1. Introduction

In this paper, I describe the legal and administrative structure of nuclear regulatory decision-making applying to the Australian Government. In particular, I describe how it was applied in the case of the new OPAL research reactor now coming into operation at Lucas Heights near Sydney.

The Australian Government, through the Australian Nuclear Science and Technology Organisation (ANSTO), operates the only nuclear installations in Australia. I note, however, that the Australian Radiation Protection and Nuclear Safety Act 1998 (the Act) has an interesting definition of ‘nuclear installation’. It includes a nuclear research reactor and associated fuel management facilities, but also includes large radiopharmaceutical production facilities and large radioactive waste storage and disposal facilities.

I need also say that the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is not the only nuclear regulatory decision-maker in Australia. The Department of Environment and Heritage (DEH) administers the Environment Protection and Biodiversity Conservation Act (EPBC Act) and the Minister for the Environment and Heritage makes decisions under that Act, including whether or not a ‘nuclear action’ may be approved having regard to its environmental impact. ‘Nuclear actions’ include the establishing or significantly modifying a nuclear installation. The Australian Safeguards and Non Proliferation Office (ASNO) administers the Nuclear Non Proliferation (Safeguards) Act 1987 which implements Australia’s nuclear safeguards obligations. I do not speak for those agencies in this paper.

2. Legislative Framework

2.1 Prohibitions

The Act prohibits ‘controlled persons’ from, amongst other things, preparing a site for, constructing, or operating a ‘facility’, including a nuclear installation, unless they have a facility licence issued by the CEO of ARPANSA or are exempt from the requirement under the Australian Radiation Protection and Nuclear Safety Regulations 1999.

A ‘controlled person’ is defined so as to include all the entities through which the Australian Government might seek to do such things, including contractors engaged for those purposes.
The Act expressly prohibits authorisation of fuel cycle facilities and nuclear power plants. This prevents the Australian Government from establishing or operating such facilities.

The CEO of ARPANSA solely is responsible for the administration of the Act, including making the decision whether or not to issue a licence and the additional conditions that may be imposed.

### 2.2 Making an Application

So how does a ‘controlled person’ obtain a licence? The first step is to make an application and that must be ‘in a form approved by the CEO of ARPANSA’. This mechanism of the ‘form approved’ allows the CEO to ask for information to be supplied. This may include information set out in the associated regulations, namely plans and arrangements for effective control of the facility, a safety management plan, radiation protection and radioactive waste management plans, a security plan, an emergency plan, and at the stage of operation: a safety analysis report and operational limits and conditions. It also gives the CEO the discretion to request related information not specified in the legislation.

The application is not only a document designed to persuade the CEO to issue a licence. The plans and arrangements put forward in the application form the basis for licensing the facility. The legislation requires the licence holder to comply with those plans and arrangements. However, it also allows those plans and arrangements to be modified over time through certain mandated change control arrangements.

### 2.3 Matters to be taken into account

Having received an application for a facility licence, on what basis does the CEO of ARPANSA make a decision whether to issue such a licence? The Act and the regulations lay down certain matters that the CEO must ‘take into account’ in making the decision.

The first of the matters I am required to take into account in making my decision is ‘international best practice in relation to radiation protection and nuclear safety’. I have had to think long and hard and I have written in some detail about what constitutes ‘international best practice in relation to radiation protection and nuclear safety’ or ‘IBP’.

My view is that at a high level IBP can be found in internationally accepted documents such as the Convention on Nuclear Safety, the Code of Conduct on the Safety of Research Reactors, the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, and the newly published IAEA Safety Fundamentals. The Recommendations on radiological protection published by the International Commission on Radiological Protection also define IBP at this high level.

Moving to a more detailed level of the safety standards to be applied to a certain type of facility, I have formed the view that the current IAEA Safety Standards do define a comprehensive and overall framework of IBP. This is not to say that every individual
Safety Standard defines IBP in every particular. I feel confident that these days they at least define ‘good’ practice and a facility that can be assessed as ‘scoring’ highly against the range of relevant IAEA Safety Standards can reasonably be regarded as meeting or comparing favourably with IBP.

The recent work of the Western European Nuclear Regulators Association (WENRA) on harmonising nuclear safety regulation in Europe supports this view of the framework of IAEA Safety Standards being IBP. The WENRA has assessed in some detail the regulations of the different European countries against the IAEA Safety Standards – it found the IAEA framework to be sufficiently comprehensive and is looking to harmonise on the basis of high performance against this framework.

There is also a very detailed, day-to-day notion of international best practice – what good designers and operators actually do. This level of IBP can be quite difficult to establish – the most practical way being through international peer review of the application.

The regulations stipulate other matters which I must take into account. These include whether the applicant has shown that the proposed activity can be carried out without undue risk to people and to the environment, whether there is a net benefit from the activity, whether radiation exposures arising are ALARA, whether the applicant has shown that it has the capacity to comply with any licence and its conditions, and submissions from the public.

While consideration of each of these matters has its challenges, the concepts are generally well defined and well known in the fields of radiation protection and nuclear safety and again, where appropriate, I assess them against IBP.

2.4 Submission from the public

In assessing an application in relation to a nuclear installation, I am obliged to seek submissions from the public and to take into account matters raised in those submissions.

One of the challenges of this provision is making information about the application available so that the public has knowledge on which they might base a submission. This presents practical issues – thank God for the internet, which largely solves those issues. It also requires me to deal with the matter of claims of confidentiality over aspects of an application flowing from commercial in confidence considerations and, especially in these post 9/11 days, security.

I feel that I have achieved a rather high degree of transparency in what I have made available to the public during the assessments of the different application for the OPAL reactor. I would claim it as exceeding what has been done for research reactors anywhere in the world.

The process of receiving written public submissions and considering and responding to them is valuable, but a bit bloodless. So I instituted the idea of a public forum in relation to licensing of nuclear installations – OPAL and the proposed national waste repository. The public forum was inspired by the hearings processes required in some
countries – with a hearing panel comprising myself and some independent people. The applicant and other organisations state their case in public and are subject to questions from the panel. A full transcript of the forum is published on the internet, as are reports by the independent panellists.

Of course, it is not a formal hearing. But I think it is a useful way to air the issues involved and to have some direct and public interaction with interested parties. In my decisions, I have taken into account matters raised through the public forum process.

2.5 Decisions and statements of reasons

For major decisions with regard to nuclear installations where public interest is high, I have adopted the practice of publishing the decision and a full statement of the reasons why I reached it. I believe that this is a valuable tool for communicating the seriousness and rigour with which a decision has been approached as well as explaining the basis for my conclusion that the matters to be taken into account have been addressed satisfactorily.

At this point, I should mention that a decision that I take is an administrative decision and subject not only to the review mechanisms detailed in the Act but to appeals to the Federal Court of Australia by interested parties under the Administrative Decisions (Judicial Review) Act 1977. This was done by Greenpeace Australia Pacific in the case of my decision to license the construction of OPAL.


3.1 Licence to prepare a site

I received an application for a licence to prepare a site for OPAL on 7 April 1999 and I issued the licence with conditions on 22 September 1999.

Not unexpectedly, there was a good deal of overlap between the assessment I had to make at this stage and the earlier process of environmental impact assessment conducted through the precursor legislation to the EPBC Act.

For future siting decisions for nuclear installations, it is likely that the Department of Environment and Heritage and ARPANSA will conduct a joint assessment process, whilst maintaining the independence required of the two decision-making processes.

3.2 Licence to Construct

I received an application for a licence to construct OPAL on 21 May 2001 and I issued the licence with conditions on 4 April 2002.

In making the decision to issue a licence, I was sufficiently satisfied that the matters I was required to take into account by the Act and regulations had been adequately addressed by the applicant. I concluded that the proposed reactor, if designed and constructed as described in the application, would be able to be safely operated.
The detailed design was, however, still being completed. Hence I imposed a most important licence condition (building upon one required by the regulations) that required ANSTO to obtain my approval to manufacture or install all items with significant implications for safety.

The licence condition required that, in seeking such approvals, ANSTO must provide information that established that the detailed design of the item had been completed in accordance with the design description and intentions in the application and that ANSTO had reviewed, verified and accepted the detailed design. ANSTO also needed to show that construction of the item would be under a certified quality assurance program. There were, of course, arrangements that allowed ANSTO to have design changes approved.

ARPANSA thus had close oversight of the process of detailed design and construction of the reactor – in fact, there were over 130 pieces of nuclear regulatory decision-making during this time.

3.3 Licence to operate

I received the application from ANSTO for a licence to operate OPAL in September 2004 and I issued a licence on 14 July 2006.

I have described in detail elsewhere the extensive assessment process undertaken by ARPANSA for this application: review by ARPANSA staff involving rounds of questions and answers with ANSTO; two international peer reviews; advice from external experts on certain aspects; reports from the external Nuclear Safety Committee; and two rounds of public submissions and a public forum. I accompanied my decision with my statement of reasons.

In this assessment, in addition to the direct issues of radiation protection and nuclear safety arising from the proposals for operation of the as-built OPAL, there were important emphases on the management of spent fuel and radioactive waste, the physical security of the reactor facility, and emergency planning. These issues were high on the public agenda and each also drew in players with significant roles other than ANSTO itself.

In issuing the licence to operate OPAL, I imposed certain licence conditions. I will comment briefly on these conditions. I imposed a requirement for periodic safety reviews, the first of these to take place no later than two years after hot commissioning is completed. Periodic safety reviews are, I believe, a part of international best practice in radiation protection and nuclear safety. An alternative would have been to require re-licensing at periodic intervals, but this is not allowed for in the ARPANSA legislation. Inevitably there will be lessons learned and various changes arising in the first two years of operation and so a periodic safety review in that time will allow those lessons to be fully consolidated. Thereafter, periodic safety reviews would take place no less than once in every decade. There is a mirroring licence condition for security reviews.

I have also imposed a licence condition requiring a program to support continuous improvement in the safety culture of the OPAL operating organisation. This is to
include surveys of the safety climate by an independent organisation. The way in which the regulator can support a positive safety culture in the operating organisation is not well defined, but I hope that this licence condition will keep the matter front and centre.

3.4 What has ARPANSA’s regulation of OPAL achieved?

This is the question all regulators dread – did all this process actually contribute positively to the safety of people and the environment? After all, INVAP and ANSTO are responsible organisations that could be relied upon to design, construct and operate a modern, safe reactor.

One basic and important outcome of regulation is the fact that a third party closely overlooked the design and construction and assessed the operating plans should give added assurance beyond the reputation of the designer, builder and operator. Just the very fact of expert third-party review limits the likelihood of ‘group think’ and should also strengthen the likelihood that any latent errors in the design, the construction or the operating plans will be discovered and addressed.

More specifically, I can point to some additional safety features that are in place because of ARPANSA, some additional safety testing being undertaken and a strengthening of the safety analysis arising from ARPANSA review.

Further the approach we took, particularly through the approvals of the construction of items important for safety, helped to strengthen ANSTO’s ownership of the design and construction. This has not been a ‘turnkey’ project.

ARPANSA's emphasis on progress with spent fuel management and radioactive waste management inspired ANSTO and the wider Australian Government to make progress on these issues. This was also an area strongly pressed by the public.

ARPANSA and our colleagues from the Safeguards Office certainly worked hard with ANSTO to achieve state-of-the-art physical security measures.

Finally, monitoring and oversight of the operations of OPAL will continue. The detailed knowledge gained by ARPANSA staff assessors during the assessment and decision making will form an invaluable basis for ongoing, risk-informed regulation.