DEST National Radioactive Waste Repository

A Second Round Submission to ARPANSA

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Introduction

This submission addresses two of the matters that the CEO of ARPANSA is required to take into account when considering licence applications:

- international best practice in radiation protection and nuclear safety
- whether the applicant has shown a capacity for complying with the regulations to the Act, and the licence conditions that would be imposed under section 35 of the Act

It is worth noting here that I am pro-nuclear, with formal qualifications which include in Nuclear Engineering, and many years experience in the nuclear industry. I am in favour of having properly engineered facilities for the disposal of radioactive waste in Australia, but I question whether the government should enter the field in a business venture such as the proposed waste repository.

INTERNATIONAL BEST PRACTICE

The term 'international best practice' itself opens up a range of questions. First, what is international best practice? Is it the same as best practicable available technology? Is cost a consideration when deciding what is international best practice? Who decides what is the best practicable available technology or international best practice? Does that decision rest with one person? Is there an internationally accepted definition of international best practice for the disposal of radioactive waste? Has Australia endorsed any internationally agreed definition of international best practice for the disposal of radioactive waste?

On 17 April 2000, the CEO of ARPANSA, Dr John Loy, issued a media release in which the opening sentence was: *"Claims that the clean-up of Maralinga is not to world best practice are not well founded."* This sentence was repeated in a release by Senator Minchin on 1 May 2000.

The Minister for Science Mr McGauran repeated this spurious claim in a letter published in the Australian Financial Review on 19 August 2002 saying of Maralinga: *"... the Government at all times acted on expert scientific advice, achieving a world's best practice result."*

Some four years after the project was said to be complete, the government's advisory committee, the Maralinga Rehabilitation Technical Advisory Committee (MARTAC) completed what they claimed was the final definitive report of the project. The report was tabled by Mr McGauran in the House of Representatives on 25 March 2003. In his speech on that day, the Minister said: *"The project achieved its goals and a world best practice result."* On the same day, in the Senate, Senator Chapman avoided the phrase 'world's best practice' and instead said the project: *"has been conducted on the basis of the best known technology and best results achievable in the world."*

These statements all suggest that the speakers knew what is meant by the term 'international best practice' and they claim that the disposal of several thousand tonnes of **debris** contaminated with plutonium, half-life 24,400 years, in a shallow trench in totally unsuitable

geology is the best that could have been done. The top of the debris is less than three metres below ground, so even a simple approach such as burial at a greater depth would have been an improvement.

How that debris came to be buried in a shallow trench denies that the solution was world's best practice. The agreed treatment of this debris was to vitrify the whole lot thereby turning it all into a hard glass-like rock which immobilises the plutonium for perhaps a million years. Long before the process to convert this debris into rock got under way at site, the government was seeking ways to reduce the cost. Soon after the vitrification process started at site, the government curtailed its application merely to save money, as shown in project documents, especially one very telling document by the project manager GHD which said: *"The recent consideration of alternative treatments for ISV of these outer pits has arisen as a result of the revised estimate for ISV being considerably above the project budget."* They said this even though there were sufficient funds remaining to cover the cost, assuming proper management.

Every member of the minister's advisory committee MARTAC agreed with me when I was a member of the committee that vitrification was a superior method of disposal; some considered it a far superior method.

When discussing the burial option, Peter Burns of ARPANSA suggested that it *"may be sensible to concrete encase the highly contaminated items [in the debris]"*. But the project manager said this would be difficult to achieve so the suggestion was dropped.

Collectively these show that vitrification was abandoned in a cost-cutting measure, that other 'eminent scientists' (to use the Minister's term) considered vitrification to be far superior, and that ARPANSA itself considered encasement in concrete to be superior. How then can Dr Loy and Mr McGauran claim the outcome to be international best practice? How can cost-cutting be considered international best practice? How can dropping a suggestion by the regulator because the contractor said it would be difficult to comply be international best practice? How can a regulator making suggestions instead of stipulating requirements be considered international best practice?

Speaking on ABC Radio on 23 January 2004 about the visit by a team from the International Atomic Energy Agency to inspect the site for the nuclear repository, Dr Loy made an astonishing comment: *"My Act certainly says I have to take into account international best practice, so I have to know what it is ..."* But four years earlier he claimed to know what it was. If Dr Loy had to invite an international team of experts to come to Australia to tell him what constitutes international best practice, how could he have claimed that the Maralinga outcome was international best practice? And if he had to invite a team from overseas to tell him, what does that say for those scientists and engineers within ARPANSA who will have responsibilities for regulation of the nuclear waste repository?

It seems from all that has been said about Maralinga and the forthcoming waste repository that international best practice is what the CEO decides it is. In the case of Maralinga the definition was what the department, who paid for ARPANSA's involvement, wanted it to be. Since the government is again the applicant, what assurance is there that the definition will not again be what the government wants it to be?

In July 2001, the government issued a discussion paper *Safe Storage of Radioactive Waste, The National Store Project: Methods for Choosing the Right Site.* The paper was prepared by the National Store Advisory Committee whose membership included a representative of ARPANSA. Twice that paper says that long-lived radioactive waste, whether considered low-level or intermediate-level *"is not suitable for near-surface disposal."* Near-surface is defined in the *Code of Practice for the Near-surface Disposal of Radioactive Waste in*

Australia (1992) as being within 30 metres of the ground surface. Thus one of the government's own committees says that shallow disposal of the long-lived plutonium at Maralinga is not acceptable, and therefore cannot be international best practice.

In August 2003, I visited the Sellafield facility in England. Sellafield is the source of the plutonium spread over hundreds of square kilometres of the Maralinga landscape. I went there with the express purpose of asking the simple question: *"When you dispose of plutonium-contaminated debris in the UK, does it have to be disposed of in a concrete lined facility?"* While I knew what the answer would be, I wanted to receive it first hand so that I could compare it with statements made in the Senate or Senate hearings.

For example in statements provided on 31 May 2000, Senator Minchin said: *"Disposal has occurred at Drigg [near Sellafield] in both [concrete] lined and unlined trenches."* And in reply to another question he said: *"There is no requirement in the UK for the plutonium contaminated material to be placed in concrete lined trenches. Rather, it must be demonstrated that the location where waste is stored will retain the waste. The current trench at the Drigg disposal facility is sited in an area of soft clay and a high water table in an area of high rainfall, and is open. The trench is lined with concrete to stabilise the structure, and to collect rainwater for monitoring."* (Senate Question 3714, 9 August 2001)

And then in answer to a question on notice, Senator Vanstone, representing the Minister for Science in the Senate said: *"British Nuclear Fuels Limited have advised that historical plutonium-contaminated wastes which are currently stored in above-ground structures at Drigg, not buried, are in the process of being retrieved and repackaged ..."* (see Question on Notice 2109, 15 September 2003.)

In answer to my question to BNFL, I was told: *"Yes plutonium contaminated debris does have to be disposed of in concrete."* To support the answer, I was given a copy of the Environmental Statement for Engineered Drum Store No 3 (EDS3). The document makes very interesting reading, especially when the standards in the UK are compared with those which ARPANSA claims were world's best practice for Maralinga.

EDS3 follows EDS1 and EDS2. Both EDS2 and EDS3 are to house plutonium-contaminated waste. The environmental statement contains very interesting sentences such as:

- This facility is required to ensure that Plutonium Contaminated Material (PCM) is stored to a consistently high standard across the Sellafield site.
- The requirement for the new store was identified during a strategic review of Intermediate Level Waste, which includes PCM management .....
- The new plant will provide a high specification store for PCM materials and allow BNFL to manage its storage responsibilities in the safest manner.
- There are a number of driving forces behind the requirement to build EDS3:
  - To ensure contained safe storage of PCM arising from Sellafield and Drigg in facilities which meet, or exceed, the modern day standards, amongst others the need for increased spacing between packages within the stores.
- The building construction comprises a reinforced concrete raft foundation, shielding walls and superstructure. The shield walls and the concrete columns are designed to integrally support the in situ waffle slab, essentially forming a concrete cell.
- The operation of the reprocessing plant at Sellafield generates Intermediate Level Waste (ILW), of which some is Plutonium Contaminated Material (PCM).
- Waste stored within EDS3 will be bagged and placed into 200 and 500 litre steel drums.

The drums are not open to the elements since EDS3 is totally enclosed and air conditioned to maintain a temperature of 15C or, in winter, 15 degrees above outside ambient temperatures.

Not only are BNFL making arrangements to store plutonium waste arising on the Sellafield site, they are also exhuming and repackaging the waste stored at Drigg, as stated by Senator Vanstone, and any plutonium contaminated material will be transferred to EDS3.

The difference in standards applied at Maralinga and Sellafield arose because of the statement by ARPANSA that the Maralinga debris was classified as Category C waste (that is low-level waste). I have never accepted that definition, and now it seems that BNFL also consider plutonium-contaminated waste to be Intermediate Level Waste (Category S) as shown above.

If the shallow disposal of plutonium contaminated debris at Maralinga is international best practice, then I am amazed that Sellafield, with many years of experience dealing with plutonium, have not adopted this far cheaper alternative to their own (responsible) method.

In summary, there is considerable doubt over ARPANSA's view of what constitutes international best practice. They appear out of step with other far more experienced organisations.

CAPACITY OF THE APPLICANT

It has to be noted that the same group responsible for the debacle of the Maralinga project have responsibility for the radioactive waste repository. On the Maralinga project they showed without any doubt that they had no experience or knowledge of radioactivity and no expertise at all in project management. They have publicly shown their complete lack of understanding in project management methods, radiation and other technical issues. Thus they are not equipped either to approve the design of the facility or see it through the construction period. I have not seen anything which tells me which organisation will be responsible for the operation of the facility. But if they are as poorly qualified as those now responsible for the repository then they too will be unqualified.

There is plenty of evidence on public record to support my statements.

Understanding of Radiation

I believe that when considering the application for a licence for the repository, ARPANSA should check the credentials of the proponent's staff responsible for the design, construction, and operation of the facility. The qualifications of DEST's consultants should also be checked. Overseas codes and standards such as the American ASME codes usually stipulate that staff in certain positions have to be suitably qualified. There is no reason why Australia should differ from overseas practice. We expect our accountants, doctors, dentists, optometrists, airline pilots, even plumbers and electricians to be suitably qualified. We expect the scientists and engineers within ARPANSA to be qualified in their respective fields, so why should we not expect those responsible for the safe disposal of radioactive waste in this country also to be suitably qualified. If those people have no understanding of radiation and other nuclear matters, then they cannot and should not be allowed to oversee or manage the repository project.

My experience of the same people on the Maralinga project leaves considerable doubt in my mind that they have any understanding of radiation or any nuclear matters, and so I question their capability to provide Australia with a safe nuclear waste repository. A discussion of the estimated dose of 1 mSv/annum on cleaned land at Maralinga in a Senate hearing of 3 May 2000 illustrates the point:

Senator Allison - Why was the background radiation dose of 2.3 milliSieverts not taken into

account? Do you not have to add that to the additional one milliSievert?
Dr Perkins - Senator, that is just an average figure. That is an average figure that Australians get now. .....
Senator Allison - Okay, let me ask the question a different way. Does that one milliSievert take into account normal background radiation?
Dr Perkins - Yes.

Other examples of the lack of understanding radiation are presented in *A Parkinson, Submission to the Senate Select Committee for an Inquiry into the Contract for a New Reactor at Lucas Heights, September 2000, Appendix 1, The Competence of the Department to Manage a Waste Management Project*

Actually, all of the answers given in the Senate hearings concerning radiation and equivalent doses need to be questioned to remove the confusion that was introduced because of lack of understanding by the respondents.

Technical Matters

In answer to a question from Senator Allison in a Senate committee hearing on 3 May 2000 about the disposal of 60 tonnes of soda ash at Maralinga, Mr Harris of DPIE said: *"... the limestone environment at Maralinga is an alkaline environment which has a neutralising effect on the soda ash."* Both limestone and soda ash are alkalis so Mr Harris has invented a new branch of chemistry in which one alkali can be used to neutralise another alkali.

Somebody must have pointed out the folly of Mr Harris's answer, because he then sent a letter to the Secretary of the Senate Economics Legislation Committee on 15 May 2000 to 'correct' his statement. In his 'correction' he said: *"What could be observed is that the limestone environment at Maralinga is an alkaline environment which is sodium and carbonate rich, and the addition of about 65 tonnes of soda ash will not substantially change the chemical nature of the environment."* Again, he shows his lack of technical knowledge; soda ash is sodium carbonate (rich in sodium and carbonate), limestone is calcium carbonate.

When describing the burial of contaminated debris, Mr Harris said: *"It might also be of interest to the committee to note that the burial trench also has a couple of layers of plastic to clearly identify for people who are wanting to intrude that they ought to pay attention to what they are doing."* Senator Allison then asked: *"Just as a matter of interest, what is the life of the plastic?"* The astonishing reply was: *"...I think it is a few thousand years"* to which the Senator responded: *"A bit of plastic lasts a few thousand years? Fascinating."*

Project Management Capabilities

The lack of competence within the department in project management is illustrated by several occurrences in my knowledge. There are probably at least as many that I do not know about.

Towards the end of my time on the Maralinga project, I was told by some-one in DEST who had no experience in project management, that my method of dealing with contractors (to expect them to do what they agreed when they signed the contract) was wrong. I was told that I *'should always seek compromises with contractors.'*

The lack of concern about the success of the project and the protection of Commonwealth interests on the Maralinga project (and by extension probably on other projects) can be illustrated by an exchange I had with another senior person within DPIE when my contract with the department was cancelled, and at the same time I was (illegally) removed from MARTAC - the person did not have any authority to cancel my membership. I asked

him: *"Who will protect the Commonwealth's interest now?"* He replied: *"GHD will do that."* I was so astounded at this naive reply that all I could say was: *"Well that will be a world first for a firm of consultants to put the client's interests ahead of their own."* The response to that was even more astonishing, He literally shrugged his shoulders and said: *"Well that doesn't matter to me, I'm leaving in two weeks time so it's somebody else's problem."*

During the hearings of the Senate Economics Legislation Committee on 3 May 2000, the department several times demonstrated their lack of skills in managing a project.

Senator Allison asked several questions about the GHD estimate of $250,000 to manage the ISV part of the project, and how that was managed by the department. In answer, Mr Harris said: *"We had month by month meetings with GHD on project management."* He seemed to think that project management consists entirely of monthly meetings. In the exchange, Mr Harris claimed that increases in cost and payments to GHD were approved, but could not give details of how claims were assessed and approvals granted.

It should also be noted that the department accepted the GHD estimated cost of $250,000 to manage the ISV phase of the project even though I advised them that the amount was a gross underestimate. Within 18 months of being awarded the extension to their contract, GHD had been paid over $2.5 million - ten times their quoted price. At the same time, their budget for the whole project had risen from $5.13 million to over $11 million. This must surely cast doubts on the department's ability to control project costs.

The inexperience of the department in project management is illustrated by the response to a question on notice when they said: *"A contract was not negotiated .... A contract variation of the existing Commonwealth/Geosafe (sic) was put in place."* Even a contract variation should have been negotiated.

Senator Allison also asked: *"Was it the first time either [Mr Rawson and Dr Perkins] had negotiated a contract of this sort?"* In his reply, Senator Minchin again avoided the question: *"A contract variation was the relevant process, not a contract negotiation."* This again completely ignores the fact that a contract variation should also be negotiated, not simply awarded.

A glaring example of the lack of expertise in project management is provided by the appointment by the department of GHD to manage the ISV phase of the Maralinga project. In spite of the fact that several aspects of GHD's performance on the earlier phases of the project were not altogether satisfactory, and the fact that they had absolutely no knowledge or experience of the complex process and equipment of ISV, the department appointed them Project Manager and Project Authority. And those responsible cannot claim they were not aware of GHD's ignorance in the ISV technology; it was spelled out in writing to them several times. It is almost a fundamental requirement for the project manager to have a good knowledge and some experience of the project - in this case GHD had none. To emphasise the department's lack of project management skills, they also appointed GHD Project Authority, in which position they should have had a detailed knowledge of the process and equipment. No wonder the Maralinga project became such a failure.

This appointment also provides an excellent example of how the department officers are very coy about what they tell their Minister. In their brief to the Minister, MCD No M1997/4390, they told the [then] Minister, Senator Parer, of the extension of GHD's contract, but they neglected to inform him that GHD were not qualified, having absolutely no knowledge of, or experience in, the in situ vitrification technology. They had not been involved in any way in the 3 years of development work.

Project Oversight

The department says that as from its formation on 5 February 1999, ARPANSA *"has oversighted the clean-up operation, ... Prior to that date, its predecessor the ARL provided such oversight."* This statement was repeated in every release, until the Senator Minchin's release of 1 August 2000. It is surprising that ARPANSA should allow this assertion to continue. By doing so, they are leaving themselves open to blame for anything that has gone wrong, or anything that has been done without their knowledge, like the burial of a drum that had been exhumed from one of the Taranaki pits, and disposal of nine concrete firing pads said in British reports to be contaminated with up to 1.5 kilograms of plutonium, that are not now recorded.

ARPANSA is not the appropriate organisation to oversee a project since, as the regulator, they should not have any interest in the cost. The role of the regulator is to specify requirements and then confirm that they have been satisfied. Oversight of the project should have been provided by the department.

The Minister changed his stance in his statement of 1 August 2000 saying: *"The Maralinga Rehabilitation Project was undertaken by private contractors, with oversight by my department, and* ***regulation*** *by ARPANSA."* It was a little late to be making that distinction because it had already become apparent that the department did not oversee the project, at least not from January 1998 onwards.

The Canberra Times of 24 February 2004 reported a comment by Professor Cullen from the University of Canberra: *"There has been a takeover in the senior public service of the generalist manager and having technical skills is almost seen as counter-productive for people seeking these managerial roles. I believe this trend creates a very high risk when technical problems like managing catchments and bush fires arise."* The same comments are applicable in the public service to management of radioactive waste disposal.

In his submission on the proposed radioactive waste repository dated 22 October 2003, Professor Johnston of RMIT said: *"In the Maralinga Rehabilitation Project, DEST had no in-house capacity for engineering or scientific assessment of its contractors for a substantial part of the project. It had internal engineering support for the early part of the project but that individual was removed."* [Note, I was that individual.] Professor Johnston went on to say: *"As a consequence, DEST contracted for services in extremely deficient ways."* And he added: *"The underlying philosophy of not having expertise relies on the concept that the risk can be contracted out. I reject this as the risk is to the Australian community not the contractor."* Further he referred to: *"very large expenditures and significant hazards resulting from deficient management of the project by DEST."*

When I was appointed both a member of MARTAC and the government's representative to oversee the Maralinga project, I reported to Mr Pat Davoren in what was then the Department of Primary Industries & Energy. His instruction to me was: *"We are a policy organisation, not a project organisation, so you look after the project and keep me informed."* I am quite sure that had he not been transferred to the Minister's office in peculiar circumstances, Mr Davoren would have heeded my advice and GHD would not have been appointed on the complex ISV part of the project. The fact that GHD were so appointed collectively by Messrs Farrow, Rawson and Perkins in the department raises serious questions. Why would they do so? And, since they have consistently attempted to defend their collective action, what evidence is there to suggest that they would not make the same silly mistakes again?

The deficiencies in project management within DEST, and the scant knowledge of radiation in general within DEST and GHD makes it very difficult to see how the government can

successfully manage the construction of the radioactive waste repository. There is no government department qualified to undertake the role and unless DEST is prepared to take on engineering expertise within its own structure, I can see no way that the project should be allowed to proceed. But if DEST were to employ some in-house nuclear engineering expertise, those currently responsible would have to step aside, or the same problems that I experienced will resurface.

Alan Parkinson
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