Australian Government
Radiation Health and Safety Advisory Council

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Dear Dr Larsson

AUSTRALIAN NATURALLY OCCURRING RADIOACTVE MATERIAL (NORM)

As the peak advisory body to ARPANSA, the Radiation Health and Safety Advisory Council (**Council**) has considered ARPANSA's role within Australia and internationally in relation to Australian Naturally Occurring Radioactive Material (**NORM**).

The 2005 Council previously provided a discussion paper titled *Naturally Occurring Radioactive Material In Australia: Issues for Discussion* (**2005 NORM Discussion Paper**) and advice to the CEO of ARPANSA on the management of NORM within Australia.[1] The 2005 NORM Discussion Paper provided a detailed overview of NORM and examined why NORM is different from other radioactive materials; discussed NORM commodities, international guidelines and regulatory issues, trade issues, Australian radiation protection regulations and guidelines; and issues and options for dealing with NORM waste.[2]

This updated Council consideration of NORM issues focusses on the developing approach to the management of NORM both internationally and in Australia.

The development of this advice has been difficult, reflecting the broad scope, complexities, multidisciplinary nature and ubiquitous nature of NORM. The Council recommends that the following recommendations be considered by ARPANSA, with the overall aim of improvements to national uniformity within Australia; and increasing Australia's influence, through ARPANSA, on the international policy setting and approach to NORM.

[1] *Naturally-Occurring Radioactive Material (NORM) in Australia: Issues for Discussion*; and Advice to the CEO of ARPANSA on NORM dated 28 September 2005, https://webarchive.nla.gov.au/awa/20161019064109/http://www.arpansa.gov.au///AboutUs/Committees/rhsac_stat.cfm

[2] Op. Cit., https://webarchive.nla.gov.au/awa/20161019045305/http://www.arpansa.gov.au//AboutUs/Committees/norm.cfm

Improved Australian input to International Guidance on NORM

- A significant part of Australia's economy is based on the export of raw materials and products. NORM is present in many of Australia's raw export commodities to a varying degree and it is therefore important to continue to ensure that Australia's position is represented in any international guidance on NORM.
- There is a large and increasing amount of international guidance on NORM, primarily from the International Atomic Energy Agency (**IAEA**)[3]. The International Commission for Radiological Protection (**ICRP**) has also provided guidance on radiological protection in industries involving NORM.[4] Recent IAEA documents cover such areas as: industry specific safety guides, residue management [4], occupational radiation protection[5] and the graded approach[6]. The IAEA general safety requirements related to radiation protection and radioactive waste management (e.g. IAEA GSR Part 3, SSR-5) also relate to NORM management. The IAEA has previously issued activity specific guidance on NORM in a series of Safety Reports[7,8,9,10,11]
- A part of the difficulty is that NORM is ubiquitous and is very broad in its characteristics (from bulk quantities of very low specific activity materials to lower volumes of higher specific activity material, surface contaminated materials, wastes and residues). Waste and residues are often managed and disposed at the site of origin. NORM can also be managed as either a "planned" or "existing" exposure situation. Therefore, standard advice and guidance is difficult to apply.
- A particular challenge revolves around the "graded approach" for the management and regulation of NORM. Establishing a consistent application for the graded approach is difficult for regulators, but necessary to ensure that "controls are commensurate with risk". In practice, applying the graded approach can vary from country to country.

Recommendation 1:

Australia, through ARPANSA, should continue to be actively involved in the international discussion and drafting of IAEA guidance documents in the area of NORM. Domestic stakeholders should be aware of international and Australian guidance; and be able to contribute to the development of NORM guidelines.

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[3] IAEA Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, GSR Part 3, 2014 [4] ICRP, 2019, *Radiological protection from naturally occurring radioactive material (NORM) in industrial processes*, ICRP Publication 142. Ann. ICRP 48(4).

[4] IAEA, Management of Radioactive Residues from Uranium Production Other NORM related Activities, SSG-60 (approved for publication and due 2020, DS459 is the available draft standard)

[5] IAEA, Safety Report on Occupational Radiation Protection in the Uranium Mining and Processing Industry, SR100 (2020)

[6] IAEA TECHDOC on the application of a graded approach to NORM residues, due for publication 2020.

[7] IAEA, Radiation protection and the management of radioactive waste in the oil and gas industry, Safety Reports Series No. 34. IAEA, Vienna (2003)

[8] IAEA, Radiation Protection and NORM Residue Management in the Zircon and Zirconia Industries. STI/PUB/1289, Safety Reports Series No. 51. IAEA, Vienna (2007)

[9] IAEA, Radiation Protection and NORM Residue Management in the Production of Rare Earths from Thorium Containing Minerals STI/PUB/1512, Safety Reports Series No.68. IAEA, Vienna (2011)

[10] IAEA, Radiation Protection and NORM Residue Management in the Titanium Dioxide and Related Industries. Safety Reports Series No. 76. IAEA, Vienna (2012)

[11] IAEA, Radiation Protection and Management of NORM Residues in the Phosphate Industry, STI/PUB/1582, Safety Reports Series No.78. IAEA, Vienna (2013)

Leadership of a Nationally Uniform Approach to NORM

- The legislative and regulatory approach to NORM in Australia is generally consistent across States and Territories. However, Council notes that there is an opportunity to improve the application of regulations for NORM in order to remove unnecessary confusion for both regulators and industry.
- ARPANSA's *RPS 15 Guide on Management of Naturally Occurring Radioactive Material*[12] and *RPS 9 Code of Practice for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing*[13]*,* have proved to be excellent practical documents for the management of NORM. Council notes that RPS 9 is being reviewed and advises that industry input to this review should occur. Use of these national standard documents, rather than separate state or territory guidance, will assist in a nationally uniform approach.
- The IAEA guidance of 1 Bq/g for NORM (total for U238 and Th232 in secular equilibrium) is usually regarded as the trigger level to commence consideration of regulation and to have specific controls in place for radiation protection. Despite the low risks, this has provided certainty for some industries, but has also caused concern for some parties whose material may not present a safety risk but is at, or above, the 1 Bq/g level. Above this trigger level, a nationally consistent application of the graded approach to regulation of NORM would benefit operators and regulators. IAEA GSR Part 3[14] provides a reference level of 1 mSv/y for NORM, and appropriate use of this reference level would provide for a more risk-based approach.
- Council notes that a nationally consistent approach provides international credibility, and assists with a single source of Australian input to International guidance as outlined above.
- A widespread concern is that facilities or operations in Australia with NORM above 1 Bq/g are currently being classified as "Nuclear Actions" under the *Environment Protection and Biodiversity Conservation Act* (1999) (**EPBC Act**). The Council notes that ARPANSA and other bodies including the South Australian government have addressed this in submissions to the EPBC Act review.[15] Council encourages ARPANSA to maintain proactive relationships with other Commonwealth bodies to ensure that radiological and nuclear matters continue to have significant ARPANSA input.

Recommendation 2:

ARPANSA to maintain a national leadership role on NORM to:

- ***Continue to align stakeholders to the nationally and internationally agreed positions; and***
- ***Engage with stakeholders, including industry and regulators, to identify a process to share information about international developments on NORM; and represent a clear and nationally uniform Australian position.***

[12] Safety Guide for the Management of Naturally Occurring Radioactive Material (NORM) (2008) *at https://www.arpansa.gov.au/regulation-and-licensing/regulatory-publications/radiation-protection-series/guides-andrecommendations/rps15*

[13] C*ode of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005) RPS9 at* https://www.arpansa.gov.au/regulation-and-licensing/regulatorypublications/radiation-protection-series/codes-and-standards/rps9

[14] Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014)

[15] Federal Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Review at https://epbcactreview.environment.gov.au/

Developing and Standardising a Graded Approach to Regulation of NORM

- The international system of radiation protection as adopted in Australia's system of radiation protection notes that "controls should be commensurate with the radiological risk". In practice, this manifests as the graded approach to regulation. This is generally recognised as good regulatory practice.

- However, in Australia (and as is generally the case for the rest of the world), NORM tends to be regulated once the material is defined as "radioactive", irrespective of the actual risk. The *National Directory for Radiation Protection (RPS 6)*[16] establishes the value of 1Bq/g as the concentration at which a material is defined as radioactive. In some State and Territory jurisdictions this is not the case.

- There are some examples when NORM is not managed in a risk-based way, which is sometimes due to regulatory systems of authorisation having a binary exclusion/exemption, or full licensing requirement. Additionally, there is discretion for regulators to consider the actual radiological risk of an operation and to regulate accordingly. Once material is defined as having NORM that requires regulation (for example above 1Bq/g), then in accordance with the "graded approach", the level of regulation should be commensurate with the radiological risk. In practice, this means that a facility with 2Bq/g should not be regulated in the same way as a facility with 100Bq/g.

- A graded approach, based on the actual and potential radiation dose rather than radiological status, would encourage NORM risks and controls to be placed into a more appropriate perspective with respect to other risks.

- There are a number of steps in addressing this issue:
    - Agree with industry and regulator stakeholders, the nature of the issues including specific examples where non-graded approaches have had adverse impacts;
    - Determine what approaches might address these issues, and how international guidance might be used to help this;
    - Propose and consult on regulatory guidance.

- For industries with NORM that already engage with radiation regulation, guidance may assist the effective and graded application of controls. However, some sectors are not aware of the presence or extent of NORM radiation impacts, either because they lack the expertise or because it is disregarded either intentionally or unintentionally, contributing to the lack of a uniform approach.

Recommendation 3:

ARPANSA to lead the development of regulatory guidance for a graded approach to radiological risks, based on existing published international guidance and Australian specific Codes of Practices and Guidelines, to ensure both the effective and efficient application of NORM regulation in Australia.

ARPANSA to work with key stakeholders on appropriate communication strategy to raise awareness and increase knowledge of NORM management both within 'engaged' industry that is aware of NORM risks and 'un-engaged' industry that has little or minimal knowledge of NORM risks.

[16] National Directory for Radiation Protection (RPS 6) at https://www.arpansa.gov.au/regulation-andlicensing/regulatory-publications/national-directory-for-radiation-protection

International Trade of Australian Products with NORM

- Denial of shipment and the embargo and return of NORM is reportedly a potentially significant international trade risk for Australian companies. Lack of knowledge, lack of expertise or disregarding the requirements are all possible causes. Council notes that ARPANSA could reach out to other government departments (such as Department of Foreign Affairs and Trade) to minimise such occurrences.

Recommendation 4:

Council recommends that ARPANSA explore ways in which ARPANSA can promote guidance to industry in the export and international trade of products affected by NORM issues; and provide expertise to other Federal Government departments (such as Department of Home Affairs and Department of Foreign Affairs and Trade) to reduce trade barriers to Australian companies.

Public communication

- Public concern with NORM is based on its classification as "radioactive" and therefore it is important that there is an authoritative source of publicly available information.

- As the trusted national authority for advice on radiation protection, ARPANSA is well-positioned to communicate to the public the facts, risks and benefits of NORM.

Recommendation 5:

ARPANSA should review its communications and information available to the public concerning NORM.

Yours sincerely

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Radiation Health and Safety Advisory Council