Australian Government
Australian Radiation Protection and Nuclear Safety Agency

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National Directory for Radiation Protection

An agreed framework for nationally consistent radiation protection regulation, policies and practices

Published by the Commonwealth on behalf of the Radiation Health Committee

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National Directory for Radiation Protection

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Acknowledgement of Country

ARPANSA proudly acknowledges Australia's Aboriginal and Torres Strait Islander community and their rich culture and pays respect to their Elders past and present. We acknowledge Aboriginal and Torres Strait Islander people as Australia's first peoples and as the Traditional Owners and custodians of the land and water on which we rely.

We recognise and value the ongoing contribution of Aboriginal and Torres Strait Islander people and communities to Australian life and how this enriches us. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

Foreword

The safe generation and use of radiation in regulated facilities and activities and protection of people and the environment from harmful effects of radiation, are governed by legislation that is specific to each of the nine Australian jurisdictions, i.e. different Acts and Regulations apply in the Commonwealth, the States and the Territories. The *National Directory for Radiation Protection* (the NDRP) has been developed to facilitate harmonised management of radiation risks across all jurisdictions, for the benefit of regulators, businesses, practitioners, educators, consumers and other stakeholders, and ultimately for the protection of people and the environment from the harmful effects of radiation.

The development and updating of the NDRP, as well as of the *Fundamentals*, *Codes* and *Guides* that constitute the national regulatory framework, is overseen by the members of the Radiation Health Committee, which is established under the *Australian Radiation Protection and Nuclear Safety Act 1998* for this and other purposes as set out in the Act. All jurisdictions are represented on the Committee by their radiation regulators.

The NDRP has served its users well since it was first endorsed by the Australian Health Ministers' Conference (now the COAG Health Council) in 2004. It has been amended several times to incorporate new and updated regulatory elements as they have been developed and agreed. The most recent amendment, No. 7, was published in March 2017. However, the Committee agreed in 2017 that a more thorough revision was timely, which should aim at improving the structure, clarity and readability in addition to incorporating updated regulatory elements. Because this is a revision rather than a continuation of the amendments, the Committee agreed that the revised NDRP should be referred to as the ***National Directory for Radiation Protection,* 2nd Edition**. Importantly, however, the scope and purpose remain unchanged and are captured in the sub-title; "*an agreed framework for nationally consistent radiation protection regulation, policies and practices*".

We are convinced that the 2nd Edition of the NDRP will provide a clear picture of the nationally agreed regulatory framework for managing radiation risks, which will effectively serve all stakeholders.

On behalf of the Radiation Health Committee, we commend the 2nd Edition of the NDRP to all its users.

Hobart, July 2018

Dr Roslyn Drummond

Chair, Radiation Health Committee

Dr Carl-Magnus Larsson

CEO of ARPANSA

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1. Introduction

1.1 Citation

1.1.1 This publication may be cited as the *National Directory for Radiation Protection (2019).*

1.2 Background

1.2.1 The Australian Health Ministers' Conference (now COAG Health Council) endorsed the development of the *National Directory for Radiation Protection* (the NDRP) in August 1999 as the means of achieving uniformity in radiation protection practices among jurisdictions. Ministers agreed that upon approval of the provisions of the NDRP, the regulatory elements of the NDRP shall be adopted in each jurisdiction as soon as possible, within their respective regulatory frameworks. Ministers recognised that as a variety of agencies have a legislated responsibility for aspects of radiation safety (e.g. mines, occupational health and safety and transport agencies) in many jurisdictions, these other agencies were to be involved in measures to progress national uniformity.

1.2.2 Ministers endorsed the 1st edition of the NDRP on 29 July 2004, noting that further cost-benefit analysis was being undertaken. This was completed during 2005 and in January 2006 Ministers agreed that the additional cost-benefit analysis met the requirements of all jurisdictions. Following its publication in August 2004, the NDRP was amended seven times between December 2009 and June 2017 to update its provisions and incorporate more national codes and standards by reference, as they were finalised and endorsed.

1.3 Purpose

1.3.1 Jurisdictions have agreed that the aim of this 2nd edition of the NDRP is to:

a) provide a national framework for management of **radiation risks** to people and to the environment

b) provide a seamless regulatory framework for the safe use of radiation across the Commonwealth, States and Territories

c) facilitate the application of the *Mutual Recognition Act 1992*.

1.4 Scope

1.4.1 Jurisdictions have agreed:

a) to implement the above-mentioned framework and to work towards a nationally consistent approach to manage risks from **ionising radiation** and **non-ionising radiation**

b) that the framework will be used by all sectors involved in implementing controls related to radiation risks, including but not limited to mining, mineral processing and occupational health and safety.

1.5 Interpretation

1.5.1 The meanings of terms used in the NDRP are those explained in the Glossary. Where a word or phrase is explained in the Glossary, it will appear in bold style font at the first mention in the body of the NDRP.

1.5.2 The word 'must' in the NDRP indicates that the requirement is mandatory and the word 'should' indicates a recommendation or guidance on how to implement a requirement aimed at reducing the radiation risk. It should be noted that management of radiation risks involves safety measures that encompass radiation safety, nuclear safety, transport safety, waste safety and measures directed at managing safety during an emergency. It also includes measures directed at security, e.g. preventing unauthorised or malicious use of radiation.

1.5.3 The term safety, when used in this NDRP, includes all aspects of safety referred to above, as well as security, for the purpose of protection of people and the environment from radiation risks, unless specific mention is made of a particular measure.

1.6 Structure

1.6.1 Part A of the NDRP details the overall framework for radiation protection in Australia that all jurisdictions have agreed to implement via their **legislation**.

1.6.2 Part B contains the regulatory elements that each jurisdiction has agreed to implement within its regulatory framework and through its regulatory decisions.

1.6.3 Schedules to the NDRP provide further details of the agreed requirements, and associated information that form an integral part of the regulatory elements agreed by the jurisdictions.

1.6.4 Annexes to the NDRP are for information only.

1.7 Process to amend the NDRP

1.7.1 Jurisdictions have agreed that the process to amend the NDRP shall be in accordance with paragraphs 1.7.2 to 1.7.8 below.

1.7.2 A proposal to amend the NDRP may be made to the RHC by any person. The RHC must consider all proposals to amend the NDRP and either agree or refuse to pursue the proposal. If the RHC decides to refuse to pursue the proposal, it must advise the proponent of the reasons for the decision.

1.7.3 Many types of issues may be the subject of proposals. Some will be based on risk assessments or advice on actions to mitigate radiation risks. Others will be 'regulatory' in nature, such as reaching an agreed position on criteria for **registration** of apparatus or the incorporation by reference of a Code, including international requirements[1].

[1] International requirements is a broad term and includes, but is not limited to, the safety standards and nuclear security guidance issued by the International Atomic Energy Agency (IAEA), and the Recommendations of the International Commissions on Radiological Protection (ICRP) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

1.7.4 The RHC will form a working group to prepare the proposed amendment and to assess its impact. Composition of the working group will depend on the issue at hand. The working group will typically comprise:

a) a project sponsor, who will be an RHC member

b) a project manager

c) one or more RHC members and/or representatives from appropriate stakeholders such as industry, professional groups, academia, or Commonwealth or state/territory agencies

d) a secretary/technical support officer from ARPANSA or one of the State or Territory regulators.

1.7.5 While the formation of each working group will be issue-specific, it is anticipated that each group will require both scientific and regulatory/policy expertise.

1.7.6 As the RHC is considered to be a standard-setting body under the Council of Australian Governments (COAG) *Best Practice Regulation: A Guide for Ministerial Councils and National Standard Setting Bodies (2007)* (COAG Guidelines)[2], a Preliminary Assessment of the proposal must be completed in accordance with the requirements of the Commonwealth Office of Best Practice Regulation (OBPR), which includes consultation with all relevant stakeholders. Based on the Preliminary Assessment, the OBPR may require the preparation of a Regulatory Impact Statement (RIS) in accordance with the requirements in the COAG Guidelines.

1.7.7 A Preliminary Assessment or a RIS must satisfy the requirements of the OBPR and the requirements for regulatory impact assessment in each State and Territory.

1.7.8 Proposals to amend Schedule 11 of this NDRP (national adoption of codes) will not require a preliminary assessment or a RIS as that would have been done as part of the preparation of the code.

1.8 Authority to approve amendments to the NDRP

1.8.1 For amendments to Part B, the Schedules, and Annexes, the RHC will be the approving authority. RHC members should obtain the required level of authority from within each member's jurisdiction. For an amendment to be approved, 10 out of 13 RHC members must agree. Where an approval is not unanimous, the NDRP will reflect that.

1.8.2 Any amendment to Part A will, in addition, require the approval of the Australian Health Ministers' Advisory Council (AHMAC) or, if recommended by AHMAC, the approval of the COAG Health Council.

[2] The COAG Guidelines apply to Ministerial Councils and standard-setting bodies (e.g. the RHC). The COAG Guidelines state that the OBPR will provide advice and assistance on regulation impact assessment, the preparation of Regulatory Impact Statements for Ministerial Councils, and monitor and report on compliance with the COAG Guidelines. COAG acknowledges that although a large quantity of guidance material on best practice regulation exists at the jurisdictional level, in the case of Ministerial Councils, the COAG Guidelines should act as the primary source of direction.

1.9 Implementation and review

1.9.1 Jurisdictions have agreed that they will:

a) implement the NDRP in a uniform or consistent manner so that businesses and individuals will not have to face different licensing or safety requirements in each jurisdiction

b) peer review each other in accordance with a program of review determined by the RHC, in order to verify compliance with the NDRP.

1.9.2 Jurisdictions have agreed that the NDRP will be reviewed once every five years to ensure it continues to serve its purpose and substantially reflects world best practice.

PART A – Legal framework

2. Legal frameworks for radiation protection

2.1 Objective of radiation protection legislation

2.1.1 Jurisdictions have agreed that radiation protection legislation will include the objective of protecting the health and safety of people and the environment from the harmful effects of ionising and non-ionising radiation.

2.2 Principles for regulatory frameworks

2.2.1 Jurisdictions have agreed to incorporate the following elements in their regulatory frameworks:

a) A '**responsible person**' will be primarily responsible for the management of radiation risks and will be required to make **notifications**, or gain approvals and **authorisations** from regulators, before conducting a practice. These authorisations include registrations, **licences** or **accreditations**.

b) Effective powers for regulators to enforce requirements placed on responsible persons.

c) Adequate controls to address public, occupational, and medical exposure.

d) The **justification**, **optimisation** and **limitation** principles for ionising radiation (see *Fundamentals for Protection against Ionising Radiation*, ARPANSA Radiation Protection Series F-1) and non-ionising radiation (see Schedule 1 for applicable dose limits and dose coefficients).

e) Appropriate actions to be taken to deal with **existing exposure situations** and **emergency exposure situations** (see Schedule 1 for applicable **reference levels)**.

f) A graded approach whereby 'the stringency of the control measures and conditions to be applied is commensurate, to the extent practicable, with the likelihood and possible consequences of, and the level of risk associated with, a loss of control'[3]. Note that the graded approach is applied to the controls and does not imply a relaxation of the level of protection.

g) Requirements for engineered controls to restrict radiation levels and intake of **radioactive materials**.

h) Appropriate **protection of the environment**.

i) Requirements for responsible persons to establish a management system that promotes:

   i. a culture of safety

   ii. quality

   iii. the reduction of the probability of human error that could lead to **accidents**

   iv. making appropriate training and information available to staff

[3] IAEA Safety Glossary, 2016 Revision, June 2016, p. 75

v. the allocation of sufficient resources to enable safety and security of **radiation sources** over their lifetime (including **disposal**)

vi. the provision of necessary qualified expertise to observe the requirements

vii. processes for the verification of safety and security through **safety assessments**

viii. the maintenance of appropriate records

ix. the establishment of appropriate means of informing and consulting interested parties and the public about the possible radiation risks associated with facilities and activities, and about the processes and decisions of the regulatory body, commensurate with a graded approach.

2.3 Powers and functions to be conferred by legislation

2.3.1 Jurisdictions have agreed that legislation will:

a) establish a regulatory body (the Authority), that is accountable to a Minister of the Crown and through that Minister to the Parliament, to administer the radiation control legislation in the jurisdiction[4]

b) provide for the Authority to be effectively independent in its safety related decision making and functionally separate from entities having responsibilities or interests that could unduly influence its decision making[5]

c) prohibit any dealing with a radiation source without the appropriate authorisation

d) bind the Crown and, where appropriate, provide the following powers or functions to the Authority:

i. To advise the Minister on issues related to radiation risks and the management of such risks.

ii. To establish an advisory body to provide the Authority and the Minister with policy and technical advice and advice on risk assessments.

iii. To set standards for the management of radiation risks.

iv. To assess applications for authorisations against criteria specified in legislation.

v. To grant, refuse, vary, revoke or suspend authorisations, and to impose conditions on these;

vi. To grant authorisations under a staged approval process, as appropriate or necessary, taking into account a graded approach, for the preparation of a site for, possession or control of, construction, operation, **decommissioning** or disposal.

vii. To grant **exemptions** from regulatory requirements or to **exclude** certain radionuclides or types of radiation from regulatory control.

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4 A jurisdiction may have more than one Authority to regulate different aspects of radiation protection.

5 'Effectively independent' does not mean that the Authority needs to be a separate statutory authority, but that there should be arrangements to ensure that judgements may be made, and enforcement action taken, without undue pressure from interests that may compete with safety.

viii. To ensure a system of periodic inspections, documentation and reporting to verify compliance with regulatory requirements.

ix. To enforce compliance with regulatory requirements.

x. To require safety assessments and environmental assessments, where appropriate.

xi. To accredit persons or classes of persons to assess compliance with the requirements of the legislation, and to set the conditions to which they should be subject.

xii. To control radioactive material, and ionising and **non-ionising radiation apparatus.**

xiii. To maintain currency of a register of radiation sources.

xiv. To require authorised parties to establish records of radiation doses incurred by staff, and, if relevant, assess and maintain records of doses to the general public.

xv. To plan for, and provide advice in the case of an emergency with radiological implications.

xvi. To require notification of **radiation incidents** to the Authority, investigate radiation incidents, and notify all jurisdictions, as appropriate.

xvii. To promote or conduct studies, investigations and research associated with radiation protection and nuclear safety, including public health and safety and environmental considerations.

xviii. To carry out public consultation in relation to the establishment of certain facilities and activities as identified in legislation.

xix. To prepare an annual report for tabling before the Parliament.

2.4 Activities to which legislation will apply

2.4.1 Jurisdictions have agreed that legislation will apply to at least the following activities:

a) The manufacturing or possession of radiation sources.

b) The use of radiation or radioactive materials for any **radiation practice** which involves or could involve exposure to radiation or radioactive materials. This includes medical (diagnostic and therapeutic), dental, chiropractic, industrial, veterinary and agricultural purposes. It also includes the use of radiation or radioactive materials in nuclear activities, consumer products, education, training, research, and the servicing or maintenance of **radiation apparatus** or **sealed source** apparatus.

c) Practices involving exposure to natural sources and exposures from past practices specified by the Authority as requiring control.

d) Practices dealing with radioactive material arising from exploration, mining, mineral processing or petroleum industries.

e) Practices involving radioactive waste management and the disposal of radioactive material.

f) Practices involving non-ionising radiation apparatus.[6]

[6] All Australian jurisdictions have the power to regulate non-ionising radiation sources. The Commonwealth, Queensland, Western Australia, and Tasmania currently regulate certain non-ionising radiation equipment.

g) The sale or transfer of responsibility of radiation sources and apparatus.

h) The transport of radioactive material.

i) Any other radiation practice specified by the Authority.

2.5 Categories of authorisation

2.5.1 Jurisdictions have agreed that legislation will, as appropriate or necessary, provide for different types of authorisations to regulate dealings with radiation sources. The holding of the relevant authorisation will be a mandatory condition of engaging in a particular dealing, unless exemptions or exclusions apply.

2.5.2 Examples of different types of authorisations are:

a) authorisation to possess, which must be obtained by a responsible person who wishes to possess a radiation source, or otherwise be in control of a radiation source (including transport), or be responsible for a practice

b) authorisation to use, which must be obtained by a natural person who wishes to use a radiation source for a particular purpose, and who is not otherwise authorised to use the source

c) authorisation for other dealings, which must be obtained by a responsible person for dealings such as preparation of a site, construction, possession or control, operation, decommissioning, disposal of radioactive waste from the decommissioning of nuclear and radiation facilities, and abandonment of a site after completion of decommissioning and, as required, remedial actions.

2.6 Refusal to grant an authorisation

2.6.1 Jurisdictions have agreed that an Authority will have the power to refuse to grant an authorisation if:

a) the applicant is not a fit and proper person,

b) it is necessary to do so in the interests of public or environmental health and safety, or

c) the proposed use of radiation is inappropriate or unjustified.

2.7 Suspension, variation or cancellation of an authorisation

2.7.1 Jurisdictions have agreed that an Authority will have the power to suspend, vary or cancel an authorisation if there is evidence to suggest that:

a) the authorisation was obtained improperly

b) the holder of an authorisation has contravened a condition of the authorisation

c) the holder of an authorisation has been convicted of an offence against the legislation, under which the authorisation was granted, or other relevant legislation

d) unless the authorisation is suspended, varied or cancelled there would be a risk to the health and safety of people or to the environment

e) unless the authorisation is suspended, varied or cancelled there would be security risk from access to the radioactive source

f) the holder has ceased to hold a qualification or meet other criteria, which formed the basis on which the authorisation was granted

g) the holder of an authorisation has consistently made decisions that compromised radiation safety

h) the holder of an accreditation has ceased working in a capacity for which accreditation is required.

2.7.2 Jurisdictions have agreed that where an Authority suspends, varies or cancels an authorisation, it will, as soon as practicable, advise all other relevant Authorities within and outside of its jurisdiction of that decision.

2.8 Mutual recognition

2.8.1 In May 1992 all Australian jurisdictions reached an agreement relating to mutual recognition of goods and occupations in order to promote the goal of freedom of movement of goods and service providers in a national market in Australia. The *Mutual Recognition Act 1992*, which was enacted in identical terms in all jurisdictions, gives effect to that agreement. (For more details see www.licencerecognition.gov.au)

2.8.2 Under the Act's provisions for the mutual recognition of occupations, a person licensed to practise an occupation in one participating jurisdiction can practise an equivalent occupation in another jurisdiction, without the need to undergo further testing or examination. This is not an automatic process. An individual must apply for recognition of an existing licence and pay any applicable fee.

2.8.3 Equivalency is based on whether or not the activities authorised to be carried out under the original occupational licence are substantially the same as those under an occupational licence in the jurisdiction where mutual recognition is sought.

PART B – Regulatory elements

3. Exclusions, exemptions and clearance

3.1 Exclusions

3.1.1 Jurisdictions have agreed that the following exposures whose magnitude or likelihood is essentially not amenable to control through legislation are excluded from regulation[7]:

a) K-40 in the body

b) cosmic radiation at the surface of the earth

c) unmodified concentrations of radionuclides in most raw materials, unless otherwise specifically identified in the NDRP.

3.2 Exemptions and clearance

3.2.1 Jurisdictions have agreed that:

a) The Authority will determine which practices or sources within practices are to be exempted from authorisations using as the basis for this determination the criteria for exemption specified in Schedule 4 or exemption levels specified by the Authority on the basis of these criteria. The Authority may either exempt practices or sources on a case by case basis or the Authority may prescribe activity levels or activity concentration levels below which practices or sources will be exempt from the need to be authorised. Exemptions will not be granted for practices deemed to be not justified.[8]

b) The Authority will determine which sources, including materials and objects, within authorised practices may be cleared from regulatory control, using as the basis for such determination the criteria for **clearance** specified in Schedule 4 or **clearance levels** specified by the Authority on the basis of these criteria. The Authority may clear sources on a case by case basis or the Authority may prescribe clearance levels below which sources may be cleared without the need for approval. The Authority will ensure that sources that have been cleared from regulatory control do not again become subject to the requirements for authorisation unless it so specifies.[9]

c) A radiation apparatus or radioactive source listed in Schedule 5 will be exempted from notification, registration or licensing requirements.

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7 For normal exposure situations, the concept of exclusion usually applies to exposures from materials containing radionuclides of natural origin, where the concentration of each radionuclide is below 1 Bq/g. Typically, 'most raw materials' would include raw materials, except for uranium, which is mined to recover radionuclides; mineral sands, which have radionuclide content high enough to warrant a regulatory approach; and other materials specifically identified in the NDRP.

8 Based on paragraphs 3.10 and 3.11 of Requirement 8 of IAEA General Safety Requirement (GSR) Part 3: *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*.

9 Based on paragraph 3.12 of Requirement 8 of IAEA GSR Part 3

3.3 Prohibition

3.3.1 Jurisdictions have agreed that commercial tanning using **tanning units** will be prohibited.

4. Authorisation

4.1 Authorisations to possess, use or to otherwise deal with

4.1.1 Jurisdictions have agreed that a responsible person seeking to possess, use or otherwise deal with a radiation source for a specific purpose will be required to hold an authorisation issued by the Authority.[10]

4.2 Requirements for authorisations

4.2.1 Requirements for authorisations are published by each jurisdictions. These are not nationally uniform but there are similarities. The links to the website of each jurisdiction that specifies the requirements are at Annex 1.

4.3 Services for rural and remote areas

4.3.1 Jurisdictions have agreed that a natural person may be granted permission to undertake a restricted range of health-related diagnostic X-ray services without meeting the Authority's competency requirements for a radiographer if:

a) the person has undertaken training accredited by the Authority for the purpose

b) appropriate conditions and restrictions are placed on the authorisation in regard to the services permitted to be provided.

5. Registration

5.1 Requirement to register

5.1.1 Jurisdictions have agreed that all non-exempt apparatus, sources and premises will be accounted for in a system of registration. The categories to which a system of registration will apply are:

a) sealed sources, **sealed source apparatus**, radiation apparatus, non-ionising radiation apparatus, and the premises or facilities on which these radiation sources and apparatus are secured, stored, used or manufactured, or disposed of.

b) premises at which unsealed radioactive sources are stored or used, and

c) in the case of radiation sources that are intended for portable or field use, the sources and the principal place of storage.

[10] Obligations on holders of such authorisations are available in the *Code for Radiation Protection in **Planned Exposure Situations***, Radiation Protection Series C-1 (ARPANSA 2016)

6. Accreditation

6.1 Accreditation of third party service providers

6.1.1 Paragraph 2.3.1(d)(xi) above provides that an Authority may "accredit persons or classes or persons to assess compliance with the requirements of the legislation, and set the conditions to which they should be subject". Annex 2 lists the links to websites that provide information on existing accreditation systems for third party service providers in each jurisdiction.

7. Codes

7.1 National adoption of codes

7.1.1 Jurisdictions have agreed that Authorities will adopt the Radiation Protection Series (RPS) and Radiation Health Series (RHS) publications listed in Schedule 11.

8. National radiation incident reporting framework

8.1 Australian Radiation Incident Register

8.1.1 Jurisdictions have agreed that Authorities will report radiation incidents of the types described in Schedule 13 to ARPANSA for inclusion in the Australian Radiation Incident Register.

Schedule 1 – Dose limits, dose coefficients and reference levels

(*Refer to paragraphs 2.2.1(d) and (e)*)

The table below lists the publications that provide the applicable dose limits, dose coefficients and reference levels.

	Dose limits, dose coefficients, reference levels	Publications
1.	Dose limits for occupationally exposed persons for ionising radiation	Schedule A to the *Code for Radiation Protection in Planned Exposure Situations*, Radiation Protection Series C-1 (2016) (Planned Exposure Code) **Note**: 1. Persons between the ages of 16 and 18 will be treated as adults for dose limitation purposes (see page 23 of the Planned Exposure Code) 2. Under paragraph 3.1.14 of the Planned Exposure Code, a Responsible Person must not employ a person under the age of 16 under conditions where that person may be exposed to radiation exceeding the effective dose limit for members of the public
2.	Dose limits for members of the public for ionising radiation	Schedule B to the *Code for Radiation Protection in Planned Exposure Situations*, Radiation Protection Series C-1 (2016)
3.	Reference levels for existing exposure situations	See Annex A to *Guide for Radiation Protection in Existing Exposure Situations*, Radiation Protection Series G-2 (2017)
4.	Reference levels for emergency exposure situations	See section 2.5.1 and Table A.1 of *Guide for Radiation Protection in Emergency Exposure Situations: Part 1 – The Framework*, Radiation Protection Series G-3 (20XX)
5.	Dose coefficients	International Commission for Radiation Protection (ICRP) Publications 88, 95, 116, 119, 130, 134, 136 , and 137 (see the most recent publications). U.S. EPA federal guidance report number 12

ARPANSA Codes and Guides: see https://www.arpansa.gov.au/regulation-and-licensing/regulatory-publications/radiation-protection-series

ICRP publications: see http://www.icrp.org/publications.asp

US EPA publication: see https://www.epa.gov/radiation/federal-guidance-report-no-12-external-exposure-radionuclides-air-water-and-soil

Schedule 2 – *Intentionally blank*

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Schedule 3 – *Intentionally blank*

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Schedule 4 – Exemption and clearance levels

(*Refer to paragraphs 3.2.1(a) and (b)*)

Exemptions and clearance levels are those that are listed in Schedule I (Exemption and clearance) of the IAEA General Safety Requirement No. GSR Part 3: *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*, including Tables I.1, I.2 and I.3

GSR Part 3 may be downloaded from http://www-ns.iaea.org/standards/

Schedule 5 – Exempt radiation generating apparatus, electron tubes and radioactive sources

(*Refer to paragraph 3.2.1(c)*)

1. The apparatus listed below are exempt from authorisation requirements.
   a) visual display units
   b) cold cathode gas discharge tubes
   c) electron microscopes
   d) A radiation generator or electronic tube, provided that in normal operating conditions it does not cause an ambient dose equivalent rate or a directional dose equivalent rate, as appropriate, exceeding 1 µSv h^{-1} at a distance of 0.1 m from any **accessible surface** of the apparatus, and the maximum energy of the radiation produced is no greater than 5 keV.
2. The radioactive sources listed below are exempt from authorisation or registration requirements. Note, however, that provisions requiring authorisation prior to disposal of these sources may apply, unless the disposal is in accordance with the *Code for the Disposal of Radioactive Waste by the User* (RPS C-5):
   a) Americium-241 sealed sources of activity up to 40 kBq used in domestic smoke alarms meeting the requirements of AS3786:2014
   b) depleted uranium in solid massive form

      Note: depleted uranium is subject to permit requirements of the Australian Safeguards and Non-proliferation Office (ASNO)
   c) a gaseous tritium light source that is solely used for safety purposes and includes less than 74 GBq of tritium
   d) a sealed radioactive source used for teaching the characteristics and properties of radiation or radiation sources and containing a radionuclide listed in the Table below, with an activity not greater than that listed in the table

Radionuclide	Activity (kBq)
Cobalt-60	200
Strontium-90	80
Caesium-137	200
Radium-226	20
Americium-241	40

   e) a geological sample that contains radioactive material, if:
      i. it emits radiation at a level not more than 5 micrograys an hour, measured at a distance of 10 cm from its surface
      ii. it is being used as a sample in teaching or for display as a geological specimen
   f) an electron capture detector or similar device used in gas chromatography containing a nickel-63 sealed source with activity not more than 750 MBq, or tritium source with activity not more than 20 GBq
   g) lighting products that include krypton-85.

Schedules 6 to 10 – *Intentionally blank*

These schedules have been left intentionally blank to ensure that the schedule numbering from the 1st edition of the NDRP is not disrupted.

Schedule 11 – National adoption of codes

(*Refer to paragraph 7.1.1*)

The publications listed below are available at https://www.arpansa.gov.au/regulation-and-licensing/regulatory-publications

	Reference	Title
1.	RPS C-1	Code for Radiation Protection in Planned Exposure Situations (2016)
2.	RPS C-2	Code for the Safe Transport of Radioactive Material (2014)
3.	RPS 3	Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz, (2002).
4.	RPS 5	Code of Practice and Safety Guide for Portable Density/Moisture Gauges containing Radioactive Sources (2004)
5.	RPS 8	Code of Practice for the Exposure of Humans to Ionizing Radiation for Research Purposes (2005)
6.	RPS 9	Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005)
7.	RPS 10	Code of Practice and Safety Guide for Radiation Protection in Dentistry (2005)
8.	RPS 11	Code of Practice for the Security of Radioactive Sources 2007
9.	RPS 12	Radiation Protection Standard for Occupational Exposure to Ultraviolet Radiation (2006)
10.	RPS 13	Code of Practice and Safety Guide for Safe Use of Fixed Radiation Gauges (2007)
11.	RPS 14	Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2008)
12.	RPS 17	Code of Practice and Safety Guide for Radiation Protection in Veterinary Medicine, ARPANSA (2009)
13.	RPS 19	Code of Practice for Radiation Protection in the Application of Ionizing Radiation by Chiropractors (2009)
14.	RHS 9	Code of Practice for Protection Against Ionizing Radiation Emitted from X-ray Analysis Equipment (1984)
15.	RHS 21	Revised Statement on Cabinet X-ray Equipment for Examination of Letters, Packages, Baggage, Freight and Other Articles for Security, Quality Control and Other Purposes (1987)
16.	RHS 22	Statement on Enclosed X-ray Equipment for Special Applications (1987)
17.	RHS 24	Code of Practice for the Design of and Safe Operation of Non-medical Irradiation Facilities (1988)

	Reference	Title
18.	RHS 28	Code of Practice for the Safe Use of Sealed Radioactive Sources in Borehole Logging (1989)
19.	RHS 31	Code of Practice for the Safe Use of Industrial Radiography Equipment (1989)
20.	RHS 35	Code of Practice for the Near-Surface Disposal of Radioactive Waste in Australia (1992)

Schedule 12 – *Intentionally blank*

This schedule has been left intentionally blank to ensure that the schedule numbering from the 1st edition of the NDRP is not disrupted.

Schedule 13 – National radiation incident reporting framework

(*Refer to paragraph 8.1.1*)

This schedule specifies the types of incidents that must be reported to ARPANSA for compilation in the Australian Radiation Incident Register (ARIR).

A radiation incident is any unintended or ill-advised event when using **ionising radiation apparatus**, specified types of non-ionising radiation apparatus or radioactive substances, which results in, or has the potential to result in, an exposure to radiation to any person or the environment, outside the range of that normally expected for a particular practice, including events resulting from operator error, equipment failure, or the failure of management systems that warranted investigation.

As expected by section 2.3.1(d)(xvi), legislation in each jurisdiction must require notification of radiation incidents to the Authority. The Authority must provide information on radiation incidents of the following types to ARPANSA for inclusion in the ARIR. In some cases judgements will need to be made by the Authority in regard to whether an incident is too minor for reporting to the register.

1. Medical exposure of patients

(a) any diagnostic procedure other than as prescribed by the medical practitioner

(b) any diagnostic procedure resulting in an observable acute radiation effect

(c) any therapeutic treatment delivered to either the wrong patient or the wrong tissue, or using the wrong radiopharmaceutical

(d) when during the administration of a radioactive substance for diagnostic purposes, the activity of the substance administered exceeds the activity prescribed in the hospital/radiation practice standard protocol for that test by 50% or more

(e) when during the administration of a radioactive substance for therapeutic purposes, the activity administered differs from that prescribed by 15% or more

(f) when during administration of a therapeutic dose of radiation from a radiation apparatus or a sealed radioactive source, the dose delivered differs from the total prescribed treatment dose by more than 10%.

2. Incidents that cause or may lead to radiation injuries or radiation doses exceeding the annual dose limits to workers or members of the public[11]

3. Lost or stolen radioactive sources or radiation apparatus

4. Transport of radioactive material

(a) where a package is damaged during freight handling or transport

(b) where a package is transported without the required documentation, placarding or labelling.

[11] Note that situations where radiation injuries or high doses [exceeding 0.25 Sv whole body, 0.75 Gy organ dose, 6 Gy skin dose] occur must be reported to the ARIR as soon as possible, and within 24 hours. ARPANSA will report incidents exceeding these doses to the IAEA for inclusion on their severe incidents database.

5. Unintentional or unauthorised discharges of radioactive materials into the environment[12]

Where unintentional or unauthorised activity discharges exceeding 100 times the exempt activity for the radionuclide specified in Schedule 4 have occurred.

6. Damage to, or malfunctioning of, a radiation apparatus or sealed source apparatus

Where the damage or malfunction could in any way affect the radiation safety of the apparatus, including issues such as shielding integrity or causing increased radiation levels.

7. Contamination with, or dispersal of, a radioactive material

Where a surface, substance or material is contaminated by a radioactive substance resulting from the spillage of more than 100 times the exempt activity of that substance specified in Schedule 4.

8. Out of control source of radiation

Where a radiation source is out of control, for example, where a source is not safely secured or shielded, or contamination is not confined.

9. Non-ionising radiation

Where there is actual injury, or the potential for injury, as a result of operator error, damage or malfunction of equipment, or failure of management systems, for the types of non-ionising radiation equipment specified below:

(i) lasers

(ii) radiofrequency generating equipment

(iii) man-made sources of ultraviolet radiation

(iv) magnetic resonance imaging machines

(v) Intense pulse light equipment.

10. Nuclear Incidents

Where events such as criticality incidents or those relating to the safety of a **nuclear installation** occur.

11. Other incidents

Such incidents that the Authority must report include near-miss situations that may serve as a warning to other users, such as situations where radiation monitors at the entrance of scrap metal processing factories and landfill sites are triggered.

[12] This provision does not apply to mining.

Annex 1 – Requirements for authorisation to use radioactive sources

(*Refer to paragraph 4.2.1*)

New South Wales	https://www.epa.nsw.gov.au/your-environment/radiation/radiation-user-licence/user-licence-introduction/user-licence-criteria
Victoria	https://www2.health.vic.gov.au/public-health/radiation/
Queensland	https://www.health.qld.gov.au/radiationhealth
Western Australia	http://www.radiologicalcouncil.wa.gov.au/pages/Licensing.html
Tasmania	https://www.dhhs.tas.gov.au/publichealth/radiation/radiation_protection_in_tasmania
Australian Capital Territory	http://www.health.act.gov.au/public-information/businesses/radiation-safety/licence-prerequisites
Northern Territory	https://health.nt.gov.au/professionals/environmental-health/radiation-protection
ARPANSA	https://www.arpansa.gov.au/regulation-and-licensing/licensing Note that ARPANSA source and facility licences are issued to Commonwealth entities. ARPANSA does not currently issue authorisations to natural persons.
South Australia	http://www.epa.sa.gov.au/business_and_industry/radiation

Annex 2 – Current accreditation systems in Australian jurisdictions

(*Refer to paragraph 6.1.1*)

Australian Capital Territory

Available on application to the ACT Health Protection Service (see http://www.health.act.gov.au/public-information/businesses/radiation-safety)

Commonwealth

Security of radioactive material: https://www.arpansa.gov.au/regulation-and-licensing/safety-security-transport/security-of-sources)

New South Wales

Source compliance testing: https://www.epa.nsw.gov.au/your-environment/radiation/accreditation-of-cres

Security of radioactive material: http://www.epa.nsw.gov.au/your-environment/radiation/sealed-radioactive-sources/security-of-sealed-radioactive-sources/security-assessors

Northern Territory

Source compliance testing https://health.nt.gov.au/professionals/environmental-health/radiation-protection

Queensland

Source compliance testing: https://www.health.qld.gov.au/radiationhealth/certification/accreditation

South Australia

Source compliance testing:
http://www.epa.sa.gov.au/business_and_industry/radiation/third_party_certification

Tasmania

Source compliance testing:
http://www.dhhs.tas.gov.au/publichealth/radiation/publications2/application_forms

Victoria

Source compliance testing: http://122.252.13.117/environment/approved_testers.asp

Security of radioactive material: https://www2.health.vic.gov.au/public-health/radiation/licensing/assessment-security-plans/approved-assessors

Western Australia

Source compliance testing: http://www.radiologicalcouncil.wa.gov.au/index.html

Glossary of terms

Absorbed dose	The energy absorbed per unit mass by matter (e.g., tissue) from ionising radiation that impinges upon it. The SI unit for absorbed dose is joule per kilogram (J/kg), termed the *gray* (Gy).
Accessible surface	The surface of the apparatus to which human access is possible without the use of tools or without penetration of any radiation shield.
Accident	Any unintended event, including operating errors, equipment failures and other mishaps, the consequences or potential consequences of which are not negligible from the point of view of protection and safety.
Accreditation	An authorisation by the Authority given to a person for that person to provide specified radiation protection services.
Authorisation	A written permission granted by the Authority to a person to perform specified practices or activities. The form of an authorisation can include a licence, registration, or accreditation.
Clearance	Removal of regulatory control by the Authority from radioactive material or radioactive objects within notified or authorised facilities and activities. (From page 22 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Clearance level	A value, established by the relevant regulatory authority and expressed in terms of activity concentration, at or below which regulatory control may be removed from a source of radiation within a notified or authorised practice.
Committed effective dose	The effective dose that a person is committed to receive following the intake of radioactive material. This dose can be calculated over any time period. Typically the time period is 50 years after intake for adults and to age 70 for children.
Committed equivalent dose	The equivalent dose that a person is committed to receive following the intake of radioactive material. This dose can be calculated over any time period. Typically the time period is 50 years after intake for adults and to age 70 for children.
Decommissioning	Administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility (other than a disposal facility) (See also page 34 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Dose coefficient	Primarily describes the dose per unit intake, but is also used to describe other coefficients linking quantities or concentrations of activity to doses or dose rates, such as the external dose rate at a specified distance above a contaminated surface.
Dose per unit intake	The committed effective dose or the committed equivalent dose resulting from intake, by a specified means (usually ingestion or inhalation), of unit activity of a specified radionuclide in a specified chemical form.

	(From page 46 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Dose constraint	A prospective and source related value of individual dose that is used in planned exposure situations as a parameter for the optimisation of protection and safety for the source, and that serves as a boundary in defining the range of options in optimisation. (See also page 45 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Disposal	Emplacement of waste in an appropriate facility without the intention of retrieval. (See also page 41 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Effective dose	A measure of dose that takes into account both the type of radiation involved and the radiological sensitivities of the organs and tissues irradiated. It is the quantity obtained by multiplying the equivalent dose to various tissues and organs by a weighting factor appropriate to each and summing the products. (The SI unit for *effective dose* is joule per kilogram (J/kg), termed the *sievert* (Sv)).
Emergency exposure situation	A situation of exposure that arises as a result of an accident, a malicious act, or any other unexpected event, and requires prompt action in order to avoid or reduce adverse consequences.
Equivalent dose	A measure of dose in organs and tissues that takes into account the type of radiation involved. It is the quantity obtained by multiplying the mean absorbed dose over the organ or tissue by a factor to allow for the different effectiveness of various ionising radiation in causing harm to tissue. (The SI unit for *equivalent dose* is joule per kilogram (J/kg), termed the sievert (Sv)).
Existing exposure situation	A situation of exposure that already exists when a decision on the need for control needs to be taken. Existing exposure situations include exposure to natural background radiation that is amenable to control; exposure due to residual radioactive material that derives from past practices that were never subject to regulatory control; and exposure due to residual radioactive material deriving from a nuclear or radiological emergency after an emergency has been declared to be ended.
Environment	The conditions under which people, animals and plants live or develop and which sustain all life and development; especially such conditions as affected by human activities. Protection of the environment includes the protection and conservation of: • non-human species, both animal and plant, and their biodiversity • environmental goods and services such as the production of food and feed • resources used in agriculture, forestry, fisheries and tourism • amenities used in spiritual, cultural and recreational activities • media such as soil, water and air • natural processes such as carbon, nitrogen and water cycles.

Exclusion	The deliberate excluding of a particular type of exposure from the scope of an instrument of regulatory control on the grounds that it is not considered amenable to control through the regulatory instrument in question. See also page 62 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Exemption	The determination by a regulatory body that a source or practice need not be subject to some or all aspects of regulatory control on the basis that the exposure and the potential exposure due to the source or practice are too small to warrant the application of those aspects or that exemption is the optimum option for protection irrespective of the actual level of the doses or risks.
Ionising radiation	Electromagnetic or particulate radiation capable of producing ions directly or indirectly, but does not include electromagnetic radiation of a wavelength greater than 100 nanometres. Examples are alpha particles, gamma rays, X-rays and neutrons. When these radiations pass through the tissues of the body, they have sufficient energy to damage DNA.
Ionising radiation apparatus	An apparatus that produces ionising radiation when energised, or when assembled or repaired is capable of doing so when energised (e.g. a diagnostic X-ray machine or an industrial radiography X-ray machine).
Justification	For a planned exposure situation, the process of determining whether a practice is overall, beneficial, i.e. whether the expected benefits to individuals and to society from introducing or continuing the practice outweigh the harm (including radiation detriment) resulting from the practice. For an emergency exposure situation or an existing exposure situation, the process of determining whether a proposed protective action or remedial action is likely, overall, to be beneficial; i.e., whether the expected benefits to individuals and to society (including the reduction in radiation detriment) from introducing or continuing the protective action or remedial action outweigh the cost of such action and any harm or damage caused by the action. From page 89 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary)
Legislation	Acts of Parliament, regulations and other subordinate or disallowable instruments.
Licence	An authorisation granted by the Authority allowing a person to carry out a radiation practice.
Limitation (of risks)	The requirement that radiation doses and risks should not exceed a value regarded as unacceptable. (See also principle 6 at page 21 of the *Fundamentals for Protection against Ionising Radiation*, ARPANSA Radiation Protection Series F-1)
Non-ionising radiation	Electromagnetic radiation of a wavelength greater than 100 nanometres.
Non-ionising radiation apparatus	An apparatus that when energised produces non-ionising radiation, or when assembled or repaired is capable of doing so (e.g. laser surgery equipment).

Notification	A document submitted to the Authority to notify an intention to carry out a practice or any other dealing with radiation apparatus or radioactive material.
Nuclear installation[13]	This term has the same meaning as defined in section 13 of the *Australian Radiation Protection and Nuclear Safety Act 1998*.
Optimisation	The process of determining what level of protection and safety would result in the magnitude of individual doses, the number of individuals (workers and members of the public) subject to exposure and the likelihood of exposure being as low as reasonably achievable, economic and social factors being taken into account. (See also page 121 of IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary)
Planned Exposure Situations	Situations where radiation protection can be planned in advance, before exposures occur and where the magnitude and extent of exposures can be reasonably predicted.
Protection of the environment	Protection and conservation of: non-human species, both animal and plant, and their biodiversity; environmental goods and services such as the production of food and feed; resources used in agriculture, forestry, fisheries and tourism; amenities used in spiritual, cultural and recreational activities; media such as soil, water and air; and natural processes such as carbon, nitrogen and water cycles. (From page 57 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Radiation	See “ionising radiation” and “non-ionising radiation” above.
Radiation apparatus	An ionising radiation apparatus or a non-ionising radiation apparatus.
Radiation incident	Any unintended event, which results in, or has the potential to result in, an exposure to radiation to any person or the environment, outside the range of that normally expected for a particular practice. This includes events resulting from operator error, equipment failure, initiating events, accident precursors, near misses, or unauthorised acts (malicious or non-malicious), the consequences or potential consequences of which are not negligible from the point of view of protection and safety.
Radiation practice	Any human activity that introduces additional sources or exposure pathways or extends exposure to additional people or modifies the network of exposure pathways from existing sources, so as to increase the exposure or the likelihood of exposure of people or the number of people exposed to radiation. (See also page 129 of the IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Radiation risk	Detrimental health effects of exposure to ionising radiation including the likelihood of such effects occurring, and other risks including environmental

[13] Certain types of nuclear installation may be prohibited in Australian jurisdictions by government policy or other legislation.

	risks, that might arise from exposure to ionising radiation, the presence of radioactive material (including radioactive waste) or its release to the environment, or a loss of control over a nuclear reactor core, nuclear chain reaction, radioactive source or any other source of radiation; alone or in combination. For non-ionising radiation it means health effects and health risks associated with acute or prolonged exposure to non-ionising radiation such as ultraviolet radiation, radiofrequency radiation, optical radiation and other types of non-ionising radiation, either in occupational settings or as members of the public.
Radiation source	Anything that may emit ionising radiation or non-ionising radiation.
Radioactive material	Any material that emits ionising radiation spontaneously.
Reference level	For an emergency exposure situation or an existing exposure situation, the level of dose, risk or activity concentration above which it is not appropriate to plan to allow exposures to occur and below which optimisation of protection and safety would continue to be implemented.
Registration	An authorisation by the Authority for a radiation apparatus or sealed source apparatus, or for premises in which radiation sources are used.
Responsible person	'Responsible Person' in relation to any radioactive source, ionising or non-ionising radiation apparatus, nuclear installation, prescribed radiation facility or premises on which unsealed radioactive sources are stored or used means the person: • having overall management responsibility including responsibility for the security and maintenance of the source, apparatus, installation or facility • having overall control over who may use the source or apparatus, installation or facility • in whose name the source, apparatus, installation or facility, would be registered if this is required.
Safety assessment	Assessment of all aspects of facilities and activities that are relevant to protection and safety. For an authorized facility, this includes siting, design and operation of the facility. This will normally include risk assessment. (See also page 12 of IAEA Safety Glossary 2016 available at https://www.iaea.org/resources/safety-standards/safety-glossary).
Sealed source	Radioactive material that is permanently sealed in a capsule or closely bound and in solid form.
Sealed source apparatus	An apparatus that produces ionising radiation by virtue of the fact that it contains radioactive material in the form of a sealed source.
Tanning unit	An electrically powered appliance or installation intended to produce tanning of the human skin by utilising ultraviolet radiation.

Radiation Health Committee

The *National Directory for Radiation Protection* was developed by the Radiation Health Committee. Membership of the Radiation Health Committee when the 2nd edition of the NDRP was published, was as follows:

Chair: *(1 January 2018 to 31 December 2020)*

Dr Roslyn Drummond, Radiation Oncologist, Peter MacCallum Cancer Centre

CEO of ARPANSA:

Dr Carl-Magnus Larsson (Commonwealth)

Radiation Control Officers (representatives of states and territories):

Associate Professor Antony Hooker (SA), Principal Radiation Advisor, Science and Information, Environment Protection Authority

Ms Penny Hill (ACT), Senior Radiation Safety Officer, Department of Health

Mr Noel Cleaves (VIC), Manager, Environmental Health Regulation & Compliance, Department of Health

Mr Simon Critchley (QLD), Director Radiation Health, Department of Health

Ms Hazel Upton (WA), Managing Health Physicist, Environmental Health Directorate, Department of Health

Mr Mark Carey (NSW), Principal Policy Officer, Environment Protection Authority

Mr Bradley Feldtman (NT), A/Manager Radiation Protection, Department of Health

Dr Stephen Newbery (TAS), Principal Health Physicist, Department of Health and Human Services

Nuclear Safety Committee representative:

Dr Joanna Wriedt

Person to represent the interests of the general public:

Ms Fay Bellis

Other members:

Dr Bruce Hocking, consulting specialist in occupational medicine

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Drafting:

Mr. Selva Kumar, Assistant Director, National Codes and Standards, ARPANSA