



Australian Government

Australian Radiation Protection and Nuclear Safety Agency

CODE OF PRACTICE

Radiation Protection in the Medical Applications of Ionizing Radiation

Radiation Protection Series Publication No. ??

Version for industry consultation: 18 May 2007

Submissions should be forwarded by **2 July 2007** and addressed to:

Mr Alan Melbourne
Manager
Standards Development and Committee Support Section
ARPANSA
619 Lower Plenty Road
Yallambie VIC 3085

Or by email to: secretariat@arpansa.gov.au
(Electronic submissions are preferred)

All submissions will be held in a register of submissions, and unless marked confidential, may be made public.

Note: Technical terms which are described in the Glossary appear in **bold type** on their first occurrence in the text.

1. Introduction

1.1 CITATION

This Code may be cited as the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2007)*.

1.2 PURPOSE

This Code establishes the regulatory requirements for the use of **ionizing radiation** in medicine that will, in the context of good practice, ensure that the risks associated with **radiation** exposure to the patient, **medical practitioner**, staff and other persons are minimised.

This Code establishes:

- (a) the radiation protection principles;
- (b) a requirement for the preparation of a comprehensive Radiation Management Plan addressing the radiation protection principles;
- (c) the specific roles and responsibilities of the following:
 - the **Responsible Person**, being the person who has the overall management responsibility of the radiation source, apparatus or medical practice;
 - the medical practitioner responsible for the overall conduct of the procedure involving the exposure of the patient to ionizing radiation; and
 - the **operator** who exposes the patient to ionizing radiation,
- (d) the management and reporting of **radiation incidents**.

1.3 SCOPE

This Code of Practice applies to the following ionizing radiation exposures in medicine¹:

- (a) the exposure of patients as part of their medical diagnosis or treatment;
- (b) the exposure of individuals as part of health screening programs;
- (c) the exposure of individuals participating in research programs²;
- (d) the exposure of individuals as part of medico-legal procedures;
- (e) the **occupational exposure** of individuals;
- (f) the exposure of health professionals other than those with training in the medical applications of ionizing radiation;
- (g) the exposure of **carers**; and
- (h) the exposure of members of the public arising from the use of medical radiation equipment and radioactive sources.

¹ A separate Code of Practice for Radiation Protection in Dentistry applies to the use of ionizing radiation in dentistry.

² Specific requirements for research participants are given in the Code of Practice for the Exposure of Humans to Ionizing Radiation for Research Purposes (2005), ARPANSA.

35 This Code is supplemented by three Safety Guides that address good practice in
36 radiation protection in:

37 (a) diagnostic and **interventional radiology**;

38 (b) **nuclear medicine**; and

39 (c) **radiotherapy**.

40 **1.4 STRUCTURE**

41 This Code of Practice sets out regulatory requirements to be met to achieve a
42 satisfactory level of radiation protection in medicine. It sets out material that will be
43 adopted by State, Territory and Commonwealth Regulatory Authorities as part of
44 their regulatory controls, and in conditions of **authorisation** associated with the
45 use of ionizing radiation in medicine within their jurisdiction.

46 Schedules set out additional information that form part of this Code of Practice.

47 **1.5 INTERPRETATION**

48 The presence of the word 'must' in a section indicates that the requirement to which
49 it refers is mandatory.

50 There are a number of terms that have technical or legal significance, and are central
51 to the national radiation protection framework. The meanings of terms used in this
52 Code of Practice are those defined in the Glossary.

53

54 **2. Radiation Protection Principles**

55 In this Code, the radiation protection principles of justification, optimisation and
56 **dose** limitation are applied to radiation protection in medicine.

57 **2.1 JUSTIFICATION**

58 The justification principle is common to all practices involving exposure to ionizing
59 radiation. This principle can be stated as follows:

60 *No practice involving exposure of individuals to radiation should be*
61 *adopted unless it produces sufficient benefit to that individual or to society*
62 *to offset the detriment caused by the radiation.*

63 2.1.1 Before a procedure involving exposure to ionizing radiation is approved or
64 commenced, the procedure must be justified for that patient³.

65 **2.2 OPTIMISATION**

66 2.2.1 Radiation doses received by the public and occupationally exposed persons
67 arising from medical radiation exposures must be kept as low as reasonably
68 achievable, economic and social factors being taken into account (**ALARA**).

69 2.2.2 Equipment and methods must be selected to ensure that radiation
70 administered to a patient for:

71 (a) diagnostic purposes is:

72 (i) sufficient to enable the procedure to provide the required
73 information; and

74 (ii) not greater than is necessary to provide that information,

75 (b) therapeutic purposes:

76 (i) is consistent with the intended radiotherapeutic purpose of the
77 exposure; and

78 (ii) will achieve the required doses to the target tissues, with doses to
79 non-target tissues as low as reasonably practical.

80 2.2.3 The radiation administered to a pregnant patient must be such that the
81 radiation dose to the embryo or fetus is minimised within the parameters of
82 the procedure.

83 **2.3 DOSE LIMITS**

84 2.3.1 All medical applications of ionizing radiation must be managed in such a way
85 that radiation doses to occupationally exposed persons and members of the
86 public do not exceed the dose limits specified in **RPS1**.

87 2.3.2 Dose limits do not apply to the exposure of patients as part of their diagnosis
88 or treatment.

³ Justification may take into account a generic justification applicable to a well established procedure as defined through the relevant professional bodies.

89 **3. Responsibilities**

90 **3.1 THE RESPONSIBLE PERSON**

91 **Radiation Management Plan**

92 3.1.1 The Responsible Person must ensure that:

- 93 (a) a Radiation Management Plan incorporating the components listed in
94 section A1 of Schedule A of this Code is developed, documented,
95 resourced, implemented and regularly reviewed;
- 96 (b) the Radiation Management Plan prepared under 3.1.1(a) describes the
97 management and reporting arrangements that enable the medical
98 practitioner and operator to discharge their obligations under this
99 Code; and
- 100 (c) all persons covered by the Radiation Management Plan follow and
101 comply with the Radiation Management Plan.

102 3.1.2 Where radioactive waste is generated by the practice, the Responsible Person
103 must ensure that:

- 104 (a) a Radioactive Waste Management Plan incorporating the components
105 listed in section A2 of Schedule A of this Code is developed,
106 documented, resourced, implemented and regularly reviewed to ensure
107 safety in all applicable dealings involving medical radiation; and
- 108 (b) all persons covered by the Radiation Waste Management Plan follow
109 and comply with the Radioactive Waste Management Plan.

110 **Justification of a medical radiation procedure**

111 3.1.3 The Responsible Person must ensure that no radiation procedure is carried
112 out unless:

- 113 (a) it has been justified, either generically or on an individual basis
114 depending on the nature of the procedure and the patient, by the
115 medical practitioner in accordance with clause 3.2.3;
- 116 (b) it has been approved for each individual by:
 - 117 (i) the medical practitioner; or
 - 118 (ii) the operator, where it is not practicable for the medical
119 practitioner to approve a diagnostic exposure, in accordance with
120 written guidelines established by the medical practitioner,
- 121 (c) in the case of a female patient, all reasonable attempts have been made
122 to establish:
 - 123 (i) the pregnancy status of the patient if there is the potential for a
124 radiation dose to the embryo or fetus of more than 0.3 mSv; and
 - 125 (ii) where a radiopharmaceutical is to be administered, the breast-
126 feeding status of the patient if there is the potential for a:
 - 127 a. radiation dose of more than 1 mSv to a breast-fed child; or
 - 128 b. significant radiation dose to the breast glandular tissue of
129 the patient.

130 **Optimisation of protection and limitation of radiation doses**

131 3.1.4 The Responsible Person must ensure that radiation doses to occupationally
132 exposed persons and members of the public:

- 133 (a) do not exceed the dose limits specified in RPS 1; and
- 134 (b) are kept ALARA.

135 3.1.5 The Responsible Person must establish a program to ensure that radiation
136 dose administered to a patient for diagnostic purposes is:

- 137 (a) recorded in accordance with clause 3.2.7;
- 138 (b) periodically compared with **diagnostic reference levels (DRLs)** for
139 all commonly performed diagnostic procedures; and
- 140 (c) reviewed to determine whether radiation protection has been optimised
141 if DRLs are exceeded.

142 3.1.6 The Responsible Person must ensure that systems are in place to ensure that
143 a patient is correctly identified for the intended medical procedure involving
144 exposure to ionizing radiation.

145 **Occupational radiation exposures**

146 3.1.7 The Responsible Person must ensure that:

- 147 (a) a **personal radiation monitoring device** supplied by a Personal
148 Radiation Monitoring Service approved in accordance with the criteria
149 specified in the *National Directory for Radiation Protection* is
150 provided to each occupationally exposed person who could be exposed
151 to ionizing radiation in excess of 1 mSv in any one year;
- 152 (b) internal radiation dose assessments and biological monitoring are
153 carried out as detailed in the *National Directory for Radiation*
154 *Protection*;
- 155 (c) a record is kept of the radiation doses received by each occupationally
156 exposed person in accordance with the requirements of RPS1; and
- 157 (d) work practices are investigated and reviewed if an occupationally
158 exposed person receives or is likely to receive:
 - 159 (i) an **effective dose** in excess of 5 mSv per year; or
 - 160 (ii) more than one quarter of any of the dose limits for the skin,
161 extremities and lens of the eye.

162 3.1.8 When an occupationally exposed female declares that she is pregnant, the
163 Responsible Person must, if necessary, adapt the working conditions of the
164 pregnant female so as to ensure that the embryo or fetus is afforded the same
165 level of protection as that of a member of the public as specified in RPS 1.

166 **Radiation incident**

167 3.1.9 In the event of a radiation incident, the Responsible Person must:

- 168 (a) investigate the radiation incident;

- 169 (b) submit a complete, written report of a **reportable radiation**
170 **incident**, including the preventative action to avoid a recurrence, to
171 the **relevant regulatory authority** within 7 days; and
- 172 (c) in the case of a lost or stolen radioactive source, immediately report the
173 event to the relevant regulatory authority.

174 **3.1.10** The Responsible Person must ensure that:

- 175 (a) an internal report on all radiation incidents is written and kept in the
176 institution's radiation incident report register; and
- 177 (b) measures are implemented so that the possibility of the recurrence of
178 the radiation incident investigated in (a) is minimized.

179 **Radiation source accountability**

180 **3.1.11** The Responsible Person must:

- 181 (a) be able to account for all radiation sources within his or her control at
182 all times; and
- 183 (b) ensure that the relevant regulatory authority is notified immediately if a
184 radiation source cannot be accounted for.

185 **Inadvertent irradiation of an embryo or fetus**

186 **3.1.12** Where an embryo or fetus inadvertently receives a radiation dose of more
187 than 0.3 mSv, the Responsible Person must ensure that the requirements of
188 section B2 of Schedule B are met.

189 **Training**

190 **3.1.13** The Responsible Person must ensure that all individuals who may be
191 occupationally exposed to ionizing radiation have training⁴ that relates to the:

- 192 (a) type of work being undertaken;
- 193 (b) radiation producing equipment or source of radiation that the
194 individual may be required to use; and
- 195 (c) potential radiation hazards associated with the practice.

196 **Radiation shielding**

197 **3.1.14** The Responsible Person must ensure that the radiation shielding is:

- 198 (a) adequate to meet the requirements of the Radiation Management Plan;
199 and
- 200 (b) documented as part of the commissioning procedure of the radiation
201 producing equipment or radioactive source.

202 **Warning notices**

203 **3.1.15** The Responsible Person must ensure that:

⁴ Specific competency requirements are established in the *National Directory for Radiation Protection*.

- 204 (a) illustrated notices are:
- 205 (i) posted in prominent places within the practice advising patients
206 to notify staff before the radiation procedure if they may be
207 pregnant; and
- 208 (ii) prominently displayed in the waiting rooms and administration
209 rooms requesting that the patient inform staff before the
210 administration of a radiopharmaceutical if they are breast-
211 feeding,
- 212 (b) each general access point into a radiation area has a visible warning
213 sign or device to indicate that the room contains an ionizing radiation
214 hazard;
- 215 (c) for radiotherapy, fluoroscopy and computed tomography rooms, an
216 illuminated radiation warning sign displaying the illuminated words
217 'IONIZING RADIATION – DO NOT ENTER' (or equivalent), is:
- 218 (i) positioned directly adjacent to the entry doors of any room
219 housing:
- 220 a. radiation apparatus used for external beam radiotherapy; or
221 b. remote afterloading brachytherapy equipment; and
- 222 (ii) illuminated immediately:
- 223 a. as the radiation apparatus is placed in the preparation mode
224 prior to exposure and continues to illuminate during the
225 exposure; or
- 226 b. as the radioactive source is driven out of its shielded
227 housing and continues to illuminate until the source has
228 been returned to the shielded position.

229 **Radiation Apparatus and Radioactive Sources – General**

230 3.1.16 The Responsible Person must ensure that specialist procedures, such as
231 mammography, interventional radiology, and therapeutic procedures, are
232 performed using equipment dedicated for that purpose.

233 3.1.17 The Responsible Person must ensure that performance specifications,
234 operating and maintenance instructions, including protection and safety data
235 are kept in written form, in English, for all radiation producing apparatus,
236 radioactive sources and ancillary equipment acquired.

237 3.1.18 The Responsible Person must:

- 238 (a) ensure that a Radiation Source Register is maintained and updated with
239 information relating to the acquisition, movement, replacement or
240 disposal of each radiation apparatus or radioactive source; and
- 241 (b) advise the relevant regulatory authority of the receipt of each new
242 radiation producing apparatus or sealed radioactive source.

243 **Quality Assurance Program**

244 3.1.19 The Responsible Person must ensure that a comprehensive equipment
245 Quality Assurance program is established, performed, maintained and

246 regularly reviewed at any site where ionizing radiation is used.

247 3.1.20 The Responsible Person must implement and regularly review the Quality
248 Assurance program for all dosimetry and associated measuring instruments
249 to:

250 (a) ensure their continued accuracy; and

251 (b) to provide a means by which trends in the performance of each piece of
252 equipment can be monitored.

253 3.1.21 The Responsible Person must ensure that the results of the Quality
254 Assurance program and its outcomes are documented in a way that enables
255 easy access and understanding.

256 **Calibration of a survey meter**

257 3.1.22 The Responsible Person must ensure that the calibration of a radiation
258 survey meter for X-ray and gamma rays is maintained and traceable to:

259 (a) the Australian National Standard of air kerma; or

260 (b) a foreign reference Standard of air kerma recognised by the Chief
261 Metrologist⁵; or

262 (c) a National Standard of a country with which Australia has a mutual
263 recognition arrangement for that Standard.

264 **Expert advice**

265 3.1.23 The Responsible Person must ensure that:

266 (a) a **qualified expert** is involved:

267 (i) for consultation on optimisation, including patient dosimetry
268 and quality assurance; and

269 (ii) to give advice on matters relating to radiation protection in
270 **medical exposure**, and

271 (b) for therapeutic uses of radiation, the calibration, dosimetry and quality
272 assurance requirements of this Code are conducted by, or under the
273 supervision of, a qualified expert.

274 **Equipment – Radiotherapy**

275 3.1.24 The Responsible Person must ensure that:

276 (a) all radiation producing therapy equipment is calibrated at the time of
277 acceptance following installation;

278 (b) before release for clinical use, all newly commissioned radiation
279 producing therapy equipment is subjected to an independent⁶ series of
280 calibration tests that confirm that the conditions under which it was
281 calibrated produce acceptable clinical accuracy of dose output;

⁵ The Chief Metrologist is defined under section 18A of the *National Measurement Act 1960*.

⁶ "Independent" means by a person using equipment where neither the person nor the equipment was associated with the initial calibration.

- 282 (c) each of the treatment beams or sources for all radiation producing
283 therapy equipment (both planning and treatment delivery) is checked
284 and recalibrated at intervals specified in international and national
285 protocols; and
- 286 (d) all calibrations of reference and field measuring equipment are
287 traceable to relevant national standards.

288 **Radiotherapy treatment planning**

289 3.1.25 The Responsible Person must ensure that all physics data used for treatment
290 planning is clearly documented and has a reference trace to the original data
291 source.

292 3.1.26 The Responsible Person must ensure that:

- 293 (a) the brachytherapy treatment planning procedures detailed in
294 Schedule D1 are followed; and
- 295 (b) the testing of a treatment planning equipment is carried out in
296 accordance with requirements of Schedule D2.

297 **Equipment repair and maintenance**

298 3.1.27 The Responsible Person must obtain and keep a written record detailing the
299 work performed on a radiation emitting equipment or a radioactive source
300 following any maintenance or repairs on that equipment or source.

301 3.1.28 The Responsible Person must ensure that a radiation survey is carried out
302 after any repairs or maintenance that could alter the integrity of the radiation
303 shielding on radiation emitting equipment or a radioactive source.

304 3.1.29 The Responsible Person must ensure that, following repair or maintenance:

- 305 (a) the operation of any radiation emitting equipment is re-assessed so that
306 the radiation safety of patients, staff or the public is maintained; and
- 307 (b) all radiation producing therapy equipment is calibrated before it is
308 returned to clinical use.

309 3.1.30 Where the Responsible Person is informed that corrective maintenance has
310 been identified in medical radiation equipment and the fault could be one
311 which might be present in other similar equipment, the Responsible Person
312 must:

- 313 (a) report the details of the fault to the relevant regulatory authority; and
- 314 (b) keep a record of such faults and necessary corrective maintenance
315 performed.

316 **Death of a patient**

317 3.1.31 The Responsible Person must have systems in place to ensure that in the
318 event of the death of a patient with radioactive material *in situ*:

- 319 (a) exposure to radiation of any person handling the body is minimised;
- 320 (b) each temporarily implanted sealed source or radioactive applicator is
321 removed;

- 322 (c) consideration is given as to whether a permanent radioactive implant or
323 tissue containing unsealed radioactive material is to be excised;
- 324 (d) the level of activity of a permanent implant or unsealed radioactive
325 material remaining in the body is calculated and documented; and
- 326 (e) where a permanent implant or unsealed radioactive material remains in
327 the body, written instructions regarding handling and safety are
328 provided to each person who handles a deceased patient with a
329 radioactive source *in situ*.

330 **3.2 MEDICAL PRACTITIONER**

331 **Authorisation for a medical radiation procedure**

332 3.2.1 The responsibility for the overall conduct of a procedure involving exposure
333 of a patient to ionizing radiation can only be taken by a medical practitioner
334 who is appropriately authorised by the relevant regulatory authority.

335 3.2.2 The medical practitioner must comply with the relevant provisions of the
336 Radiation Management Plan.

337 **Justification of a medical radiation procedure**

338 3.2.3 In determining the net benefit from a medical radiation procedure, the
339 medical practitioner must take into account:

- 340 (a) the specific objectives of the procedure;
- 341 (b) the characteristics of the individual involved;
- 342 (c) the total potential diagnostic or therapeutic benefits, including the
343 direct health benefits to the patient and the benefits to society in
344 general;
- 345 (d) the individual detriment to the patient that may result from the
346 procedure;
- 347 (e) the pregnancy status of a female patient if there is the potential for a
348 radiation dose to the embryo or fetus of more than 0.3 mSv;
- 349 (f) the breast-feeding status of the female patient to be administered a
350 radiopharmaceutical if there is the potential for a:
- 351 (i) radiation dose of more than 1 mSv to a breast-fed child; or
- 352 (ii) significant radiation dose to the breast glandular tissue of the
353 patient,
- 354 (g) the efficacy, benefits and risk of available alternative techniques having
355 the same objectives, either with less exposure to ionizing radiation or in
356 combination with the medical radiation procedure; and
- 357 (h) any medical data (such as previous diagnostic information or medical
358 records) relevant to the medical exposure.

359 **Approval of a medical radiation procedure**

360 3.2.4 Other than patients involved in approved health screening programs, the
361 medical practitioner must not undertake or approve a procedure involving

- 362 exposure to ionizing radiation unless a written referral⁷ is provided that:
- 363 (a) contains adequate patient identifying information;
- 364 (b) states the:
- 365 (i) specific clinical question that the diagnostic procedure should try
- 366 to answer; or
- 367 (ii) clinical condition that the therapeutic treatment is seeking to
- 368 treat, and
- 369 (c) provides the referrer's contact details for consultative purposes.

370 **3.2.5** In approving a procedure involving exposure to ionizing radiation, the

371 medical practitioner must for a:

- 372 (a) therapeutic procedure:
- 373 (i) provide a written prescription for the procedure;
- 374 (ii) approve the treatment plan; and
- 375 (iii) where relevant, assess all associated films and images before the
- 376 first treatment delivery,
- 377 (b) diagnostic procedure:
- 378 (i) specify the protocol for the procedure; or
- 379 (ii) provide a written prescription for the procedure.

380 **Optimisation of protection and limitation of radiation doses**

381 **3.2.6** The medical practitioner must ensure that exposure of non-target tissue

382 during radiotherapy is kept ALARA consistent with delivering the required

383 dose to the target volume.

384 **3.2.7** The medical practitioner must maintain a record of:

- 385 (a) the radiation dose administered to the patient, or sufficient information
- 386 on the exposure or administration parameters that would allow the
- 387 radiation dose to the patient to be estimated; and
- 388 (b) for a nuclear medicine procedure, the radiopharmaceutical form and
- 389 confirmed⁸ activity administered to the patient.

390 **Provision of advice to patients and carers**

391 **3.2.8** In the case of a patient undergoing treatment with an implanted radioactive

392 source or a therapeutic radiopharmaceutical, the medical practitioner must

393 provide the patient, carer or the patient's legal guardian with written

394 information and instructions that address:

- 395 (a) the risks associated with ionizing radiation exposure to carers and other
- 396 persons; and

⁷ This referral may be in written or electronic form.

⁸ "confirmed" means that the nuclide, form and activity for a diagnostic procedure are verified by at least one trained and qualified staff member and for a therapeutic procedure, a second such person witnesses and verifies the measurement of the dispensed activity.

397 (b) how to restrict exposures to carers and other persons that could result
398 from contact with the patient,
399 before the patient leaves the place where the radiation procedure took place.

400 3.2.9 If a sealed source is permanently implanted in a patient, the medical
401 practitioner must provide written advice to the patient and carers describing
402 procedures for:

- 403 (a) radiation safety; and
- 404 (b) storage or disposal of dislodged sources.

405 3.2.10 The medical practitioner who will be taking clinical responsibility for a
406 therapeutic procedure or an interventional radiological procedure must:

- 407 (a) take all reasonable steps to ensure that the radiation risk associated
408 with the procedure has been explained to the patient or guardian; and
- 409 (b) following an interventional radiological procedure where there is a
410 possibility of radiation induced **deterministic effects**:
 - 411 (i) ensure that the patient receives post-procedure counselling; and
 - 412 (ii) liaise with the referrer to ensure there is follow up of the patient.

413 **Procedures for potentially pregnant or pregnant patients**

414 3.2.11 Immediately before the commencement of a radiation procedure that is likely
415 to result in a radiation dose of more than 0.3 mSv to the embryo or fetus, the
416 medical practitioner must take all reasonable steps to establish whether a
417 female patient is pregnant.

418 3.2.12 Before administering a therapeutic nuclear medicine treatment to a female
419 patient of childbearing age that is likely to result in a radiation dose of more
420 than 1 mSv to the embryo or fetus, the medical practitioner must establish
421 the pregnancy status of that patient with a definitive biochemical test within
422 24 hours of the commencement of the treatment.

423 3.2.13 The medical practitioner must take into account the requirements of
424 Schedule B for females for whom pregnancy has been established and who
425 will be receiving a radiation exposure, particularly where:

- 426 (a) abdominal and pelvic regions are involved; or
- 427 (b) an embryo or fetus may be exposed.

428 3.2.14 The medical practitioner must take all reasonable steps to advise a pregnant
429 patient before the radiation exposure is delivered or a radioactive substance
430 is administered of the potential risks to the embryo or fetus associated with
431 *in-utero* exposure.

432 **Procedures for a patient who is breast-feeding a child**

433 3.2.15 The medical practitioner must, when a radiopharmaceutical is administered
434 to a patient who is breast-feeding a child, take reasonable measures to ensure
435 that any:

- 436 (a) exposure of the breast-fed child is minimised or eliminated in
437 accordance with Schedule C1; and

438 (b) significant radiation dose to the breast glandular tissue of the patient is
439 avoided.

440 3.2.16 The medical practitioner must, when a therapeutic radiopharmaceutical is
441 administered to a patient who is providing close care of a child, take
442 reasonable steps to ensure that any exposure of the child is eliminated or
443 minimised in accordance with Schedule C2.

444 **Procedure for a patient with an implanted electronic device**

445 3.2.17 Before approving a radiotherapy treatment plan for a patient who has an
446 implanted electronic device that might be affected by the radiation⁹, the
447 medical practitioner must:

448 (a) obtain an:

449 (i) estimate from the qualified expert of the dose and the dose rate to
450 the device; and

451 (ii) assessment from the qualified expert of the need for additional
452 shielding of the device; and

453 (b) where relevant, determine the need for cardiac monitoring at all stages
454 of the treatment process.

455 **Interstitial or intraluminal high dose rate brachytherapy**

456 3.2.18 For interstitial or intraluminal high dose rate brachytherapy procedures, the
457 medical practitioner must be immediately available in person for the
458 duration of the treatment in the event that medical assistance is required for
459 the emergency removal of the applicator(s).

460 **3.3 OPERATOR**

461 **Authorisation for a medical procedure**

462 3.3.1 Only a person who is appropriately authorised by the relevant regulatory
463 authority to administer ionizing radiation to a patient for **radiology**, nuclear
464 medicine or radiotherapy may administer ionizing radiation to a patient.

465 **General requirements for an operator**

466 3.3.2 The operator must comply with the relevant provisions of the Radiation
467 Management Plan.

468 3.3.3 The operator must:

469 (a) wear all personal protective equipment provided by the Responsible
470 Person where applicable to the procedure as detailed in the Radiation
471 Management Plan; and

472 (b) wear a personal radiation monitoring device where provided by the
473 Responsible Person.

⁹ Such a device could be a cardiac pacemaker, cochlear implant or other device with a microchip controller.

474 **Specific requirements for a medical radiation procedure**

475 3.3.4 The operator must:

- 476 (a) not expose a person to ionizing radiation unless:
- 477 (i) the exposure has been approved by a medical practitioner; or
- 478 (ii) where it is not practicable for a medical practitioner to approve a
- 479 diagnostic X-ray exposure, the operator does so in accordance
- 480 with formal directions issued by the medical practitioner,
- 481 (b) follow the established protocol for the procedure;
- 482 (c) ensure that the protection of the patient is optimised within the scope of
- 483 the parameters under the control of the operator;
- 484 (d) ensure that the radiation exposure of persons other than the patient is
- 485 minimised; and
- 486 (e) in the case of radiotherapy, ensure that:
- 487 (i) the radiation treatment plan has been endorsed by the medical
- 488 practitioner as being consistent with the prescription for the
- 489 patient's treatment; and
- 490 (ii) the radiation dose to the patient is delivered in accordance with
- 491 the medical practitioner's prescription.

492 **Identification of a patient**

493 3.3.5 Immediately before conducting a radiation procedure on a patient, the

494 operator must:

- 495 (a) take all reasonable steps to ensure that the patient is correctly
- 496 identified; and
- 497 (b) ensure that the prescribed procedure is to be performed on the patient.

498 **Procedures for potentially pregnant or pregnant patients**

499 3.3.6 The operator must:

- 500 (a) when conducting a procedure that is likely to result in a radiation dose
- 501 to an embryo or fetus of more than 0.3 mSv, seek confirmation from the
- 502 medical practitioner that the pregnancy status of the patient has been
- 503 established; or
- 504 (b) in circumstances where an approved procedure is conducted in
- 505 accordance with clause 3.3.4(a)(ii), take all reasonable steps to establish
- 506 the pregnancy status of the patient.

507 3.3.7 The operator must take into account the relevant requirements of Schedule B

508 for females in whom pregnancy cannot be excluded and who are undergoing

509 a radiation exposure, particularly if abdominal and pelvic regions are

510 involved.

511 **Control of exposure to persons other than the patient**

512 3.3.8 During all procedures involving ionizing radiation, the operator must:

- 513 (a) ensure that any person who is not required to be in attendance during
514 the radiation exposure leaves the room before the exposure
515 commences;
- 516 (b) ensure that visual surveillance of the patient is maintained throughout
517 an imaging or radiotherapy procedure; and
- 518 (c) report any radiation incident within 24 hours to the:
- 519 (i) medical practitioner; and
- 520 (ii) Responsible Person.

521 **3.3.9** The operator of equipment that delivers external beam radiotherapy or intra-
522 operative radiotherapy must:

- 523 (a) ensure that no-one other than the patient receiving the treatment is in
524 the room during the time that the equipment is emitting radiation,
525 unless:
- 526 (i) the circumstances are specified in the Radiation Management
527 Plan; and
- 528 (ii) such persons remain behind protective screens,
- 529 (b) continuously oversee the operating parameters of the equipment during
530 the exposure; and
- 531 (c) immediately terminate the exposure if:
- 532 (i) there is any concern that the equipment will not deliver the
533 correct patient exposure; or
- 534 (ii) any person other than the patient might be accidentally exposed.

535 **Equipment**

536 **3.3.10** The operator of radiation emitting equipment must ensure that safety
537 interlock devices are not bypassed at any time during routine clinical use of
538 the equipment.

539 **Equipment malfunction or error**

540 **3.3.11** The operator of medical radiation equipment, or associated apparatus, who
541 experiences any malfunction or error of equipment or system, or unusual
542 operating behaviour must immediately:

543 (a) record the details of the malfunction or error; and

544 (b) report it to:

545 (i) the medical practitioner; and

546 (ii) the Responsible Person.

Schedule A

Radiation Management Plan

A1 PREPARATION OF THE RADIATION MANAGEMENT PLAN

A1.1 The Radiation Management Plan¹⁰ must address the following:

- (a) work practices and protocols for all procedures involving medical exposure to ionizing radiation, including those:
 - (i) to ensure that the prescribed radiation procedure is performed on the correct patient;
 - (ii) for the proper planning and delivery of radiotherapy doses;
 - (iii) for preparation and dispensing of radiopharmaceuticals; and
 - (iv) for optimising the protection of the patient consistent with section 2 of this Code,
- (b) construction and shielding of the medical practice so that:
 - (i) a **dose constraint** of not more than 5 mSv per annum is applied for occupationally exposed persons;
 - (ii) a dose constraint of not more 0.3 mSv per annum is applied for members of the public,
- (c) the action to be taken if the radiation doses to occupationally exposed persons or members of the public are found to exceed the dose constraints;
- (d) optimisation of the shielding so that external radiation exposure rates are kept ALARA; and
- (e) observation of the patient by the operator throughout the entire procedure¹¹;
- (f) the training, qualifications and supervision of the staff of the medical practice and their roles and responsibilities;
- (g) personal radiation monitoring requirements for persons involved in the use of radiation;
- (h) personal protective equipment to be worn by persons involved in the use of radiation;
- (i) actions necessary to manage a radiation incident, including reporting and investigation of the radiation incident;
- (j) emergency procedures to cover radiation incidents;
- (k) a quality assurance program that includes planned and systematic actions necessary to provide adequate confidence that a structure, system, component or procedure will:
 - (i) perform satisfactorily and safely;
 - (ii) comply with agreed standards; and
 - (iii) include quality control, with particular emphasis on the optimisation of radiation protection,
- (l) arrangements for the storage of radioactive material;

¹⁰ The Radiation Management Plan may make reference to, and utilise, other documented safety procedures and work practices.

¹¹ Observation may be effected by indirect means such as video surveillance.

- 587 (m) arrangements for the transport of radioactive material;
588 (n) mechanisms for implementation and review, including the arrangements for
589 provision of expert advice in radiation protection, of the Radiation
590 Management Plan; and
591 (o) any other requirement that may have a bearing on radiation safety.

592 A1.2 Where other documented safety procedures and work practices that exist within the
593 organisation are referred to or utilised:

- 594 (a) the Responsible Person must have authority over the safety procedures and
595 work practices referred to; and
596 (b) the safety procedures and work practices referred to must not be modified
597 without consideration of the effect on the Radiation Management Plan.

598 **A2 PREPARATION OF A RADIOACTIVE WASTE MANAGEMENT PLAN**

599 A2.1 The Radioactive Waste Management Plan must address the following:

- 600 (a) mixed waste hazards¹²;
- 601 (b) the necessary equipment and instructions for the safe handling and disposal of
602 all radioactive waste in accordance with any authorisation issued by the
603 relevant regulatory authority;
- 604 (c) procedures to ensure that all persons involved in the handling of radioactive
605 waste receive, understand and comply with the radioactive waste management
606 plan;
- 607 (d) the storage of all radioactive waste in adequately shielded containers or in a
608 secure shielded room, as appropriate to the nature of the waste, so as to
609 ensure no member of the public receives an effective dose greater than
610 0.3 mSv per annum as a consequence of the storage;
- 611 (e) procedures to ensure that all radioactive waste leaving the facility, either as
612 gaseous or liquid effluent discharged to the environment or sewerage system,
613 does so within the relevant discharge limits specified in the National Directory
614 of Radiation Protection; and
- 615 (f) provision of advice to the relevant regulatory authority of any radiation
616 incident which has resulted in:
- 617 (i) a discharge of effluent in excess of the relevant discharge limit; or
618 (ii) spillage of radioactive waste during transport.

619

¹² The radioactive waste may also be flammable, toxic, infectious or putrescible material.

Schedule B

Protection of an Embryo or Fetus

B1 PROCEDURE IF PATIENT IS PREGNANT

B1.1 The radiation exposure of pregnant patients that may result in a radiation dose of more than 0.3 mSv to an embryo or fetus must:

- (a) be justified on an individual basis;
- (b) include an assessment of the risks to the:
 - (i) embryo or fetus from the radiation exposure; and
 - (ii) patient if the procedure is not performed.

B1.2 Before approving a radiotherapy treatment plan for a pregnant patient, an estimate of the expected embryonic or fetal dose must be obtained to assess and consider the radiation risk to the embryo or fetus.

B1.3 Where it is decided that a medical radiation procedure that may result in a radiation dose of more than 0.3 mSv to the embryo or fetus is necessary or advisable for a woman who is pregnant, the risks must be fully explained to:

- (a) the referrer; and
- (b) the pregnant woman,

before the procedure is carried out.

B1.4 When planning a radiotherapy treatment for a patient known to be pregnant, the embryo or fetus must be protected as much as possible by optimal treatment planning and shielding.

B2 PROCEDURE IF AN EMBRYO OR FETUS HAS BEEN INADVERTENTLY IRRADIATED

B2.1 Where a radiation dose received by the embryo or fetus may be more than 0.3 mSv, the dose to the embryo or fetus from the procedure must be calculated.

B2.2 Where the radiation dose to the embryo or fetus is calculated to be more than 0.3 mSv:

- (a) advice must be sought from the patient regarding any other medical radiation procedures which may have taken place during gestation;
- (b) the referrer must be provided with information about the:
 - (i) radiation dose to the embryo or fetus; and
 - (ii) likely risks to the embryo or fetus.
- (c) the patient must be:
 - (i) informed about the magnitude of the radiation dose to the embryo or fetus; and
 - (ii) counselled about any potential risks¹³.

¹³ Termination of the pregnancy at an embryonic/fetal radiation dose of less than 100 mSv is not justified on a radiation risk basis alone.

657 **Schedule C**

658

659 **Protection of a Child**

660 **C1 PROCEDURES TO AVOID RADIATION EXPOSURE FROM BREAST-**
661 **FEEDING**

662 C1.1 Before commencing a nuclear medicine procedure, every female patient of
663 childbearing age must be queried by the administering person whether she is breast-
664 feeding a child.

665 C1.2 Where a nuclear medicine patient is breast-feeding a child, advice must be given to
666 the patient about any recommended restriction of breast-feeding with the object of
667 ensuring that the breast-fed child will not receive an effective dose greater than
668 1 mSv.

669 C1.3 A patient who is breast-feeding a child must be advised of the risks, to the both the
670 child and the patient, of continued breast-feeding before:

- 671 (a) commencing radiopharmaceutical therapy; or
672 (b) the intravenous administration of a diagnostic gallium-67
673 radiopharmaceutical.

674 **C2 PROCEDURES TO AVOID SECONDARY RADIATION EXPOSURE OF A**
675 **CHILD UNDER CLOSE CARE**

676 C2.1 Before commencing a therapeutic nuclear medicine procedure or a radioactive
677 implant, every patient must be queried by the administering person whether he or
678 she is involved with close care of a child.

679 C2.2 A patient who has received a therapeutic radiopharmaceutical or a radioactive
680 implant, and who is involved with close care of a child, must be provided with advice
681 relative to external radiation dose on:

- 682 (a) the length of time for which he or she can hold, or be in close proximity to, the
683 child; and
684 (b) the date or time after which no restrictions will be necessary.

685 **Schedule D**

686 **D1 BRACHYTHERAPY TREATMENT PLANNING**

687 D1.1 The basic data for each available computer treatment planning program must be
688 verified for:

- 689 (a) correct exposure rate constant;
- 690 (b) parameters for tissue attenuation and scatter;
- 691 (c) source wall information;
- 692 (d) anisotropy;
- 693 (e) source activity; and
- 694 (f) the half-life of the radioisotope.

695 **D2 TESTING OF TREATMENT PLANNING EQUIPMENT**

696 D2.1 Before computer treatment planning equipment is introduced clinically, it must be
697 tested to ensure that the:

- 698 (a) computed dose distributions for all of the external radiotherapy beams
699 intended to be used, compared with measured data, are within acceptable
700 tolerances;
- 701 (b) computed dose distributions for all the available brachytherapy sources are
702 within tolerances of published or measured data; and
- 703 (c) critical data input and output devices are operating correctly.

704 D2.2 A standard set of beam profiles and depth dose measurements must be:

- 705 (a) generated by the computer treatment planning program; and
- 706 (b) compared with measured reference data.

707 D2.3 The computer treatment planning equipment must be retested when the
708 radiotherapy equipment to be used is different from that with which the system had
709 been tested.

710 D2.4 Where the planning computer software is changed or upgraded, standard computer
711 generated plans for a comprehensive range of treatment techniques must be
712 compared with:

- 713 (a) previous plans;
- 714 (b) manually calculated plans; or
- 715 (c) directly simulated phantom dosimetry measurements, and
716 any discrepancy between dosimetry plans must be resolved before clinical use.

Bibliography

717
718

719 ARPANSA 2001, Australian Radiation Protection and Nuclear Safety Agency 2001, Code of
720 Practice for the Safe Transport of Radioactive Material, Radiation Protection Series No. 2
721 (RPS2), ARPANSA, Yallambie. (<http://www.arpansa.gov.au/pubs/rps/rps2.pdf>)

722 ARPANSA 2002, Recommendations for limiting exposure to ionizing radiation (1995)
723 (Republished 2002), and National Occupational Health and Safety Commission 2002,
724 National standard for limiting occupational exposure to ionizing radiation (1995),
725 (Republished 2002), Radiation Protection Series No. 1 (RPS1), ARPANSA, Yallambie.
726 (<http://www.arpansa.gov.au/pubs/rps/rps1.pdf>)

727 ARPANSA 2004, Australian Radiation Protection and Nuclear Safety Agency 2004, National
728 Directory for Radiation Protection - Edition 1.0, Radiation Protection Series No. 6 (RPS6),
729 ARPANSA, Yallambie. (<http://www.arpansa.gov.au/pubs/rps/rps6.pdf>)

730 ARPANSA 2002, Australian Radiation Protection and Nuclear Safety Agency
731 2002, Recommendations for the Discharge of Patients Undergoing Treatment with
732 Radioactive Substances (2002), Radiation Protection Series No. 4 (RPS4), ARPANSA,
733 Yallambie. (<http://www.arpansa.gov.au/pubs/rps/rps4.pdf>)

734 NHMRC 1986, National Health and Medical Research Council 1987, Code of Practice for the
735 Safe Handling of Corpses Containing Radioactive Materials (1986), Radiation Health Series
736 No. 18, NHMRC, Canberra. (<http://www.arpansa.gov.au/pubs/rhs/rhs18.pdf>)

737

738 **Glossary**

739 **Absorbed dose**

740 the energy absorbed per unit mass by matter from ionizing radiation which impinges upon it.

741 Absorbed dose, D , is defined by the expression:

$$742 \quad D = \frac{dE}{dm}$$

743 where dE is the mean energy imparted by ionizing radiation to matter of mass dm .

744 The unit of absorbed dose is joule per kilogram (J kg^{-1}), with the special name gray (Gy).

745 **ALARA**

746 A principle of radiation protection philosophy that requires that exposures to ionizing
747 radiation should be kept as low as reasonably achievable, economic and social factors being
748 taken into account. The ALARA principle is equivalent to the principle of optimisation
749 defined by the ICRP, which states that protection from radiation exposure is optimum when
750 the expenditure of further resources would be unwarranted by the reduction in exposure that
751 would be achieved.

752 **Authorisation**

753 a written permission granted by the relevant regulatory authority for an operating
754 organisation to perform specified practices. The form of an authorisation can include a
755 licence, registration, or accreditation.

756 **Carer**

757 a person who voluntarily, willingly and knowingly assists or helps in the care, support or
758 comfort of patients undergoing a diagnostic or therapeutic medical radiation procedure.

759 **Deterministic effect**

760 an effect, such as partial loss of function of an organ or tissue, caused by radiation and
761 manifest only above some threshold of dose, the severity of the effect depending upon the
762 dose received.

763 **Detriment**

764 a measure, or measures, of harm caused by exposure to radiation and usually taken to mean
765 health detriment; it has no single definition, but can be taken to be an attribute or a
766 collection of attributes which measure harm, such as attributable probability of death and
767 reduction of life expectancy.

768 **Diagnostic reference level (DRL) for medical exposure**

769 dose levels for medical exposures in medical radiodiagnostic practices or levels of activity in
770 the case of radiopharmaceuticals applied to groups of standard-sized patients or standard
771 phantoms for common types of diagnostic examination and broadly defined types of
772 equipment. These levels are expected not to be exceeded for standard procedures when good
773 and normal practice regarding diagnostic and technical performance is applied. DRLs will
774 be set by relevant professional bodies and published by ARPANSA from time to time.

775 **Dose**

776 a generic term that may mean **absorbed dose**, **equivalent dose** or effective dose
777 depending on context.

778 **Dose constraint**

779 a prospective restriction on anticipated dose, primarily intended to be used to discard
780 undesirable options in an optimisation calculation.

781 In occupational exposure, a dose constraint may be used to restrict the options considered in
782 the design of the working environment for a particular category of employee.

783 In medical exposure, a dose constraint for volunteers in medical research may be used to
784 restrict the options considered in the design of an experimental protocol.

785 In **public exposure**, a dose constraint may be used to restrict the exposure of the critical
786 group from a particular source of radiation.

787 **Effective dose**

788 a measure of dose which takes into account both the type of radiation involved and the
789 radiological sensitivities of the organs and tissues irradiated.

790 Effective dose, E , is the sum of weighted equivalent doses in all organs and tissues of the
791 body. It is given by the expression:

792
$$E = \sum_T w_T H_T$$

793 where H_T is the equivalent dose in organ or tissue T and
794 w_T is the tissue weighting factor for that organ or tissue.

795 The unit of effective dose is J kg^{-1} , with the special name sievert (Sv).

796 **Equivalent dose**

797 a measure of dose in organs and tissues which takes into account the type of radiation
798 involved.

799 Equivalent dose, H , is a weighted dose in an organ or tissue, with the radiation weighting
800 factor(s) determined by the type and energy of the radiation to which the organ or tissue is
801 exposed. The equivalent dose H_T in organ or tissue T is given by the expression:

802
$$H_T = \sum_R w_R D_{T,R}$$

803 where $D_{T,R}$ is the absorbed dose averaged over the organ or tissue T due to radiation
804 R and
805 w_R is the radiation weighting factor for that radiation.

806 The unit of equivalent dose is the same as for absorbed dose, J kg^{-1} , with the special name
807 sievert (Sv).

808 **Interventional radiology**

809 procedures comprising guided therapeutic and diagnostic interventions, by percutaneous or
810 other access, usually performed under local anaesthesia or sedation, with fluoroscopic
811 imaging used to localise the lesion/treatment site, monitor the procedure, or control and
812 document the therapy or diagnosis.

813 **Ionizing radiation**

814 radiation which is capable of causing ionization, either directly (for example: for radiation in
815 the form of gamma rays and charged particles) or, indirectly (for example: for radiation in
816 the form of neutrons).

817 **Medical exposure**

818 exposure of a person to radiation received as a patient undergoing medical diagnosis or
819 therapy, or as a volunteer in medical research, or non-occupational exposure received as a
820 consequence of assisting an exposed patient.

821 **Medical practitioner**

822 the practitioner responsible for the overall conduct of the procedure involving the exposure
823 of the patient to ionizing radiation. In nuclear medicine, this person will normally be a
824 nuclear medicine specialist, in radiation oncology, this person will normally be a radiation
825 oncologist and in diagnostic or interventional radiology, this person will usually be a
826 radiologist, but might also be, for example, a cardiologist or general practitioner.

827 **Nuclear medicine**

828 the scientific and medical specialty that utilises the properties of radionuclides to make
829 diagnostic evaluations of the physiologic and or anatomic conditions of the body and to
830 provide therapy with **unsealed radioactive sources**.

831 **Occupational exposure**

832 exposure of a person to radiation which occurs in the course of that person's work and which
833 is not excluded exposure¹⁴.

834 **Operator**

835 any natural person who is authorised by the relevant regulatory authority to administer
836 radiation to a patient for radiology, nuclear medicine or radiotherapy.

837 **Personal radiation monitoring device**

838 a device designed to be worn by a person to monitor any radiation dose received by the
839 person.

840 **Practice**

841 a type of human activity; in a radiological context, a human activity which may result in
842 exposure to ionizing radiation and to which a system of radiation protection applies.

843 **Public exposure**

844 exposure of a person, or persons, to radiation which is neither occupational nor medical
845 exposure.

846 **Qualified expert**

847 a person who:

- 848 (a) is qualified in the application of the physics of therapeutic or diagnostic uses of
849 ionizing radiation; and
- 850 (b) has been recognised by the relevant regulatory authority as being able to perform
851 the dosimetric calculations, measurements and monitoring relevant to the
852 person's area of expertise¹⁵.

853 **Radiation**

854 electromagnetic waves or quanta, and atomic or sub-atomic particles, propagated through
855 space or through a material medium.

¹⁴ Excluded exposure means the component of exposure that arises from natural background radiation.

¹⁵ Competency requirements for a qualified expert will be listed in future editions of the *National Directory for Radiation Protection*.

856 **Radiation incident**

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

863 **Radioactive material**

864 material which spontaneously emits ionizing radiation as a consequence of radioactive
865 decay.

866 **Radiology**

867 the use of X-rays to diagnose disease or injury.

868 **Radiotherapy**

869 the therapeutic use of ionizing radiation from radiation-producing equipment and sealed
870 radioactive sources.

871 **Referrer**

872 a registered medical practitioner, dentist or other health professional who is entitled to refer
873 individuals to the medical practitioner who will be responsible for the overall conduct of the
874 procedure involving the exposure of the patient to ionizing radiation.

875 **Relevant regulatory authority**

876 the radiation protection authority or authorities designated, or otherwise recognized, for
877 regulatory purposes in connection with protection and safety relating to medical applications
878 of ionizing radiation. A list of radiation protection authorities in Australia is included in
879 Annex 1 of this Code.

880 **reportable radiation incident**

881 a radiation incident as defined in Schedule 13 of the *National Directory for Radiation*
882 *Protection*.

883 **Responsible Person**

884 in relation to any radioactive source, radiation apparatus, prescribed radiation facility or
885 premises on which unsealed radioactive sources are stored or used means the legal person:

886 (a) having overall management responsibility including responsibility for the security
887 and maintenance of the source, apparatus, or facility;

888 (b) having overall control over who may use the source or apparatus, or facility; and

889 (c) in whose name the source, apparatus, or facility, would be registered if this is
890 required.

891 **RPS1**

892 the *Recommendations for limiting exposure to ionizing radiation (1995) (NOHSC guidance*
893 *note)* and the *National standard for limiting occupational exposure to ionizing radiation.*
894 *Radiation Protection Series No. 1.*

895 **Sealed radioactive source**

896 a radioactive substance bonded within metals or sealed in a capsule or other container in
897 such a way as to-

- 898 (a) minimise the possibility of escape or dispersion of the radioactive substance;
899 and
900 (b) allow the emission of ionizing radiation for use as required.

901 **Transport Code, the**

902 the Code of Practice for the Safe Transport of Radioactive Material 2001 published by the
903 Chief Executive Officer of ARPANSA in September 2001. Radiation Protection Series No. 2.

904 **Unsealed radioactive source**

905 a radioactive source that is not a sealed radioactive source.

906 **Annex 1**

907

908 **Regulatory Authorities**

909 Where advice or assistance is required from the relevant regulatory authority, it may be
910 obtained from the following officers:

COMMONWEALTH, STATE / TERRITORY	CONTACT
Commonwealth	Chief Executive Officer ARPANSA PO Box 655 Miranda NSW 1490 Email: info@arpansa.gov.au Tel: (02) 9541 8333 Fax: (02) 9541 8314
Australian Capital Territory	Manager Radiation Safety Radiation Safety Section ACT Health Locked Bag 5 Weston Creek ACT 2611 Email: radiation.safety@act.gov.au Tel: (02) 6207 6946 Fax: (02) 6207 6966
New South Wales	Manager Hazardous Materials and Radiation Section Department of Environment and Climate Change PO Box A290 Sydney South NSW 1232 Email: radiation@environment.nsw.gov.au Tel: (02) 9995 5000 Fax: (02) 9995 6603
Northern Territory	Manager Radiation Protection Radiation Protection Section Department of Health and Community Services GPO Box 40596 Casuarina NT 0811 Email: envirohealth@nt.gov.au Tel: (08) 8922 7152 Fax: (08) 8922 7334
Queensland	Director, Radiation Health Department of Health 450 Gregory Terrace Fortitude Valley QLD 4006 Email: radiation_health@health.qld.gov.au Tel: (07) 3406 8000 Fax: (07) 3406 8030
South Australia	Director, Radiation Protection Division Environment Protection Authority PO Box 721 Kent Town SA 5071 Email: radiationprotection@epa.sa.gov.au Tel: (08) 8130 0700 Fax: (08) 8130 0777
Tasmania	Senior Health Physicist Health Physics Branch Department of Health and Human Services GPO Box 125B Hobart TAS 7001 Email: health.physics@dhhs.tas.gov.au Tel: (03) 6222 7256 Fax: (03) 6222 7257
Victoria	Manager, Radiation Safety Section Department of Human Services GPO Box 4057 Melbourne VIC 3001 Email: radiation.safety@dhs.vic.gov.au Tel: 1300 767 469 Fax: 1300 769 274
Western Australia	Secretary, Radiological Council Locked Bag 2006 PO Nedlands WA 6009 Email: radiation.health@health.wa.gov.au Tel: (08) 9346 2260 Fax: (08) 9381 1423

911 **Please note:** This table was correct at the time of printing but is subject to change from
912 time to time. For the most up-to-date list, the reader is advised to consult the ARPANSA
913 web site (www.arpansa.gov.au). For after hours emergencies only, the police will provide the
914 appropriate emergency contact number.

915 **Contributors to Drafting and Review**

916

917 **WORKING GROUPS**

918

919 **Convenors**

920 **Members**

921

922 **ORGANISATIONS/PERSONS CONTRIBUTING TO THE DEVELOPMENT OF THIS**
923 **PUBLICATION**

924 **Index**

925

926