Certification in Ionising Radiation Safety within Australia and New Zealand

Candidate's Kit - Version: 4.2, June 2025

Australasian Radiation Protection Accreditation Board Inc.

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1 Introduction

This document describes the process for certification in ionising radiation safety as a Certified Radiation Safety Advisor (CRSA) within Australia and New Zealand. This certification scheme has been designed for radiation protection professionals wishing to have their expertise and experience recognised by their peers.

Australasian Radiation Protection Accreditation Board Inc., referred to (as "the Board"), manages and conducts candidate accreditation. The board consists of four members appointed by each of the three Sponsoring Societies. The Board elects its own Chairperson and appoints Examiners as required.

The following professional societies sponsor certification:

- Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM),
- Australian Institute of Occupational Hygienists Incorporated (AIOH), and
- Australasian Radiation Protection Society (ARPS).

The standard assessment pathway has been designed for candidates who are recent graduates in a science or engineering degree related to radiation protection. A candidate qualifies for candidature once they have:

- one year experience in a role or appointment in which they gain relevant experience in radiation protection and
- part-time study across the broader field of radiation protection as per the CRSA syllabus.

Professionals already working in radiation protection and with five (5) or more years of experience may be eligible for fast-track accreditation. Candidates should contact the Secretariat to discuss their eligibility to be considered for fast-track assessment, which will be based on qualifications, demonstrated experience, and professional activities the candidate can show they have completed.

Certification is valid for five years. To maintain certification for a further five years, already certified professionals must demonstrate that they are actively maintaining their expertise (see section 7).

Candidates are required to pay various fees as listed on the application form. These fees have been set to recover the costs associated with the conduct of the examinations and the expenses of the Board. The Board determines the fees, which are subject to change from time to time as determined by The Board.

Upon completion of the application process, the Registrar or delegate will assess and advise if the application has been accepted. No steps in the Certification Process listed below shall be attempted or assessed until candidate status has been achieved.

2 Objectives of Certification

The objective of this certification scheme is to ensure that successful candidates:

- understand the duties and responsibilities of a Radiation Safety Advisor (RSA),
- have a broad knowledge of ionising radiation, its effects, and its relevance to mining, medicine, the public, industry, education and research,

- can use radiation monitoring equipment to identify and quantify radiation hazards,
- have a broad knowledge of the techniques for radiation protection and the ability to design and implement protection strategies,
- have a broad knowledge of current legislation, standards, and guidelines and
- have the necessary oral and writing skills to communicate their conclusions.

3 Certification Process

To obtain certification, all candidates must complete a theoretical, RPP review and practical assessment component. There is no prescribed order that these must occur.

To complete the theoretical component of the assessment, a candidate must:

- complete a self-paced reading program (see Appendix A), and
- pass a written examination based on the prescribed reading material and the requirement for adequate skills in numerical computation.

To complete the practical component of the assessment, a candidate must:

- submit a radiation protection plan for an institution or commercial operation (approximately 5000 words), which is either the candidate's work or they were a significant contributor.
- complete twelve months of relevant experience, preferably under the supervision of a person who already holds ARPAB certification,
- pass a practical examination in the use of monitoring equipment,
- defend the presented radiation protection plan at an oral examination/interview (generally held in conjunction with the practical examination) and satisfy the examiners that they can perform the duties at an ARPAB Certified Radiation Safety Advisor (CRSA) level.

Applicants must complete the certification process within 18 months of being accepted into the program (within 12 months for applicants accepted for fast-track assessment).

3.1 Theory Syllabus

The recommended reading list is in Appendix A. It is assumed that candidates have completed physics and some chemistry at the first-year level in a university or equivalent. Candidates are advised to acquire a knowledge of relevant anatomy and physiology and should have completed senior secondary school mathematics.

Candidates must possess the ability to perform basic manipulation of equations, exponentials, and logarithms, and explain the use of graphical techniques, counting statistics and counting precision as it relates to radiation protection.

Candidates are expected to have a clear understanding of the underlying principles of radiation included in the following topics:

- The structure of matter,
- Radioactivity and radiation,
- Radiation units,
- Biological effects of radiation,
- Natural and man-made radiation,
- The system of radiological protection,
- Radiation detection systems and measurement,
- Internal and external radiation hazards, and
- Radiation interactions

Candidates are expected to have a broad understanding of the principles of radiation practice and protection over a wide range of applications as detailed in the following:

- nuclear reactor health physics,
- radioactive waste,
- medical imaging, radiotherapy, and radiation protection in medicine,
- uranium, heavy mineral concentrates, and rare earth mining, and NORM,
- health physics laboratory techniques, and
- radiological emergencies.

General questions regarding radiation protection legislation will be included in the theory exam.

3.2 Written Examination

All candidates will be required to pass a 2-hour written examination based on the prescribed theory syllabus (section 3.1). The written examination contains a mixture of:

- multiple-choice questions,
- short-answer questions, and,
- 1 long-form question from a choice across a variety of industries. .

Candidates will be required to achieve a pass mark of 70% in each section.

3.3 Practical Work with Radiation Monitors

Candidates will be expected to have a broad understanding of the principles of operation of radiation detectors. It is important to understand how to select a suitable monitor for a stated purpose (e.g. monitoring for spilt radioisotopes, estimation of dose to staff from a known source). An understanding of the use of absorbers to identify the type of source is also essential.

3.4 Assignment – Radiation Protection Plan

(exempt if candidature is fast-tracked)

Candidates are required to prepare a Radiation Protection Plan (RPP) for a medium to large institution such as a major hospital, a university, a large mine or a mineral processing plant. In the case of a large institution or operation it is permitted to submit a RPP for only a single department or section of a facility to reduce the length of the submission.

Candidates are encouraged to develop or submit a RPP that is relevant to their place of employment. The examiners will be looking for a document that demonstrates a practical impact on radiation safety and radiation exposure to be *as low as reasonably achievable*. If the RPP is developed from a pre-existing RPP or prepared in association with others, then the candidate should clearly indicate what their contribution has been.

Submission of the RPP is part of the practical section of the certification. Candidates will be required to respond to questions related to their submission during an oral examination/interview. The RPP should be submitted at least four weeks prior to the practical examination so that examiners can assess them prior to the interview.

Note: all submissions will be treated as confidential documents and not distributed or used for purposes other than for ARPAB accreditation.

3.5 Practical Experience

Candidates are required to complete one year of relevant experience working under the supervision of a suitably qualified person, preferably a Certified Radiation Safety Advisor. During this period, candidates must spend a minimum of 60% of their time performing relevant duties. The Board will assess each candidate based on:

- a written submission prepared by the candidate describing their experience, its duration, and its relevance,
- copies of relevant documents(s) prepared by the candidate,
- a written reference from a suitable referee supporting the candidate's claims above, and
- additional evidence from the examiners after discussing the candidate's work during the oral examination.

The submission should be pertinent with relevant evidence provided. If documents have multiple authors, then the covering letter should detail the contribution made by the candidate.

It is recommended that candidates maintain a logbook during this period detailing the tasks undertaken and including copies of any technical reports to which they have contributed. If a logbook has been kept, candidates are encouraged to discuss it with the examiners during their oral examination.

3.6 Practical and Oral Assessment

The practical assessment will last for approximately 20 minutes. Its purpose is to ensure that candidates are familiar with the theory of operation, selection and use of radiation monitors. They will be asked to undertake several monitoring tasks involving the location of hidden sources and the identification of source type (alpha, beta, gamma, neutron, mixed).

They will then be asked to advise on safe distances and precautions. The tasks required of candidates may be varied for those who work in specialised areas, e.g. underground mining, and candidates are advised to briefly state their area(s) of expertise in their application.

The oral assessment/interview will last approximately 30 minutes. The candidate will be asked to respond to question related to their Radiation Protection Plan. The assessors may also use this occasion to clarify any outstanding issues regarding the candidate's RPP.

Candidates will be notified of their results as soon as possible after each assessment.

4 Fast-track Certification

Candidates who have worked more than 5 years in radiation protection may be eligible (upon request) for *fast-track* certification. This process recognises that some applicants may already possess the requisite knowledge expected of an ARPAB Certified Radiation Safety Advisor.

Fast-track assessment still requires applicants to complete the following:

- written examination (3.2),
- submission of a relevant RPP of their own work (3.4), and
- practical and oral assessment (3.6).

5 Application Procedure

Applicants should obtain a current copy of this Candidates Kit from the ARPAB website.

Applicants must complete the Application Form (downloaded from the website) and forward their application electronically to the ARPAB Secretariat.

Candidates must demonstrate that they have attained an adequate level of education or equivalent experience. Qualifications should be listed together with the highest levels attained in physics, mathematics and chemistry. To verify academic achievements, candidates are requested to copies of certificates and/or correspondence for inspection during the theory examination.

Candidates without extensive experience should prepare a brief statement addressing their ability to achieve the objectives of certification. In such cases the application should include proposals for obtaining the required practical skills and the required one year of relevant experience. This proposal may be from the Head, Chief or Director of the Department or Organisation or other such supervisory person deemed acceptable to the Board.

If the application is accepted, an invoice for the Enrolment Fee, specified in the Application Form will be sent by the Secretariat. This invoice must be paid before any further assessment of the candidate will occur.

For those candidates that wish to be considered for Fast-track assessment, please forward supporting evidence with your application. This will enable the Board to assess your application.

In certain circumstances, a candidate may be requested to perform additional work to satisfy the Board that they have achieved the required standard.

6 Notification of Results

All applications for enrolment will be acknowledged in writing or by email and later notified of the acceptance or non-acceptance of their application.

Candidates who pass the written examination will be notified in writing by the Board that they have successfully completed the theory, but not practical, part of the certification.

Candidates who successfully complete the accreditation process will be awarded a certificate stating that they have gained Certification in Ionising Radiation Safety from the Board and the Sponsoring Societies.

The names of all successful candidates will be forwarded to the Registrar of each of the Sponsoring Societies.

Enquiries from candidates regarding their assessment should be directed to the ARPAB Secretariat. Candidates who feel aggrieved by a decision of the Board should note that there is no mechanism for appeal to the Sponsoring Societies.

7 Appeals process

After a candidate has been advised of the outcome of any or all of their assessment process, they may request further consideration via an appeal to either the Registrar, Chairperson or any other current Board member. An appeal should be requested formally via email.

8 Maintenance of Certification

The Board regards Certification to be an indication that the accredited person is actively engaged in the field of radiation protection and is maintaining their relevant expertise and knowledge. Every five years, accredited persons will be sent a certification renewal form. When renewing certification, candidates must submit:

- a one-page summary of experience gained, conferences and/or seminars attended, papers and/or reports prepared, awards gained and any other relevant material arising during the preceding three years as evidence of their continuing professional activity; and
- the renewal certification fee.

A list of activities and their respective maintenance points can be found in Appendix B. This list is by no means exhaustive, but a list of evidence that will be accepted by the Board without further justification. A candidate may submit evidence that is not on that list if they feel it demonstrates the requirements for renewed certification.

Applications for renewal will be assessed by The Board. The Board reserves the right to change the requirements for renewal from time to time.

9 Powers of The Board

Certification is determined and administered by the Board. The Board has over-riding authority to administer this Certification and reserves the right to alter any rule, condition, the syllabus, prescribed texts and/or fees from time to time.

The Board's decision is final in all matters regarding this Certification. There is no direct mechanism for appeal to the Sponsoring Societies.

10 Code of Ethics and Post Nominals

Successful candidates are required to abide by the Codes of Ethics of the Australasian Radiation Protection Accreditation Boad and Sponsoring Societies. Certification may be withdrawn by the Board in cases involving serious breaches of these Codes.

The codes of ethics for ARPAB and the sponsoring organisations are available on the relevant website:

- ARPAB Code of Ethics (link)

- APRS Code of Ethics (link)

- AIOH Code of Ethics (link)

- ACPSEM Code of Ethics (link)

The post nominals of CRSA (Certified Radiation Safety Advisor) may be used while ARPAB certification remains current.

11 Fees

Fees are specified in the Application Form. Fees are not refundable.

Appendix A. **Reading list**

Prescribed Texts (can be taken into the written examination)

Candidates are expected to be familiar with the following documents and texts

1. A.Martin, S.Harbison, K.Beach and P.Cole, An Introduction to Radiation Protection.6th Edition, CRC Press, 2012, ISBN 9781444146073.
2. Grupen, C. (2010). Introduction to radiation protection: practical knowledge for handling radioactive sources. Springer science & Business media.
3. ICRP Publication 103, 2007 Recommendations of the International Commission on Radiological Protection. J. Valentin, (ed.), Elsevier 2007.

Recommended texts (for further reading, but cannot be taken into the written examination)

1. H. Cember, Introduction to Health Physics, 4th Edition 2008, McGraw-Hill.
2. E. J. Hall, Radiobiology for the Radiobiologist, 6th edition, 2006, Lippincott Williams & Wilkins.
3. J. E. Martin, Physics for Radiation Protection, 3rd Edition 2013, Wiley.
4. G. F. Knoll, Radiation Detection and Measurement, 4th Edition, Wiley.
5. Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements Part 3, No. GSR Part 3, IAEA Vienna 2014.Download at http://www-pub.iaea.org/MTCD/publications/PDF/Pub1578_web- 57265295.pdf
6. ARPANSA Radiation Protection Series (RPS) documents

Appendix B. **Renewal maintenance point**

Category / CPD Activity		Points	Max.
A – ARPS, ACPSEM or AIOH Conference Presentation/Posters			
1	Conference attendance	3	No max.
2	Simple contribution (presentation/poster)	10	30
3	Invited talk/plenary/keynote/deliver Continuing Education Seminar	15	
B – Attendance at related conferences (at Registrar discretion)			
1	Local conference attendance	2	6
2	Attendance at international conference relevant to radiation protection	3	No max.
3	Presentation at international conference relevant to Radiation Protection	10	30
C – Peer reviewed radiation paper in local or international journal			
1	Single contribution	15	30
2	Co-author (main author)	10	
3	Co-author (not main author)	5	
D – Science communication (run radiation safety training courses in-house or externally, assist at science expos, run a school presentation, do a community talk)			
1	Event	5	10
E – Teaching and Education			
1	Teaching duty at a University as a Con-joint, adjoint or full staff member. Lecture content should involve topics relevant to radiation protection	20	20
2	Sabbatical activity abroad (as Visiting Academia or Research Activity)	20	20
F – RSO for a complex radiation organisation (university, hospital, or large company) for part or all of the 5 years			
1	RSO for a complex radiation organisation	5	10
G – Participation or membership of a State, Territory or Commonwealth radiation protection committee (including ARPANSA working groups)			
1	Participation or membership as above	20	20
H – ARPAB Board Member, ACPSEM/AIOH/ARPS Executive Member			
1	Board member of one of the above societies	10	10
I – ACPSEM/AIOH/ARPS State Branch Chair, Secretary or Treasurer			

Category / CPD Activity		Points	Max.
1	ACPSEM/AIOH/ARPS State Branch Chair, Secretary or Treasurer	5	5
J – Membership of Other Professional Societies or Bodies relevant to Radiation Science and/or Radiation Safety and Protection (eg, HPS, SRP, ESTRO, IPEMB, AAPM, etc)			
1	Membership of other professional societies or bodies	3	6