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11 - Advice from Radiation health and safety advisory Council

Gillian Hirth

On 13 October 2022 the CEO received advice from the Radiation Health and Safety Advisory Council regarding the principles and attributes of an effective independent regulator for nuclear-powered submarines. This is attached for information and discussion by the SMC. The SMC should also note that in 2015 the NSC provided similar advice to the CEO, at that time the driver was the South Australian Royal Commission. The CEO will request the NSC to re-validate their advice at their upcoming meeting on 28 October 2022. s 33 - security [redacted]

Attachments

20221013 Letter to ARPANSA CEO from RHSAC - NuclearSubs.pdf

nsc_regulatoryframework_.PDF

13 October 2022

Dr Gillian Hirth
Chief Executive Officer
Australian Radiation Protection and Nuclear Safety Agency
619 Lower Plenty Road
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Dear Dr Hirth

Principles and attributes of an effective independent regulator for nuclear-powered submarines

The Radiation Health and Safety Advisory Council (**Council**), as the statutory advisory body to the CEO of the Australian Radiation Protection and Nuclear Safety Agency (**ARPANSA**), has considered radiation protection and nuclear safety in relation to the future regulation of nuclear-powered submarines in Australia. Council advises that there are some fundamental principles and attributes for a future regulatory framework that are of critical importance to guide the formation of the future regulator and regulatory framework of nuclear-powered submarines in Australia.

Council considers that Australia has a unique opportunity to establish a regulatory framework that meets Australia's international obligations whilst also being suited to the safety and security and defence needs of Australia and embodying the values of its people. Given actual and perceived health and safety risks of nuclear-powered submarines, a robust and effective regulatory framework in Australia is essential and should be a priority. Regulatory frameworks utilised in other countries such as the United States and United Kingdom are useful for comparison and guidance. However, other countries' frameworks grew from an era of different drivers, priorities and expectations.

Safety, Security and Safeguards principles

A regulatory body of nuclear-powered submarines must have public safety as its primary focus, together with a strong safety culture. Council notes that laws alone cannot ensure nuclear safety and security; but rather a complex web of technical, legal, administrative, institutional, economic, social, political, ethical and psychological considerations is required. A strong legal framework can assist in enhancing a good nuclear safety culture by assisting to ensure the necessary regulatory resources are available, avoiding conflicts, facilitating transparency and ensuring independence.

Australia needs to comply with international non-proliferation and safeguards standards as well as ensuring nuclear safety and security continue to be met. It is important that the framework does not allow 'national security' to mask inadequate radiation safety protection of the Australian public, weaken regulatory authority, or inhibit transparency on matters of Australian public safety.

Regulation of any nuclear-powered submarine program must not undermine the integrity of the international nuclear non-proliferation regime currently overseen by the Australian Safeguards and Non-Proliferation Office (ASNO). Any agreement Australia reaches with the IAEA to facilitate the possession of nuclear-powered submarines should continue to ensure the IAEA's safeguards system operates effectively with access to facilities by IAEA safeguards inspectors. Where multiple regulators are involved with safety, security and safeguards due to the importance of nuclear non-proliferation, it is crucial to ensure clearly defined guidelines in legislation to ensure seamless regulation.

Independence principle

Council highlights the importance of independence of the regulatory authority to ensure that the regulator cannot be influenced in its decision-making process by political or economic issues, or other unwarranted interferences and can exercise its functions effectively and efficiently. This includes making and being perceived by stakeholders to make independent and unbiased regulatory decisions. The IAEA has recommended how a country's radiation safety, security and safeguards regulators can be effectively independent from undue influences on its decision making.

Independence of the regulator is a critical part of its effectiveness. The regulator should be independent of the operators and departments overseeing any aspect of purchase, manufacture, maintenance, and operation of the program. It is noted that some of the more significant global nuclear and radiation incidents have arisen from inadequate separation of responsibilities from regulatory capture. More than functional separation, it is important that the independent regulator can operate without influence, and with a strong voice. If a regulatory body cannot provide information on safety and incidents at licensed facilities without the approval of another organisation, issues of independence and transparency will arise. Reporting arrangements should therefore enable the regulatory body to be able to provide safety related information to the Government and the public with the maximum amount of transparency.

A fundamental element of an international best practice national radiation regulation framework is the operation and maintenance of a regulatory body with the legal powers and technical competence necessary. The regulatory body should be able to make decisions in line with its statutory obligations for the regulatory control of facilities and activities and be able to perform its functions without undue pressure or constraint[1]. The regulatory body should be independent in its safety related decision making and hold functional separation from entities having responsibilities or interests that could unduly influence its decision making.

Transparency principle

Transparency to stakeholders is fundamental for the regulator to achieve credibility, trust and respect. The framework needs a mechanism that requires operators/licensees to make available relevant information that could have an impact on public health, safety and the environment, including nuclear and radiation safety management, discharges and emissions, incidents, near misses, and abnormal occurrences. Recognising national security issues are relevant, the criteria by which information is withheld for such purposes should be clear, and alternative approaches to public assurance provided. Transparency and openness of regulatory activities and decisions can assist with enhanced public confidence that decision-making is based on consistent best practice criteria and processes.

[1] **Governmental, Legal and Regulatory Framework for Safety**, General Safety Requirements, IAEA Safety Standards Series No. GSR Part 1 (Rev. 1), Requirement 4 at 6.

Attributes for effective regulation of nuclear-powered submarines

Council considers that it is crucial that any future public agency regulator of nuclear-powered submarines must have the confidence of, and be trusted by the Australian public and international community. Such trust from the Australian public cannot be legislated for, or earned quickly. Importantly, the trust placed in a regulator by the Australian community will enable it to respond efficiently and effectively at times of emergency and crisis. Internationally recognised capabilities of a nuclear industry regulator include:

- Clear and consistent regulation;
- Consistent and balanced decision making;
- Accountability;
- Strong organisational capability;
- Strong management systems;
- Strong leadership;
- Sufficiently qualified staff;
- Continuous improvement, peer review and international involvement;
- A risk-based approach;
- Authoritative science and science led;
- Acknowledged legitimacy with the Australian public, government and international peers; and
- Credibility, trust and respect.

National Harmonization of Radiation Regulation

Council considers that there are challenges in Australia's federated and fragmented radiation regulatory system particularly as it relates to emergency preparedness, interstate transport, and logistics; and radioactive waste which are key aspects of any future nuclear regulatory activities.

Separate and unaligned nuclear and radiation regulatory frameworks, for example a Commonwealth nuclear powered submarine regulator apart from existing jurisdictional radiation regulators, could present a risk to public safety. While a separate nuclear regulator can provide adequate assessment and approvals processes, incident response needs 'boots on the ground' radiation incident response capability that will inevitably sit substantially within locally based agencies.

The development of a regulatory framework for nuclear-powered submarines offers an opportunity for a reformed approach across Australia, with coherence and alignment. The impetus of a submarine program can galvanise such reform, but importantly Council considers that such reform is essential to address the findings identified in the 2018 International Atomic Energy Agency's (**IAEA**) Integrated Regulatory Review Service (**IRRS**) report to ensure the effective protection of the Australian public. The 2018 IAEA IRRS recommended the Australian Government establish and implement a strategy to give effect to the policy principles and goals in the Australian Radioactive Waste Management Framework; should establish a national policy and strategy for decommissioning of facilities; and should ensure a consistent level of protection of people and the environment through effective coordination and harmonized implementation of codes and guides by the Commonwealth, States, Territories and regulatory bodies. The implications of a nuclear submarine program and the potential interfaces with, and principles of these national strategies should be considered in the development of any reformed regulatory framework.

Nuclear Competence - Capability, Training & Development

It is imperative that the regulatory body is provided with adequate human and financial capital to attract, train and retain the technical competence and experience required to regulate nuclear-powered submarines within Australia. In addition, it is important that funding is reliable and consistent. The development of competent human resources to regulate nuclear-powered submarines is as important for the regulatory body as it is for the operator. Maintaining competence leads to effectiveness as a regulator in the areas such as independence, transparency, credibility and trust. Technical capabilities of the regulatory body should be appropriate for evaluating regulatory compliance and nuclear and radiation safety, security and safeguards. ARPANSA is well-placed to build on this competence and capability.

Radiation Emergency Preparedness & Response

Australian governments have well-established emergency management arrangements that are constantly refined and enhanced through review of incidents. However, nationally integrated emergency management arrangements do not exist for large scale radiological or nuclear incidents. The infrequency of radiological or nuclear emergencies of significance within Australian jurisdictions means that the arrangements for this type of emergency have not been adequately tested, nor provided opportunity for reflection and review, limiting development and enhancement.

This limitation affects both national and state/territory emergency preparedness, and is reflected in the recommendations from the 2018 IAEA IRRS review. The national strategy for radiation safety acknowledges the limitations of emergency management arrangements in Australia. They are not fit for purpose for a future with nuclear powered submarines. Council considers that by strengthening ARPANSA's overall emergency preparedness, and by taking a leadership role in advocating for enhanced national and jurisdictional capability, this will enhance the ability of a future regulator to assess the emergency preparedness plans of regulated entities, such as the nuclear-powered submarines program.

International Nuclear Cooperation

Both the operator of the nuclear technology and the regulator of the nuclear activities should maintain close relationships with peers in other countries and relevant international organisations (where appropriate). An independent nuclear safety regulator is best placed to fulfil its international obligations, to share operating and regulatory experiences, to participate in the relevant international agreements and promote international cooperation and assistance to enhance safety globally.

Summary

Council advises that as a priority ARPANSA stress these principles and attributes to the Australian government as fundamental elements of a future Australian regulatory framework that protects the Australian public and enables the effective safety, security and safeguards regulation of nuclear-powered submarines.

In view of the evolving circumstances Council will continue to review the situation and offer you further advice when appropriate.

Yours sincerely

Dr Roger Allison
Chair
Radiation Health and Safety Advisory Council

Australian Government
Nuclear Safety Committee

Our Reference: R15/15998

7 December 2015

Dr Carl-Magnus Larsson
Chief Executive Officer
ARPANSA
PO Box 655
Miranda NSW 1490, Australia

Nuclear Safety Committee

Advice to the CEO of ARPANSA

Dear Dr Larsson

I refer to your request (30 October 2015) that the Committee provide you with their advice and recommendations relating to several areas of regulation of an expanded nuclear industry, should a government be minded to allow or promote nuclear facilities currently not in operation in Australia. The Committee's recommendations focus on the following areas:

- The functional structure of the regulatory body;
- The jurisdictional scope;
- The jurisdiction - state/territory and Commonwealth; and
- Regulatory capacity and capability.

These areas were discussed during and subsequent to the June and October 2015 NSC meetings. The recommendations and advice of the Nuclear Safety Committee are attached.

Yours sincerely

Dr Tamie Weaver
Chair of the Nuclear Safety Committee

Attachment 1: Recommendations regarding the options available for the regulation of an expanded nuclear industry within Australia.

an advisory body to the CEO of ARPANSA established under the ARPANS Act 1998
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NSC recommendations to the CEO of ARPANSA

Recommendations regarding the options available for the regulation of an expanded nuclear industry within Australia

Functional structure of the regulatory body

The Committee discussed several alternative regulatory models for an expanded nuclear industry in Australia, drawing on members' experience within Australia and overseas. We consider that ensuring the regulatory body maintains independence from industry and government is of upmost importance, thereby increasing confidence for the operator and public of the regulator's decision making and effectiveness. Consistent with this, mechanisms should be in place to provide transparency regarding the independence of regulatory decisions. For example, if a minister is able to instruct the regulator, the instructed actions should be tabled in parliament.

The Committee considers that a CEO with an advisory board would be an effective framework on which to build regulation. This model combines a single accountable person for regulatory decisions (e.g. the CEO) with the diversity of knowledge and experience of an advisory board. The decision-maker must have relevant knowledge and experience so that they can target questions and judge advice received. Several members noted that the UK Office of Nuclear Regulation (ONR), which is a public corporation, detached from Government and headed by a CEO and Board of Directors, has been considered to be an effective regulator.

The Committee discussed the merits of an executive board in comparison to an advisory board, and considered that an executive board may have certain advantages in regard to joint decision making, especially in a young organisation. With this and other models, however, there may be difficulties regarding the accountability of decision making. A feasible approach would be that an executive board could transition to an advisory board as the regulatory organisation matures.

The Committee also considered the merits of a single regulatory organisation compared with a regulatory body supported by a technical services organisation. A regulatory body supported by a technical services organisation may be more appropriate for a country with major involvement in nuclear activities, like France. For Australia, at least in the initial stages of an expanded nuclear industry, two bodies may be an unnecessary complexity and expense. Members pointed out that the requirements of the regulatory body and/or technical services organisation are clearly stated in the *IAEA General Safety Requirements Government, Legal and Regulatory Framework for Safety, GSR part 1*.

In summary, the structure preferred by the Committee is a CEO supported by an Advisory Board, ensuring that the expertise of the regulatory body is consistent with IAEA General Safety Requirements. The regulator's independence from both government and industry is fundamental, and the regulatory framework and regulatory body should be established well in advance of any expansion of the nuclear industry.

Jurisdictional Scope

The Committee considers that the structure of the regulatory body may be dependent on the combination of nuclear industry expansion options that may be pursued in Australia.

Overall, however, the Committee's consensus was that a single nuclear regulator provides substantial advantages in delivering a uniform and efficient regulatory service, particularly when considering the specialist resourcing required. The Committee discussed specific areas including radiation protection (in terms of both people and the environment), nuclear safety, safeguards, nuclear waste disposal and management, and transport that should fall under the nuclear safety regulator.

There was also discussion on whether or not some other activities such as mining of uranium should come under the remit of a nuclear regulator. Although there is an argument that such activities have only a limited local impact, experience has demonstrated the far reaching impacts to facilities and public trust as well as company and industry reputations from incidents at mine sites involved in the nuclear fuel cycle. Notable examples (amongst others) include fires in the solvent extraction plant at Olympic Dam and the more recent uranium leachate tank failure at the Ranger Uranium Mine. Several members of the Committee felt it would be difficult to justify the exclusion of one part of the nuclear fuel cycle (such as mining and related processing) and such an exclusion may not meet public and political expectations.

The Ranger Uranium Mine in the NT is currently regulated by both the Commonwealth and the NT. In the case of the NT this involves the Department of Mines and Energy, NT WorkSafe and the NT Environment Protection Authority. At the Commonwealth level, the Supervising Science Branch of the Department of the Environment and the Department of Industry are the main regulatory bodies. By bringing together nuclear safety and radiological environmental protection aspects associated with mining there could be a significant opportunity to simplify such arrangements.

The Committee also discussed other areas that may be incorporated into a single nuclear regulator. There is an advantage in the materials accounting (safeguards) and the physical protection and security of nuclear material sections of ASNO being transferred to the single nuclear regulator. ASNO, as a division of DFAT, would continue to ensure that obligations under Australia's international treaties are met and would manage Australia's bilateral safeguards agreements.

In summary, the Committee considers that, due to the specialist nature of nuclear fuel cycle industries, a single nuclear regulator that encompasses the full nuclear fuel cycle from mining and processing of radioactive minerals, radiation protection (of both people and the environment), nuclear safety, safeguards, nuclear waste management and disposal, and transport would provide substantial advantages. The Committee also noted the importance of effective liaison and, where appropriate, joint working with other health, safety and environment regulators in respect of non-nuclear issues.

The jurisdiction - state/territory and Commonwealth

The Committee considers that the safety and security regulation of an expanded nuclear industry should fall under a single regulator rather than under a mix of separate Commonwealth and state and territory regulators. A single regulator would provide consistency across the existing jurisdictions and therefore would be more efficient and less burdensome on the industry, particularly for those industries operating in multiple states and territories.

Australia has made progress towards a single regulator in several areas including in Work Health and Safety. However, a single regulator need not be a solely *Commonwealth* regulator. Given the likely controversy associated with an expanded nuclear cycle and that nuclear facilities would in practice be located in the states and territories or possibly on Commonwealth land within a state/territory, the Committee felt it was likely that the states and territories would need to have some say in the governance of a regulator. However, a single national regulator could be formed under Commonwealth legislation but with governance from all jurisdictions. There is precedent for this approach including for example, the National Offshore Petroleum Safety and Environment Management Authority (NOPSEMA) which addresses territorial waters.

Regulatory capacity and capability

Based on members' experience, the Committee considers that the question of regulatory resources needs to be determined long before a nuclear-industry expansion program is initiated. Having the regulatory framework in place would allow targetted planning by the industry for such regulation.

Consequently, financial investment to establish the regulatory body would be required prior to development of the industry, and employment with the regulator would need to be sufficiently attractive to entice workers from industry. Based on the limited capability within Australia at this time, Australia may need to look overseas for sufficient qualified resources to staff an expanded nuclear regulatory authority. It is important that the regulatory authority has sufficient expertise so that they know the questions to ask and can judge information provided by manufacturers and industry.

A respected regulator will need more than the essential technical competencies identified above. The regulator will also need an ability to effectively demonstrate and communicate how it performs its regulatory functions. Given the sensitivity of the nuclear fuel cycle an effective regulator would also need the ability to effectively communicate technical decisions and complex risk issues; this requires particular expertise including an understanding of risk perception and risk communication. Such skills are essential if a regulator is to achieve and retain the confidence and trust of stakeholders. An effective regulator will also need to have regulatory skills and technical expertise in Human and Organisational Factors.

The Committee agreed that the regulatory body would need to be established in time to build its capability in relevant areas before any expansion of the industry became advanced. Hiring the expertise necessary to do this from overseas is a normal practice across many industries, particularly given the importance of hiring experienced people; the risk that the expertise subsequently leaves the organisation is a downside of this approach.

In the longer term, Committee members considered that education is an important aspect of building regulatory (and industry) capacity and capability. However, there are currently limited nuclear science and engineering courses at Australian universities. In the case of an expanded nuclear industry and the regulatory body required to service it, Australia would likely need to recruit, at least initially, from overseas.

During our discussions, the Committee noted that ARPANSA currently undertakes some research and provides specific services to the industry. In the case of an expanded nuclear industry, the regulator would need to be mindful of the risk that such activities could become, or be perceived, as a conflict of interest.

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