essential-elements-and-risks-in-bankable-feasibility-studies-for-mining-transactions.pdf>;
- <http://www.enthalpy.com.au/wp-content/uploads/2014/06/EnthalpyCorporateProforma1100-The-Use-and-Abuse-of-Feasibility-Studies.pdf>;
- http://www-pub.iaea.org/mtcd/publications/pdf/pub1449_web.pdf ;
- http://www-pub.iaea.org/mtcd/publications/pdf/pub1553_web.pdf ;
- http://minerals.statedevelopment.sa.gov.au/data/assets/pdf_file/0020/255710/TYNE_Australian_UraniumConference_15Jun15.pdf
- www.dtf.vic.gov.au/files/.../ilg-project-risk-management-feb-2009.pdf ;
- http://www.iso.org/iso/iso-gri-26000_2014-01-28.pdf;
- <https://www.globalreporting.org/standards/g4/Pages/default.aspx>

ⁱⁱ Department of Environment and Heritage 2003, *Triple Bottom Line Reporting in Australia: A Guide to Reporting Against Environmental Indicators*, Australian Government

<http://www.environment.gov.au/archive/settlements/industry/finance/publications/indicators/pubs/indicators.pdf>

ⁱⁱⁱ Pg. 59 in J Green, for Conservation Council of SA, May 2015, South Australia's Nuclear Fuel Cycle Royal Commission Issues May 2015

^{iv} Munro, A. 2001, *Notes on the economic valuation of nuclear disasters*, National Graduate Institute for Policy Studies, Tokyo <http://www3.griips.ac.jp/~munro/notes%20nuclear%20valuation%20a.pdf>

^v <https://www.newscientist.com/article/2075615-radioactive-waste-dogs-germany-despite-abandoning-nuclear-power/>

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