

SUMMARY OF SUBMISSIONS AND RESPONSES
DRAFT CODE OF PRACTICE FOR SAFE USE OF RADIATION IN VETERINARY SCIENCE

SUBMITTER	COMMENT	RESPONSE																														
<p>01 Keith Baldry, SA EPA</p>	<p>3.4.1 The Responsible Person must ensure that: (a) the fastest film and film-intensifying screen combination compatible with acceptable image quality is used; (b) cassettes and intensifying screens are cleaned and maintained; [Digital Radiography – the correct use of digital radiography should be included]</p> <p>(page 23) TABLE 1 HALF VALUE LAYERS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Column 1</th> <th style="text-align: center;">Column 2</th> <th style="text-align: center;">Column 3</th> </tr> <tr> <th style="text-align: center;">Equipment Type</th> <th style="text-align: center;">Operating Potential kilovolt peak (kVp)</th> <th style="text-align: center;">Half Value Layer (mm Al. eq.)</th> </tr> </thead> <tbody> <tr> <td rowspan="8" style="vertical-align: top;">Equipment designed to operate with X-ray tube potentials up to 120 kilovolts peak (kVp)</td> <td style="text-align: center;">50</td> <td style="text-align: center;">1.5</td> </tr> <tr> <td style="text-align: center;">60</td> <td style="text-align: center;">1.6</td> </tr> <tr> <td style="text-align: center;">70</td> <td style="text-align: center;">1.8</td> </tr> <tr> <td style="text-align: center;">80</td> <td style="text-align: center;">2.1</td> </tr> <tr> <td style="text-align: center;">90</td> <td style="text-align: center;">2.3</td> </tr> <tr> <td style="text-align: center;">100</td> <td style="text-align: center;">2.6</td> </tr> <tr> <td style="text-align: center;">110</td> <td style="text-align: center;">2.9</td> </tr> <tr> <td style="text-align: center;">120</td> <td style="text-align: center;">3.2</td> </tr> <tr> <td rowspan="3" style="vertical-align: top;">Equipment designed to operate with X-ray tube potentials above 120 kVp</td> <td style="text-align: center;">130</td> <td style="text-align: center;">3.5</td> </tr> <tr> <td style="text-align: center;">140</td> <td style="text-align: center;">3.8</td> </tr> <tr> <td style="text-align: center;">150</td> <td style="text-align: center;">4.1</td> </tr> </tbody> </table> <p>[Half value layers differ from state to state eg. : @ 80 kVp NSW, Qld, SA – 23 @ 60 kVp NSW 1.8, SA 1.3 etc]</p> <p>3.12.3 Each capacitor discharge x-ray unit must meet the relevant requirements of Sections 3.8 and 0. [3.9?]</p> <p>3.13.5 Personal protective devices made of lead impregnated rubber or plastic such as aprons, gloves and shields suitable for hand and forearm protection, must be provided for all persons who are:</p>	Column 1	Column 2	Column 3	Equipment Type	Operating Potential kilovolt peak (kVp)	Half Value Layer (mm Al. eq.)	Equipment designed to operate with X-ray tube potentials up to 120 kilovolts peak (kVp)	50	1.5	60	1.6	70	1.8	80	2.1	90	2.3	100	2.6	110	2.9	120	3.2	Equipment designed to operate with X-ray tube potentials above 120 kVp	130	3.5	140	3.8	150	4.1	<p>This former requirement is now a safety guide advisory statement and includes reference to digital radiography.</p> <p>This table has changed and covers the HVL vs the operating potential, irrespective of the type of equipment.</p> <p>It is not considered to be an onerous requirement to add less than 0.5 mm of aluminium to bring the HVL up to the level specified in the revised table.</p> <p>Now Schedule B9. The correct referencing is now made.</p> <p>Now in the Safety Guide (not mandatory). Also, prescription of material type has been removed.</p>
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[Composite material protective shields are now available]

5.1 PROCEDURES AND FACILITIES

Nuclear medicine involves the use of **unsealed radioactive sources [materials]** (i.e. liquid, aerosol or gaseous materials) for either diagnostic or therapeutic purposes. It introduces a further dimension of hazard in terms of ensuring adequate containment of the radioactive material during preparation, administration and in the subsequent care of the animal.

[For consistency, refer “unsealed” sources to unsealed radioactive materials – whereas for “sealed” as in radiotherapy 4.3 use sealed radioactive sources. (use “word search” for global replace)]

5.1.1 Diagnostic veterinary nuclear medicine must only be undertaken by personnel who:

- (b) have practical experience in:
 - (i) nuclear medicine instrumentation;
 - (ii) imaging procedures;
 - (iii) quality control;**

[in instrumentation or radiopharmaceuticals?]

5.1.12 Dedicated facilities must be used for nuclear medicine procedures for:

- (d) **housing of the animals before discharge once the studies are completed.**

[Is this requirement necessary?]

5.1.16A record of the receipt, use and disposal of **all radionuclides [radioactive materials]** must be maintained.

Schedule B Survey Meters

B1.1 The radiation survey meter required by Clause **4.2.1** must: **[should be Clause 4.3.1 and 5.1.7]**

Annex 3 Guide to Manual Processing of Radiographs (Para 4)

With respect to the time-temperature relationship, the use of a fixed temperature and a fixed time of development is strongly recommended. If a fixed temperature is not achieved, it is important that the temperature of the developing solution be measured and a time of development employed appropriate to that temperature. This is calculated from a time-temperature **chart. [(to include) ...time-temperature chart for the developer used as provided by the manufacturer.]**

Done.

Now Schedule C1.2(b): “of the radiopharmaceuticals” added.

Now Schedule C1.5(e): The WG believes that this is necessary for radiation protection and waste disposal/removal purposes.

Now Schedule C 1.9: Done.

Survey meters now a requirement within the Radiation Management Plan. Annex D of the Safety Guide provides guidance on the survey meter.

Now Annex G: Done.

	<p>Developer heater: For example, an adjustable temperature tropical aquarium heater. This should be used in conjunction with a core balance leakage circuit breaker to minimise the risk of electric shock.</p> <p>[N.B. Glow from some heater elements may cause light fogging on films being developed.]</p> <p>Processing Guide</p> <p>10. After the 30 minutes, briefly rinse the film in a small tank of water containing a wetting agent solution. Drain the films and hang to dry – warm moving air is most effective.</p> <p>NOTE: Steps 1 - 8 must carried out under a safe-light. [under safe-light conditions]</p>	<p>Done.</p> <p>Done.</p>
<p>02 Cynthia Kardell</p>	<p>I have recently had the need to consider the relevant law in respect to the therapeutic use of radioactive iodine as I have had my cat treated for hyperthyroidism.</p> <p>He was given 175 mega becquerals of iodine by subcutaneous injection, for moderately enlarged bilateral nodes at my local vet at Gladesville, NSW. A surface doserate about 22mr/hr was measured up close to his head after about 48 hours.</p> <p>I am concerned that the draft code only addresses the use of iodine delivered by capsule, to be ingested and absorbed into the food chain.</p> <p>My concerns are:</p> <ol style="list-style-type: none"> 1. The Code does not regulate a regime currently in use: it only provides for treatment by capsule. 2. A dose by capsule would require a larger dose than that delivered by injection as the delivery is much less local and direct. As presumably the dose would need to be calculated to allow for most of the activity to be discharged in urine and faeces in the first three days. 3. That is, the public health requirements as to isolation and the safe discharge of the animal would presumably be different for each of the treatments and would need to be stated. 4. Unless the different forms of treatment are specified the public is open to being mislead and possibly overcharged in terms of the required accommodation. The vet could assert at least 5 days isolation at the vets was required when it was not, for a treatment by injection. 	<p>Now Schedule C2.2: This section has been amended to include intravenous or subcutaneous injection.</p> <p>Further, the justification and optimisation requirements subsequently added to the Code should ensure that the most appropriate method is used.</p>

	<p>5. The public are in a position of ignorance and have to be able to trust that the vet is providing proper advice.</p> <p>6. The Code should require that a copy of the requirements, in simple language and under the auspices of the EPA is provided to the owner. It should include some information as to the RRP for iodine in capsule or volume by injection. The public should not have to rely on the vet in this.</p> <p>I used to work in radiation oncology and so, have some knowledge. I am conscious that for most of the public, it could be a very different matter and it is not sufficient to say that the treatment is being given by a properly licensed person.</p> <p>I trust that the draft code, when it becomes the law, will have been changed to accurately reflect the current practice and I will periodically check your website in anticipation of that.</p>	
<p>03 Karin C Mogg Currimundi Veterinary Surgery</p>	<p>I would like to make the following comments regarding the Draft Code of Practice for Safe Use of Radiation in Veterinary Science:</p> <ol style="list-style-type: none"> 1. I own a small animal practice in Queensland. We only use xrays for diagnostic imaging. Our frequency of use is 1-3 xray examinations per month. 2. We currently have a 3 monthly monitoring system in place consisting of 2 dosimeters. One as an area monitor and the other as a "control". At last reading, the control measured 2.2 uGy/day for the 3 month period and the area monitor measured MDL of xrays. The area monitor is attached to the unit and is located approximately 1m from the primary beam. Staff present in the designated area where possible remain at least 1 m from the primary beam. In addition to the licensed user, one of 3 veterinary nurses may be present in the designated area at the time of radiography. 3. In this situation, the requirements of section 7.1.1 (a) become rather cumbersome, i.e. the requirement for each person exposed to be issued with a monitor. I would suggest that for low use situations such as ours that the area/control monitoring system be used and individual monitoring only be implemented when the area monitor detects sufficient radiation exposure warrant monitoring of individuals. 	<p>Now clause 3.1.9: "...is provided to each occupationally exposed person who is likely to be exposed to ionizing radiation in excess of 1 mSv in any one year" has been added to that requirement. That should cover the low exposure issue.</p>
<p>04 Dr Caroline Mansfield</p>	<p>1. This submission concerns the administration of radioactive Iodine (I131) to cats with hyperthyroidism only (section 5.2.2)</p>	<p>Now Schedule C2.2: This section has been amended to include intravenous or subcutaneous injection.</p>

It is considered that a safer and more accurate method of administering radioactive iodine is by administration of an injectable form of the isotope I¹³¹. This practice is similar to that adopted by many institutions and higher education centres world wide.

There are several advantages with this method, as compared to administration of a capsule to a heavily sedated animal. They are as follows:

- There is significant risk to the person handling the capsule due to the high likelihood of vomiting after administration of a capsule with a large volume of water in a heavily sedated animal. The vomitus (containing the capsule) must then be cleaned as appropriate. Even with sedation there is a high risk of the sedated animal biting the person administering the capsule.
- Physically handling a capsule is technically difficult even with the use of forceps and there is a greater risk of dropping the capsule than if an injection is used.
- There is significantly less risk to the animal with injection rather than capsule due to the following:
 - Most cats with hyperthyroidism are unwell and because they have not been medicated for a minimum of 2-4 weeks prior to I¹³¹ treatment they may have significant cardiac arrhythmias that may increase the risk of heavy sedation. Sedation for administration of a sub-cutaneous injection is by necessity not required to be as heavy as for capsule administration
 - There is a significant risk of aspiration pneumonia developing using the oral capsule technique
 - Another significant risk is oesophagitis following vomiting on recovery
 - Injection of a substance under the skin is significantly less stressful for cats than oral administration of a capsule and liquid bolus

Many overseas countries also hospitalise their cats in appropriate wards for 2-4 weeks so that when discharged owners can have full contact with their pets, thus significantly decreasing the risk to owners.

As this is a treatment for a medical condition it is considered appropriate that qualified veterinary surgeons with expertise or experience in this condition (i.e. specialist training or qualifications in internal medicine) should be allowed to determine dosage required, order the drug and administer the drug. The Responsible Person would still be responsible for monitoring overall radiation exposure and safety.

05
 Dr WH Round
 Australasian College of
 Physical Scientists &
 Engineers in Medicine

The Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) welcomes the opportunity to review and comment on the Draft Discussion Document ‘Code of Practice for Safe Use of Radiation in Veterinary Science’ as prepared by ARPANSA.

Individual members, who have some expertise and experience in radiation protection, have provided a number of minor comments and suggestions that would improve the document or make it more useful to the potential stake holders. These are provided in the attached pages.

General Comments

Firstly, this Draft Document relates to the responsibilities of the ‘responsible person and the veterinary surgeon’. In other draft COPs the requirements for each person or body are grouped together. In this COP the requirements for veterinary radiology are very much distributed throughout section 3. For example, we have clauses 3.2.1, 3.3.1, 3.3.2, 3.3.3, 3.4.1, all of 3.5, 3.6.2, 3.8.3 and perhaps others, all relating to the responsibilities of the responsible person for radiographic procedures. For consistency should this material not be reorganised? A similar situation occurs in section 4 dealing with radiotherapy.

Secondly, in section 3, dealing with radiology, reference is made to Standards. In some clauses it is not necessarily clear what Standards these are referring to whilst in other clauses it may be inferred that the text is referring to AS/NZS Standards applying to the Medical use of X-rays on humans. Is this latter reference intended and is it a reasonable requirement to expect veterinary equipment to perform to the same level as X-ray equipment used for humans? Specific examples are highlighted in the table below. It is noted that in clause 4.2 that veterinary equipment for radiotherapy must conform to normal safety requirements for medical X-ray equipment. If this is intended for radiology then perhaps a similar statement should appear in clause 3.8 which would help overcome this problem.

Specific Suggestions

Page #	line #s	Comment
12	181	Is the requirement to report all incidents or just those as required by National Directory? Some clarification may be warranted as it is probably unnecessary to report trivial ones.

Responsibilities on the veterinary surgeon have now been effectively removed. There are only indirect responsibilities on the veterinary surgeon through a direct responsibility on the Responsible Person or when the veterinary surgeon is also the operator of the radiation source.

Only relevant requirements of the Standards are now referred to, such as those that reduce scatter, relating to shielding or negating the need to hold equipment (thereby reducing operator dose).

3.1.13 requires a written report for reportable radiation incidents (as defined).

14	243	Dose constraint is not defined in glossary.	Definition included.
15	257-263	These lines are essentially duplicated by lines 330-335, which outline the responsibility of the veterinary surgeon. Would seem better placed in this latter position because it is the user of the X-ray equipment, not the responsible person, who must ensure these precautions are taken.	Obligations on the “veterinary surgeon” have now effectively been removed.
15	272-274	May be difficult to ensure absoluteness of this requirement. Would suggest weaken slightly by rewriting as: “ <i>The veterinary surgeon in charge of the radiography must endeavour to ensure....</i> ”	Removed.
17	363-364	Sub-clause (g) refers to Clause “0”??	Amended.
18	375-387	Not sure these lines require a clause number since material is informative only and contains no mandatory requirements. Material leads on to mandatory items in clause 3.6.2	Informative part included in Safety Guide. Mandatory part now in Schedule B3.
18	389-424	Clauses 3.6.2 and 3.6.3 contain similar requirements but they are imposed on different parties. Suspect requirements would be better split between the responsible person and the veterinary surgeon according to whether they relate to the provision of equipment (the responsible person) or they relate to the specific procedure (the vet.).	The effective duplication here is removed and the obligation is on the Responsible Person to make sure it happens.
23	Table 1	Are these HVL values compatible with any Standards as they are low compared with requirements for medical irradiation?	Table has been amended.
23	560-562	What is mean by “ <i>irradiation value</i> ”? Is <i>air kerma</i> intended?	“air kerma” now used.
23	569-574	Is this specification on alignment consistent with any Standard for veterinary X-ray equipment? As it is, it would not be consistent with Standards for Medical X-ray Equipment.	This is consistent with medical requirements and has an impact on the amount of scattered radiation.
24	597-598	Given the values subsequently provided in Table 2-4, the implication seems to be that the equipment must meet the requirements of AS/NZS for Medical X-ray Equipment. Is this intended and is this really a reasonable requirement?	The air kerma rates are now specified. These are considered reasonable due to scattered radiation.
26	630-631	Section “0”??	Rectified.
26	638-639	Footnote. Device is more commonly known as a <i>dark shutter</i> .	“or dark shutter” added to the footnote.

27	670-673	The specification should be 0.5 mm for gloves to be consistent with AS/NZS Standard that applies to radiology and should apply equally to veterinary radiology since this is occupational exposure we are talking about.	These are now safety guide items but no change has been made to the values.
32	878-883	This will be difficult to comply with as an owner is not likely to have access to such a shielded container. Perhaps the responsible person must provide such a container on release of animal.	Now Schedule 3.8(b)(iii): The owner should have something to place the dislodged seed or grain in. This should be noted in the advice given to the owner when the animal is released.
33	920	<i>Radioactive isotope</i> perhaps?	“radioisotope”
35	Footnote 27	Makes reference to Radiation Management Plan. Nowhere else in the document is this mentioned or its contents described.	“Radiation Management Plan” is now a significant requirement of the Code.
35	1032-1034	This seems a bit draconian as even medical use of radioisotopes does not require this type of approval. Perhaps a compromise is for therapeutic procedures only.	This is considered necessary as nuclear medicine procedures for animals are not as common as for humans.
36	1047-1072	For clarity clause 5.2.1 (a) to (k) needs some reorganization to consolidate requirements that apply to (a) imaging area, (b) animal accommodation, (c) both imaging area and accommodation and (d) other issues. For example, sub-clauses (d) to (f) apply to both imaging and accommodation but (g) a applies to just imaging.	This section (Schedule C2.1) has been reorganised.
37	1080-1082	Sub-clause (p) is not normal practice in nuclear medicine because of weight of aprons so why must it be here?	Removed.
38	1146-1148	For clarity rewrite as: <i>“instructions that if the cat urinates...”</i>	Done.
38	1149-1150	For clarity rewrite as: <i>“instructions to wear rubber gloves when cleaning up urine and to wash hands thoroughly afterwards.”</i>	Done.
39	1158-1159	There is a new edition (2004) of Standard with accompanying guide AS/NZS 2211.10:2004.	Done.
39	1164-1165	Some regulatory authorities have no requirements for training. Perhaps remove reference to regulatory requirement and combine with sub-clause 6.1.1(g).	Done.
40	1194-1202	Clause 7.1 does not seem to allow for any exemptions if doses are trivial (e.g. for office workers in next room etc). Sub-clause 7.1.1 also seems to put onus on Responsible Person rather than the Equipment Supplier to provide monitor for service personnel. This is not the usual	Wording changed to allow for exemptions if doses are trivial.

		practice.	
	42	1272-1276	Schedule B. The use of such difficult dose terms seems unnecessary for a COP designed for Vets. Why not just use equivalent dose rate?
	44	1318 & 1334	Delete these definitions in view of comments about their use in Schedule B.
	45	1346 & 1362	Other COPs do not define these terms by using mathematical equations. Suggest provide generic text description (See RPS 1).
	45	1392 & 1400	Do we need to define ICRU & ICRP?
	46	1405	The definition of incident should be expanded slightly, in keeping with draft Radiology COP, to read: <i>“any unintended or ill-advised event when using ionizing radiation apparatus, 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.”</i>
	53	1685	Should probably read <i>“bucky or fixed grid”</i> .
	61	2048	The Standard should be specified.
	62	2094	Should <i>element</i> be <i>isotope</i> ?
	63	2143	Neither glutaldehyde (Cidex) nor chlorhexidene is allowed as a sterilisation solution in Victorian Public Hospitals as they have substantial OH&S issues. We would question their use in vet practice as well. Ortho-phthalaldehyde (Cidex OPA) is recommended.
	65	2237-2246	The standards referred to have all been superseded by newer editions. There is also an accompanying guide AS/NZS 2211.10:2004 which goes with AS/NZS 2211.1.1:2004.
			<p>This is standard wording, but it is now in the safety guide anyway.</p> <p>(See previous comment).</p> <p>Standard definition.</p> <p>These terms are used so they should remain defined.</p> <p>Standard definition.</p> <p>Done.</p> <p>This is a safety guide item now so it can remain as non-descript.</p> <p>“radioisotope”</p> <p>Done.</p> <p>Done.</p>
06 Nola V Lester BSc, BVMS(Hons), Diplomate American College of Veterinary			<p>This comment refers specifically to Section 5.2.2 (page 37) – Treatment of feline hyperthyroidism with ¹³¹I in capsule form requiring oral administration.</p> <p>Most veterinarians that have experience in the diagnosis and treatment (whatever form) of feline hyperthyroidism will agree that hyperthyroid cats are generally</p>
			Now Schedule C2.2: This section has been amended to include intravenous or subcutaneous injection.

<p>Radiology Lecturer in Diagnostic Imaging School of Veterinary & Biomedical Sciences Division of Health Sciences Murdoch University</p>	<p>somewhat agitated and cantankerous, and can often be quite difficult to restrain. Administering any pill to these cats can be problematic, and exposes the veterinarian to unnecessary health and safety risks (cat bites and scratches). Indeed, many of these cats are presented for treatment because the owners are unable to administer tablets - often there has been a considerable period of time during which this has been attempted, and the cats have become very sensitized and resistant to tablet administration. Trying to hold a cat with one hand, open the mouth and administer a tablet with a pair of long handled forceps, followed by 20 ml of water via a syringe, introduces additional difficulties, particularly when trying to restrain the animal in a baby bath. Sedation of the patient may facilitate this process, however most sedatives interfere with oesophageal and gastrointestinal motility, and increase the risks of retention of tablets in the oesophagus, and regurgitation, vomiting or aspiration of tablets. Additionally most of these cats are aged and many are in sub-clinical renal failure and / or have cardiac disease; any use of sedatives must be both judicious and well justified.</p>	
<p>Jennifer Richardson BVMS, FACVSc(Radiology) Lecturer in Diagnostic Imaging Department of Veterinary Clinical Science School of Veterinary and Biomedical Sciences Murdoch University</p>	<p>The problem of retention of tablets in the oesophagus is well recognized in both humans and cats.^{1,2} It has been stated that “moderate delay in pill transit is a common event even in people with normal oesophageal motility” and that this risk increases with increasing age and medication in capsule form rather than tablet (more likely to stick to the mucosa).³ Graham et al. demonstrated that oesophageal transit time of capsules in clinically normal, unsedated cats was frequently prolonged (compared with tablets) and complete entrapment (retention for more than 4 hours) was common.</p>	
<p>Victoria Johnson BVSc, DVR, MRCVS Diplomate European College of Veterinary Diagnostic Imaging Registrar in Diagnostic Imaging School of Veterinary & Biomedical Sciences Division of Health Sciences Murdoch University</p>	<p>Alternative routes of administration for radioactive iodine include intravenous or subcutaneous injection. Studies have demonstrated that subcutaneous administration of radioactive iodine is as efficacious as intravenous administration, and significantly safer to personnel and less stressful to the cats.^{4,5} Subcutaneous injections can generally be administered by trained veterinarians quickly and easily without the need for sedation in most cats.</p>	
<p>Peter J. Irwin BVetMed, PhD, FACVSc, MRCVS Fellow, Australian College of Veterinary Scientists Associate Professor in Small Animal Medicine School of Veterinary & Biomedical Sciences Division of Health Sciences</p>	<p>When ¹³¹I is available in injectable form (e.g. from ANSTO), suitably qualified and trained veterinarians working in licensed facilities should have the option to administer it by injection.</p> <p>1. Graham JP, Lipman AH, Newell SM, Roberts GD. Esophageal transit of capsules in clinically normal cats. Amer J of Vet Research, Vol 61, No 6, June 2000</p>	

<p>Murdoch University</p> <p>Caroline Mansfield BSc BVMS MVM CertSAM MACVSc DECVIM-CA Lecturer in Small Animal Medicine School of Veterinary and Biomedical Science Murdoch University</p> <p>Anna Tebb MA, VETMB, MUM, CertSAM, MRCVS Registrar in Small Animal Medicine School of Veterinary & Biomedical Sciences Division of Health Sciences Murdoch University</p>	<ol style="list-style-type: none"> 2. German AJ, Cannon MJ, Dye C et al. Oesophageal strictures in cats associated with Doxycycline therapy. J of Feline Med & Surg 7, 33-41, 2005 3. Boyce HW. Drug-induced esophageal damage: diseases of medical progress. Gastrointestinal Endoscopy 47, 547-550, 1998 4. Theon AP, Van Vechten MA, Feldman E. Prospective randomized comparison of intravenous versus subcutaneous administration of radioiodine for treatment of hyperthyroidism in cats. Amer J of Vet Research, Vol 55, No 12, Dec 1994 5. Mooney CT. Radioactive iodine therapy for feline hyperthyroidism: efficacy and administration routes. J of Small Animal Practice 35, 289-294, 1994 	
<p>07, 08, 09, 10 and 11 IDENTICAL SUBMISSIONS FROM:</p> <p>Dr Andrew Easton (Qld Div of AVA) Dr Andrew Easton (Aust Veterinary Dental Assoc) Dr Andrew Easton (Kuranda Vets) Dr Roger Smith (Kuranda Vets) Dr Adrienne Easton (Kuranda Vets)</p>	<p>3.5.2 The responsible person must ensure that all small animal radiography is carried out in a defined X-ray room or area.</p> <p>((3.6.1 then goes on to describe outside of defined areas including kennels. The most likely other part of the premises to require small animal radiography outside of the designated area/ room would be when intraoperative radiographs are required and the patients is not in a fit state to be moved from the theatre.)</p> <p>3.11 Veterinary Dental X-ray Equipment</p> <p>3.11.1 Dental X-ray units used for veterinary purposes must comply with the requirements of the relevant regulatory authority</p> <p>(Dental x-ray units when used in veterinary setting are registered as veterinary diagnostic apparatus, however these units are not designed to carry a collimating light as is required of veterinary units as they have fixed collimation. This is highlighted in by superscript 16 - further clarification is needed as to which requirements these units need to comply with)</p>	<p>These former requirements are now located in the Safety Guide.</p> <p>Schedule B8 is now quite specific as to what is required for veterinary dental X-ray equipment.</p>

	<p>3.11.2 For dental examinations, a dental X-ray unit with appropriate collimation must be used rather than a standard X-ray unit.</p> <p>(In principle there is nothing wrong when this is applied to dogs and cats in most circumstances when the use of intraoral film provides the best detailed radiograph with a minimum number of exposures, however in the exotics the size of the oral cavity usually does not allow an intraoral plate to be positioned so extraoral views must be used in which case limited collimation available from dental units would necessitate more than one exposure with higher exposure times than would the use of a standard fixed/ mobile unit. The use of dental unit for dental examination in large animals eg horses would be difficult as these units do not have the flexibility of mobile units nor the penetrating power and again the use of intraoral film while not impossible is limited and normal examination would require extraoral techniques to be applied. Further the normal size of an equine cheek tooth is larger than the normal collimation of a dental unit other than having poor exposure due to lower fixed Kv of dental units the fixed collimation would result in cut out artefact and necessitate additional exposures well in excess of those required when a standard unit is used.)</p> <p>6 Lasers (This section does not appear to differentiate between low energy therapeutics, diagnostic and high energy therapeutic lasers, while the safe use of lasers is required there are definite differences in the degree of risk between the low level lasers used in acupuncture for example versus the high energy lasers used in tumour surgery to vaporize tissue, similar to the varied degree of risk between standard radiography versus fluoroscopy.)</p> <p>7 Personal Radiation Monitoring 7.1.1 The responsible person must provide a personal monitoring device approved by the relevant regulatory authority to determine radiation doses received by each person who:</p> <p>(a) may be exposed to radiation from veterinary radiation equipment or radioactive source: (For many veterinary practices the number of X-ray exposures is low and area monitors placed in rooms often don't have higher than background exposure levels. Which would suggest that individuals would be having low levels of exposure. This would also seem to be impractical for people described in 3.7.2 (e) persons not normally exposed occupationally to ionizing radiation)</p>	<p>Schedule B8.1 now implies that dedicated veterinary dental X-ray equipment is "optional" but where it is used, it must comply with the requirements of B8.</p> <p>Noted.</p> <p>Wording changed to allow for exemptions if doses are trivial.</p>
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	<p>Glossary Responsible Person (c) in whose name the source, apparatus , or facility, would be registered if this is required</p> <p>(In Queensland if the apparatus is owned by a company then the possession licence is in the company name and the company requires a radiation safety officer)</p> <p>In general the document appears to be fair and well constructed however as an advisory code "should " does not seem have been used at all and the " must" is often are practicable statement which would suggest that those "musts" perhaps should be "shoulds"</p>	<p>Noted. This is standard wording accepted by RHC.</p> <p>The style has changed significantly since the public comment draft and has now been separated into a Code of Practice (containing “musts”) and a Safety Guide (containing “shoulds”).</p>
<p>12 Darin O’Keffe Medical Physicist, Christchurch Hospital</p>	<p>Based on my experience in providing radioiodine to veterinarians for the treatment of feline hyperthyroidism, I would like to make the following comments about the above COP.</p> <p>5.2.2 (e)(f)(g) We have found that the best form for administration is a sterile isotonic injection of sodium iodide. This is either dispensed volumetrically at the veterinary facility, or (most commonly) transported as a unit dose syringe to the veterinary facility. The injection is given <i>subcutaneously</i> into the skin of the neck and requires very little time and handling. Combining our knowledge with the experience of staff at Radiocat (www.radiocat.com), we have found this to be an effective and safe method of administering Iodine-131.</p> <p>In the initial stages of treatment, the subcutaneous injection means no hazard associated with vomiting or diarrhoea (gastric excretion of iodide means that this may not be the case many hours after the administration). I recommend adding the option of injection to this COP.</p> <p>5.2.2 (c) Because of the simple injection procedure, we have never found it necessary to tranquillise a cat. Our most thyrotoxic cat was difficult and required netting, but once this was performed, it was a simple procedure for the veterinarian to give the injection.</p> <p>5.2.2 (k) I think it should be an explicit requirement that all areas and gloves be monitored with a suitable radiation meter after the administration (eg. thin window GM detector)</p> <p>Finally, may I draw your attention to our National Radiation Laboratory’s “Code</p>	<p>Now Schedule C2.2: This section has been amended to include intravenous or subcutaneous injection.</p>

	<p>of Safe Practice for Use of Iodine-131 for the Treatment of Thyroid Disorders in Cats” (NRL C11), available at http://www.nrl.moh.govt.nz/C11.pdf .</p>	
<p>13 Jennifer Richardson Murdoch University</p>	<p>I am pleased to see that the Code is being updated.</p> <p>I lecture the undergraduate students at Murdoch University in Diagnostic Imaging including Radiation Safety and radiographic technique and consult in the Murdoch University Veterinary Hospital. I am also responsible for examining veterinarians who apply for licensing to operate x-ray equipment in WA and consult to our state authority as to enquiries regarding Fluoroscopy and CT use as well as radiology. I am currently involved in setting up a Nuclear Medicine Facility at Murdoch University for both Diagnostic and Therapeutic use.</p> <p>Attached is a document itemising my comments relative the item number in the code. My greatest concerns are with the section on Specific Nuclear Medicine Procedures and in particular the treatment of cats with radioiodine. I also note there is no mention of the use of CT in Veterinary Medicine an emerging area and we have just negotiated with our local authority in WA and Radiological Council for the licensing for operation of Veterinary CT for veterinarians with Specialist eligibility in Imaging .</p> <p>I am happy to provide further information on any of my comments and more documentation if required. I also support the document submitted by Dr Nola Lester regarding the Iodine therapy of cats.</p>	<p>Several respondents have queried why CT is not specifically addressed within the Code. In medical CT imaging, the primary concern is patient dose, which can be of the order of 2-30 mSv per procedure. The patient may undergo several procedures during the course of their diagnosis or treatment and therefore receive quite a large dose. A secondary concern in medical CT imaging, while not insignificant, is that of the dose to the operators and any assistants. Operator dose is reduced quite considerably by shielding in the control rooms and around the CT room generally. In veterinary radiology however, patient dose is effectively not a consideration other than where it will affect the dose to the operator or assistant. Consequently, as long as the operator and assistants are protected in accordance with the requirements of the Vet Code, the operational aspects of a veterinary CT scanner need not cover the patient dose considerations that are necessary for a medical CT scanner. The reason why there are more requirements in the Vet Code for plain radiology, fluoroscopy and dental X-ray units than there are for medical CT is that a veterinary assistant or the operator could possibly stand next to the animal (and hence the X-ray tube), and even hold the animal, during the procedure. This will not occur for CT procedures as the Responsible Person would not be able to meet the dose limitation requirements of the Vet Code.</p> <p>In relation to ICRP Committee 5, the following quote explains their objectives: “ICRP Committee 5 is concerned with radiological protection of the environment. It will aim to ensure that the development and application of approaches to environmental protection are compatible with those for radiological protection of man, and with those for protection of the environment from other potential hazards.” Protection of animals will therefore be in the context of protecting a species and not necessarily individual animals.</p>

Consultation Draft - February 2005

Comments relating to items listed below:

3. Diagnostic Radiology

COMMENT 1: ITEM 3.4

3.4 REDUCTION OF RADIATION HAZARDS

3.4.1 The Responsible Person must ensure that:

- (a) the fastest film and film-intensifying screen combination compatible with acceptable image quality is used;

Comment:

No reference is made in this code to the use of non-screen film in any form. There is a trend in the profession internationally to use newer combinations of non-screen film (faster than the older varieties) for specific specialist examinations. This is not covered in this item. An emerging debate is developing on its use and manufacturers are marketing soft cassette covers for this purpose.

I consider this is safe if used within the premise that non-screen film is acceptable when used for specific purposes (not routine) and an additional item should be added, or an alteration of the wording to a) to cover this.

- (a) the fastest film and/or film-intensifying screen combination compatible with acceptable image quality is used;

OR

- (b) the fastest film and film-intensifying screen combination compatible with acceptable image quality is used;

- (c) ***Non-screen film is acceptable for specific and specialist examinations only.***

In additional no reference is made to the use of dental film in this category – there are people that use dental film for radiography on small birds and some cat extremities or for use in the mandible and maxilla.

COMMENT 2: ITEM 3.4.1

This response applies to all respondents querying the omission of CT from the Code of Practice.

This former requirement is now a safety guide advisory statement and includes reference to digital radiography.

This point:

- in the case of veterinary dental procedures, the fastest available film compatible with an acceptable image quality is used;

is now included in the Safety Guide for guidance.

3.4.1 The Responsible Person must ensure that:

(d) appropriate film processing facilities are available and are used correctly (see Annex 3);

Comment:

Annex 3 refers to manual processing only.

Many practices now use automatic processors and are having film quality problems relating to the use and maintenance or lack of. Processing by other methods should be covered if the item is to remain.

Some practices are looking at moving to Computed Radiography (CR) and should at least be mentioned.

COMMENT 3: ITEM 3.5 AND 3.6

3.5 RADIOLOGY IN DEFINED X-RAY ROOMS OR AREAS

3.5.2 The Responsible Person must ensure that all small animal radiography is carried out in a defined X-ray room or area.

3.6 RADIOGRAPHY OUTSIDE DEFINED X-RAY ROOMS OR AREAS

3.6.1 Radiography of animals outside defined X-ray rooms or areas (in other parts of the premises, or on visits to farms, stables or kennels) is likely to add to the radiation risks for the following reasons:

3.6.2 When radiography is carried out outside defined X-ray rooms or areas, the Responsible Person must ensure that:

3.6.3 When radiography is carried out outside defined X-ray rooms or areas, the veterinary surgeon in charge of a radiology procedure must ensure that:

Comment:

3.5.2 suggests that all small animal radiography must be performed in a defined x-ray room then

3.6 discusses the rules for radiography of small animals outside defined x-ray rooms which is ambiguous.

This is now in the Safety Guide. “(see **Error! Reference source not found.** for information on the manual processing of radiographs)” has been appended to that clause. This however does not prohibit the use of automatic processing.

Digital radiography is also now covered (see 2.1 of the Safety Guide).

These former requirements are now located in the Safety Guide.

	<p><i>Small animal radiography should be carried out in a defined x-ray room where possible, however there are intra-operative procedures, critical patients that cannot be moved and patients that need radiography in other parts of the premises for various legitimate reasons that needs to be accounted for.</i></p> <p><i>3.5.2 should allow radiography outside the defined x-ray room when appropriate. Refer to later item – maybe this should be added into 3.5.2 ie - unless it is not practicable to bring the animal to that room or area.</i></p> <p><i>3.8.4 X-ray examinations must not be carried out outside a defined X-ray room or area unless it is not practicable to bring the animal to that room or area.</i></p> <p><u>Also Item 3.5.3</u></p> <p>3.5.3 The Responsible Person must ensure that all shielding requirements for defined X-ray rooms or areas⁵ meet the requirements of the relevant regulatory authority.</p> <p><i>Comment:</i> <i>Horizontal beam use in small animals is not specifically mentioned (except for the footnote). Some additional guidelines here would be useful.</i></p> <p><u>COMMENT 4: ITEM 3.10</u></p> <p>3.10 FACILITIES – FLUOROSCOPY</p> <p><i>Comment:</i> <i>C or U arm systems mentioned in Facilities under fluoroscopy but there are no rules or references to it’s use in theatre or as a mobile unit.</i></p> <p><u>COMMENT 5: ITEM 3.11</u></p> <p>3.11 VETERINARY DENTAL X-RAY EQUIPMENT</p> <p>3.11.2 For dental examinations, a dental X-ray unit with appropriate collimation must be used rather than a standard X-ray unit¹⁶.</p> <p><i>Comment:</i> <i>This refers to the use of dental machines with dental film exclusively and not</i></p>	<p>Noted.</p> <p>Noted.</p> <p>Dental X-ray equipment requirements have been changed and it is now optional whether to use dedicated equipment.</p>
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the use of screen film systems and regular x-ray equipment for the structures of the mandible and maxilla and survey studies of the teeth. This needs to be clearer.

COMMENT 6: ITEM 3.13

3.13 ANCILLARY EQUIPMENT

3.13.4 Where cassette holders are not self-supporting, they must be fitted with:

- (a) handles at least 1 metre long; and
- (b) a ground support, to ensure that a person holding them can remain well outside the primary beam.

Comment:

The use of ground supports for cassette holders can often be dangerous and are not practical in many situations with large animals. These can also increase the number of repeats taken when used and should not be mandatory.

Cassette holders must be fitted with handle 1metere long

but the ground support needs to be used when possible. Remove the word must for this item.

Comments relating to items listed below:

5. Diagnostic and Therapeutic Nuclear Medicine

5.2 SPECIFIC NUCLEAR MEDICINE PROCEDURES

5.2.1 *Technetium-99m labelled bone-seeking agent for bone imaging:*

Responsible Person must ensure that the following requirements and considerations are implemented when technetium-99m labelled bone-seeking agent for bone imaging:

COMMENT 7: ITEM 5.2.1a

- a) an isolated, shielded and secure accommodation is used for administering the radioactive material and hospitalising the animal until the day after the administration²⁹;

Now a safety guide item.

Noted, but no change made. Guidance will be given dependant on the individual situation.

²⁹ For the normal doses of technetium-99m used in bone imaging, the animal may be discharged the day after administration of the dose.

Comment:

There should be total activity levels that are used for the final decision on discharge of patients (as for the Radiotherapy section. This can be added as and the total animal activity is less than

COMMENT 8: ITEM 5.2.1 e

e) drainage is provided to the normal establishment waste;

Comment:

In our state it was required that the drainage is isolated from the normal establishment waste to allow decay prior to entering the normal establishment waste. This may vary with local authority.

COMMENT 9: ITEM 5.2.1 g

(g) as production of radioactive urine in the imaging area could not only be hazardous but could also interfere with the imaging process, procedures to minimise this possibility by the prior use of an appropriate diuretic are considered;

Comment:

The use of diuretics is a clinical decision in some cases and should not be required. Procedures to minimize the possibility of urination should be considered is OK but ‘the prior use of an appropriate diuretic’ needs to be clearly ‘a suggestion rather than a requirement.’

COMMENT 10: ITEM 5.2.1 j

(j) contaminated bedding and other material from the area is disposed of after 24 hours,

Comment:

The disposal of this material should be left as long as possible before cleaning the box is carried out. After 24 hours is OK but it should be encouraged to

Noted.

This is now a footnote and therefore “advice”.

leave this longer if at all possible. We do not remove the bedding from the stall until after 24 hours and leave it until 48 hours where possible. The bedding is then appropriately stored until background level before disposing of. This will probably vary from state to state.

COMMENT 11: ITEM 5.2.1 m and n

- (m) all personnel involved be made aware that they are handling a radioactive animal;
- (n) the procedures and precautions are explained to all personnel involved with handling a radioactive animal;

Comment:

All staff entering the facility are required by our state authority to have undergone specific training to a level commensurate with their involvement in the procedure as well as the degree of supervision required when in the facility.

COMMENT 12: ITEM 5.2.1 r

- (r) suitable animal restraints e.g. stocks, are provided to minimise handling of the radioactive animal during imaging or other procedures;

Comment:

The use of stocks should not be a requirement. Many argue they actually increase the time involved in the procedure and therefore increase staff exposure. They do not always decrease animal handling during imaging. We do not use stocks in our x-ray facility for that reason. Stocks can be used an option but should not be referred to as required.

Comments relating to items listed below:

5. Diagnostic and Therapeutic Nuclear Medicine

5.2 SPECIFIC NUCLEAR MEDICINE PROCEDURES

5.2.2 Treatment of feline hyperthyroidism with iodine-13130: The Responsible Person must ensure that the following special requirements

Noted.

Clause 3.1.15(a) requires that the Responsible Person provides training in the type of work being undertaken.

“stocks” removed.

and considerations are implemented for the treatment of feline hyperthyroidism with iodine-131:

COMMENT 13: ITEM 5.2.2.a)

- (a) an isolated, shielded, well ventilated and secure area is provided for:
 - (i) administering the radioactive material; and
 - (ii) hospitalising the cats for at least 5 days after the administration,

Comment:

Hospitalization times should be at least 5 days but with the addition of guidelines as to acceptable total activity prior to discharge.

COMMENT 14: ITEM 5.2.2.c)

- (c) the cat is lightly tranquillised and placed in a deep tray³¹ lined with absorbent paper for administration of the radioactive material;

Comment:

Sedation should be recommended but not mandatory as many of these cats are aged and have sub-clinical renal failure or cardiac disease and sedation may contra-indicated clinically. Refer a more detailed submission from Dr Nola Lester and others. Dr Nola Lester has many years experience with I131 therapy in cats.

COMMENT 15: ITEM 5.2.2. e, f and g

- (e) the radioiodine is in capsule form;
- (f) where possible, long handled forceps are used to insert the capsule well down the throat followed by about 20 ml of water introduced into the mouth by a syringe;
- (g) consideration is given to the risk of subsequent vomiting by the animal;

Comment:

This dictates that only oral administration is allowed. Alternative routes of

Noted, but no change effected.

Footnote added to warn of potential side effects of tranquilisation.

administration must be allowed in this Code. Prescribed methods of administration include intravenous injection, subcutaneous injection as well as oral administration and are considered both effective and safe. All methods are well documented in the literature ^{1, 2, 3, 4, 5} and it is short sighted if not outdated to only include one of these in the Code.

Subcutaneous administration is recommended over oral administration in some of the literature and is considered effective, uses lower doses than oral administration as well as reducing the problems of risk associated with biting or chewing the capsule or vomiting post administration.^{1,23} Please refer to published articles and additional submission by Dr Nola Lester and others.

References:

1. Peterson ME and Becker DV: "Radioiodine treatment of 524 cats with hyperthyroidism". JAVMA, Vol 207, No 11, December 1, 1995: 1422-8.
2. Malik et al, "Treatment of feline hyperthyroidism using orally administered radioiodine: a study of 40 consecutive cases." AVJ, 1993; Jun; 70 (6):218-9.
3. Feeney et al, "Relationship between orally administered dose, surface emission rate of gamma radiation, and urine activity in radio-iodine treated hyperthyroid cats." AJVR, Vol 64, No 10, October 2003: 1242-7.
4. Theon AP et al, "Prospective randomized comparison of intravenous versus subcutaneous administration of radioiodine for treatment of hyperthyroidism in cats." AJVR, 1994, Vol 55 No 12, December :1734-8.
5. Mooney CT, "Radioactive iodine therapy in feline hyperthyroidism: Efficacy and administration Routes." JSAP, 1994, 35; 289-294.

Comments relating to items listed below:

Annex 3

GUIDE TO MANUAL PROCESSING OF RADIOGRAPHS

COMMENT 16: Annex 3

Comment:

Refer to previous notes - COMMENT 2: ITEM 3.4.1

Injection of I-131 now allowed for.

Noted (see above).

<p>14 Tanya Puksmann Equine Centre, University of Melbourne</p>	<p>I have read the Draft Code of Practice for the Safe use of Radiation in Veterinary Science on the ARPANSA website and the section that refers to veterinary nuclear medicine, in particular the section regarding bone imaging. It requires any persons required to be in close proximity to the animal for the imaging procedure to wear lead aprons of a minimum 0.5 mm lead equivalent thickness. As the nuclear medicine technologist at the University of Melbourne Veterinary Clinic and Hospital we routinely perform equine bone scans which often take over four hours if a wholebody scan is requested. The scanning times are quite variable depending on the how much of the horse is being imaged and the co operation and temperament of the horse. We have in the past tried to wear lead gowns, and again recently with new ultra light weight gowns, however we have found that they are still to heavy for the long continuous periods that they have to be worn. It is also difficult as we have to manually position the horse and their legs close to the camera which requires alot of physical effort. We have found with wearing gowns, even the skirt and vest types, that we go home exhausted with sore backs and shoulders.</p> <p>As a solution I am trying to see if I can obtain lead vinyl sheeting large enough to drape over the horse so it can carry the weight instead of us. The lead vinyl, or rubber sheeting should be in sections so that we only have to remove the section of the area we are imaging. For the reasons given I feel that wearing lead gowns would not be practical, particularly when performing long imaging procedures on equine patients. Therefore, I think it would be advantageous to find an alternative method of reducing our radiation exposure whilst performing equine bone scans.</p>	<p>The wearing of lead gowns is now a Safety Guide item.</p>
<p>15 Kathryn Kelly Veterinary Surgeons Board of ACT</p>	<p>Thank you for the invitation to make submissions on the Draft Code of Practice for Safe Use of Radiation in Veterinary Science. The Board has reviewed the Code and would be grateful for clarification on the source of advice for medical treatment prior to deciding on what form of medication should be used and how it is administered.</p> <p>The following comments are submitted for your consideration:</p> <ul style="list-style-type: none"> • 3.7.2(d) – There is no mention of thyroid protection which should be mandatory. • 5.2.2(c) – Tranquillisation is inappropriate in cats that may be cardiac or renally compromised with hyperthyroidism. 	<p>Noted.</p> <p>Footnote added to warn of potential side effects of tranquilisation.</p>

	<ul style="list-style-type: none"> • 5.2.2(e) – Capsule formulation. There is no mention of injectable Iodine 131 which is what is currently used. • Schedule B2.1, yearly calibration of equipment is overly regulated. • Pp 12 & 40 There should be provision for the responsible person to also be an individual and not necessarily self-employed. Even better would be the separation of the holder of the badge from the practice and make each individual holder of the badge responsible for its wearing and submission at the appropriate time. <p>If somewhere and elsewhere a veterinary hospital employs a locum veterinarian – not a contractor – then the veterinarian would have two badges and each employer would have the hassle of getting the badge back and submitting it at the appropriate time. In some cases veterinarians have no radiation number, just a name, and the practice holds the record of exposure. When a veterinarian leaves a place of employment before the 3-month cycle, the veterinarian may never see the results and also has no correlation of the results and the effects on his/her body. The same could apply to veterinary nurses.</p> <p>Your consideration of these matters is appreciated.</p>	<p>Injection of I-131 now allowed for.</p> <p>Now a Safety Guide item.</p> <p>The Responsible Person can be an individual or a corporation.</p> <p>Noted.</p> <p>Clause (3.1.9) has been changed to “... is provided to each occupationally exposed person ...”. If a locum already has an existing badge, the Responsible Person will have met their requirements, albeit by somebody else doing it.</p>
<p>16 Simon Critchley Director Radiation Health Qld</p>	<p>General comments</p> <ol style="list-style-type: none"> 1. In the title, is “veterinary science” the correct term to use or would another term such as “veterinary medicine” be a better description of the activities about which we are seeking to influence? 2. The whole structure of this Code is dated and inconsistent with the general structure which is emerging for these Codes. While there is no reason to stop this Code from “going it alone”, I suggest that, instead, it would benefit from having a structure similar to that emerging in the radiotherapy and diagnostic radiology codes. In particular, it is clear that all practices such as those dealt with by this Code should have a detailed radiation management plan which details how that particular practice will be conducted to achieve the desired outcomes not only of the Code, but also of the regulatory authority. I suggest there should be a separate section which exclusively specifies the minimum content of such a plan. 3. The way reference is made to the authorities required before veterinary 	<p>Change effected.</p> <p>The structure has now been changed in accordance with the directions of RHC.</p> <p>These changes have been effected.</p>

	<p>procedures are allowed to be performed needs to be reviewed throughout the document to ensure consistency with other documents such as the NDRP and thereby ensuring clarity in the information provided.</p> <p>4. In addition to the above, it has been very clearly stated during the development of other Codes that all decisions which are to be made by the relevant regulatory authority need to be very carefully considered, so that the tendency towards allowing decisions which might not be in the best interests of achieving national uniformity are minimized. I therefore suggest that such an analysis be undertaken in relation to this code and, wherever possible, places where decisions are left to relevant regulatory authorities be changed to the specification of performance criteria.</p> <p>5. Further, all statements must be carefully examined and re-written to ensure that it is clear who has the responsibility to perform the stated action and what that action is. The whole Code must be re-drafted to ensure statements are written in the form: “The responsible person must ensure that...”. This is a significant amount of work but the clarity of intent which results is well worth it. I believe such a re-draft would be consistent with the path being taken in drafting other ARPANSA Codes.</p> <p>6. It is not clear to me when it is expected that personal radiation monitoring is required for diagnostic radiography procedures. I suggest the section which deals with personal radiation monitoring should be further developed and the responsibilities borne by the responsible person in relation to personal monitoring should be more clearly specified. I also suggest that personal monitoring be required for persons involved in large animal radiography because of the increased probability of unintended exposure of personnel.</p> <p>Specific comments:</p> <p>Lines 29 – 30 The term “appropriate regulatory authority” is inconsistent with terms used elsewhere in the ARPANSA documents and elsewhere in this document. I suggest it be replaced by “relevant regulatory authority”.</p> <p>Lines 61 – 92 This section entitled “Structure” reads more like a table of contents at present. I suggest this section be changed so that it is similar in nature to other ARPANSA Codes.</p>	<p>These changes have been effected.</p> <p>These changes have been effected.</p> <p>This change has been effected.</p> <p>This change has been effected.</p> <p>This change has been effected.</p>
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	<p>Lines 117 – 139 This section is quite interesting when reading it now after looking at other Codes of Practice and after recent forays into the world of optimisation and dose constraints. The whole concept of a person sustaining “radiation injury”, I hope, is very dated so I suggest that, if this section continues to be a necessary element of the Code, it be changed to not talk about limitation so much, but instead to talk about optimisation of practices and dose constraints so that exposure to radiation is minimized.</p> <p>Lines 159 – 160 Again, we have an emphasis here on dose limits, which may be valid, but there should also be mention of dose constraints, perhaps at least linking across to what happens in the medical world. It would be better, however, if the veterinary world could be encouraged to develop its own DRLs or equivalent to initiate a focus on industry-based reference levels rather than on the overall dose limits. Since the majority of radiography performed by veterinary surgeons is plain film X-radiography, it might be possible to incorporate a table of DRLs in the Code for some simple diagnostic procedures.</p> <p>Lines 162 – 201 These lines detail the duties of the radiation safety officer. I think we must be clear about the roles and responsibilities of the various parties and use language which is consistent with the roles we want them to have. At present, these lines blur the responsibilities of the responsible person with the duties of the radiation safety officer. While the radiation safety officer may have <u>duties</u> and <u>functions</u> which result in him or her reporting events to the relevant regulatory authority or maintaining records etc., we must be quite clear that it is the responsibility of the responsible person to ensure that these functions or duties are undertaken. This section needs to be reviewed to ensure the responsible person’s responsibilities are clearly annunciated and differentiated from the duties and advisory functions of the radiation safety officer.</p> <p>Lines 214 – 217 I doubt whether any relevant regulatory authority will be needing details of radiation shielding plans etc. any more. Instead, they will be seeking to ensure that a third party assessor has certified that the premises meet specified radiation safety standards, including those relating to radiation shielding. These standards should be specified, in some way, in this Code or if they are more general in nature, in the NDRP. In any case, this clause should be a</p>	<p>Justification, optimisation and dose limitation now incorporated into the revised version.</p> <p>Noted.</p> <p>RSO has been removed to the Safety Guide (Annex A).</p> <p>Now a Safety Guide item.</p>
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	<p>performance type statement which will help ensure uniformity of standards, rather than a statement which will encourage non-uniformity.</p> <p>Lines 235 – 236 In other Codes produced recently the rules relating to persons supplying and servicing equipment have been specified in some detail. I believe similar sections relating to these aspects of ownership and maintenance need to be detailed in this Code also so that veterinary surgeons can be clear about such matters.</p> <p>Lines 272 – 274 These lines imply that a veterinary surgeon will always be the person in charge of the procedure. This might not be the case, in fact it would probably be better for this document to promote the concept of others performing the radiography so as to encourage and not discourage a movement towards developing a sub-profession of persons who are more practiced in radiographic procedures than most veterinary surgeons.</p> <p>Lines 341 – 346 These statements should be revisited in the light of recent discussions. Any replacement statement should emphasise that the X-ray tube must not be held unless circumstances indicate that the risk of physical injury to personnel from an animal is significant, or the specific view required is otherwise very difficult using other equipment configurations, thereby making holding the tube necessary. However, such a relaxation must be accompanied by a statement specifying that even under such circumstances, only X-ray tubes specifically made with handles allowing them to be held safely must be used for such activities.</p> <p>Line 422 Change “alignment” to “aligned”.</p> <p>Line 421 See my comment on Lines 341 – 346.</p> <p>Lines 468 – 472 It is quite correct to say that the illumination of the light beam collimator could be ineffective when out doors, but there needs to be a requirement for the person who performs radiography under such circumstances to adopt procedures which compensate for this reduction in safeguards or, alternatively,</p>	<p>Now a Safety Guide item.</p> <p>Now an obligation on “the operator”.</p> <p>Now a Safety Guide item.</p> <p>Done.</p> <p>Now a Safety Guide item.</p> <p>Wording has been changed so that it is more performance based.</p>
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	<p>for other engineered safeguards to be put in place such as an appropriate laser marking system (as is used on some equipment).</p> <p>Lines 509 – 682 The majority of these requirements are requirements which equipment must meet rather than requirements to be met by persons. It would be appropriate for the requirements which equipment must meet (such as the performance standards of the X-ray equipment) to be placed in a schedule so that any requirements on persons can be clearly seen in the main body of the Code. Again, this would ensure consistency with other recently developed Codes.</p> <p>Lines 715 – 786 Refer to my comments about lines 509 – 682.</p> <p>Lines 788 – 952 I suggest that this section be re-drafted to clearly specify, in regulatory statements, those things which persons must do. For instance, in lines 951 – 952 the current version of the Code says “Strontium-90 applicators must only be disposed of as prescribed by the relevant regulatory authority.” This statement does not clearly state who it is who has this responsibility. It would be far better to state “The responsible person must ensure that strontium-90 applicators are only disposed of as prescribed by the relevant regulatory authority.”.</p> <p>Lines 956 – 1152 Note my comments on lines 788 – 952. Similar comments apply here. Additionally, it might be appropriate for there to be a schedule containing the information which the treating veterinary surgeon must provide to the owner of the animal to ensure exposures are minimized while the animal is being treated.</p> <p>Lines 1157 – 1183 AS2211 contains material relating to the design of equipment and premises. While this material is important, I believe it would be very beneficial to mention that the procedures followed in the use of the lasers should be consistent with the guidance provided by AS4173. There is some very sound advice in AS4173 which ought to be followed by anyone using lasers on animals.</p> <p>I think an annex on film-screen combinations and the use of the highest speed</p>	<p>These are now in a Schedule.</p> <p>These are now in a Schedule.</p> <p>Done.</p> <p>Done.</p> <p>The laser schedule has been amended.</p> <p>Noted.</p>
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	<p>film and optimal X-ray machine settings would be beneficial. Queensland has developed such a document, in consultation with industry, which has proved to be helpful to many veterinary surgeons.</p> <p>Lastly, once the changes I have suggested herein have been made, there will become evident a number of other matters which will require resolution. I note the working group is a little sparse and it might be prudent for at least one or two other persons to be included in the working group to re-draft the Code and assist with dealing with the comments from others.</p>	<p>Working Group was increased in number following the public comment period.</p>
<p>17 Margaret B Wilson Registrar Veterinary Practitioners Registration Board of Victoria</p>	<p>The Veterinary Practitioners Registration Board of Victoria thanks you for the opportunity to make submissions in relation to the proposed Code of Practice for Safe Use of Radiation in Veterinary Science.</p> <p>In making this submission, the Board sought comment from registered veterinary practitioners working in both small and large animal practice, from a registered specialist veterinary radiologist and from a registered equine veterinary practitioner.</p> <p>Overall the Board considers the draft code excellent and all encompassing, that it demonstrates an understanding of veterinary practice and it's inherent difficulties and the mandatory and suggested conditions would be achievable in practice.</p> <p>The Board's comments are consistent with the numbering in the document:</p> <p>2 Responsibilities and Radiation Surveillance The Responsible Person (RP) will always need to be the registered veterinary practitioner who is on duty in the practice and in all but the very largest of practices appointing a Radiation Safety Officer (RSA) will be impractical or irrelevant. OR Is it the intent that the 'senior veterinary practitioner' become the RP and delegate to other veterinary practitioners in the practice?</p> <p>2.1.4(c) To what extent and in what form is the RSA to consult and liaise with the regulatory authority?</p> <p>Line 184 Requires annexe to show what the emergency kit will contain</p>	<p>This issue should be resolved now. There is no longer a requirement to appoint an RSO.</p> <p>RSO no longer required.</p> <p>Noted. No change due to inexhaustive contents of an emergency kit.</p>

	<p>Line 221 “Appropriately qualified person” should be defined</p> <p>2.2.1 The approval required in this paragraph must be obtained before the veterinary clinic can be built.</p> <p>2.2.2 Is formal approval required where changes in workload are made, or an X-ray machine is replaced?</p> <p>3 Diagnostic Radiography 3.1.1 (e) and 3.7.2(d) and 3.13.5 These sections do not refer to Thyroid protection collars which are routinely in use in many small animal clinics and should be included.</p> <p>Reference should also be included to cover the fact that a common mistake with restraint of animals is that the assistant will place a lead glove OVER the hand that is holding the animal - and not wear it. This habit does not protect the holder from scatter radiation –it will protect the hand from the primary beam but it should not be within a meter of that.</p> <p>3.4.2 (f) & (g) and repeated at 3.6.3(g) When taking radiographs of horses, ability to comply with these provisions depends on the responsible person providing a suitable cassette holder and a trolley for the small portable x-ray machines commonly used in equine veterinary practice. Ability to comply with these provisions also depends on the co-operation of the equine patient, which can be assisted by tranquilisation in a field situation. In a practice situation it is not always possible to comply completely with these provisions.</p> <p>Veterinary attendance during radiography procedures in horses might be allowed according to the three principles outlines on page 49 - <i>Justification, Optimisation of Protection, and Limitation of Individual Dose</i>. Veterinary attendance might also be allowed to ensure that a minimum number of exposures is taken to reduce unnecessary repeat exposures to personnel (see page 53). Holding the horse, ensuring that the cassette is correctly positioned, and that the primary beam accurately aimed and suitably collimated all contribute to a minimum number of exposures being taken to provide necessary information to</p>	<p>Term removed.</p> <p>Now a Safety Guide item.</p> <p>Now a Safety Guide item.</p> <p>Noted, but no change effected.</p> <p>Noted, but no change effected.</p> <p>Noted.</p> <p>Noted.</p>
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	<p>clinicians. These provisions are in addition to proper developing procedures outlines in Annex 3 (pages 53-58)</p> <p>These concepts of veterinary radiation protection have been a real issue for equine veterinarians with the demand from the horse industry to provide radiographs of yearling thoroughbreds at sales in the past three years. The Australian Equine Veterinary Association (AEVA) have recorded radiation exposures to persons present when taking these radiographs. The survey results indicate that with the usual precautions undertaken in equine veterinary practice during radiography of a large number of horses and involving several people, no person was exposed to radiation doses that were anywhere near the prescribed exposure levels.</p> <p>3.7.1 Unless a horse is under the influence of general anaesthesia, it is not possible to comply with this provision in equine practice.</p> <p>3.7.5(a) Discusses protection of the legs. Unless lead trousers are available, cattle practitioners would have difficulties in complying with leg protection.</p> <p>This section should address the need to keep good exposure charts. The absence of such charts is the most common cause for repeat and unnecessary radiation.</p> <p>3.13.7, line 675 The testing of personal devices needs to be defined or the reader referred to a reference that describes the testing procedure, such as the Victorian Department of Human Services publication <i>Advisory Information to Assist in the Testing of Lead Aprons used in Diagnostic Radiology Departments</i>.</p> <p>4 & 5 Radiation Therapy and Nuclear Medicine 4.1.5 It should be noted that the facilities for housing the animal must have adequate radiation warning signage</p> <p>4.4.4 How soon is “as soon as possible”? Surely this should be immediately the loss is suspected.</p>	<p>Noted.</p> <p>Now a safety guide item with several options.</p> <p>Now a safety guide item. The “may” suggests that it should be considered.</p> <p>Noted, but no change made.</p> <p>This is now a Safety Guide item and would encourage a vet to contact the regulatory authority or other expert to find out what testing arrangements were available.</p> <p>Changed to “immediately”.</p>
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	<p>5.1.7 What is a “reasonable time”? Presence of such a meter should be mandatory at a site where nuclear medicine procedures are carried out routinely. It is imperative that any radiation contamination is detected immediately so that prompt and appropriate control and decontamination procedures can be implemented without delay. Radiation contamination could be from inadvertent spillage or breakage of a radiation source, or from unexpected urination from a horse that has been given a radioactive source (5.2.1(g)). It is imperative that all staff know immediately whether any contamination has happened, what has become contaminated and to what degree. From an Occupational Health & Safety point of view, any delay in discovering such information is unacceptable.</p> <p>5.2.1(j) The University of Melbourne Veterinary Clinical Centre follows the guidelines set up by Assoc Professor Greg Daniels from the University of Tennessee that bedding should be disposed of after 48 hours. That is, held for a further 24 hours after the animal is discharged as even after 48 hours the bedding is not back to background radiation levels. We would be interested to be advised of the rationale for the disposal of bedding after 24 hours.</p> <p>5.2.1 (p) It should be noted that 0.5 mm lead equivalent thickness will not protect the wearer from the 140 keV emissions of technetium-99m. A study published in Radiology 1993 186:269-272 by Murphy, Wu and Glaze looked at the attenuation of both the composite light-weight aprons and conventional lead aprons for 60, 80, 10 and 120 kVp x-rays, as well as for monoenergetic gamma photons at 31, 59, 81, 140 and 364 keV, respectively, corresponding to x-and gamma ray emissions from Xenon-133, Americium-241, Technetium-99m and Iodine-131. They concluded that the photon-attenuating properties were quite adequate (attenuation >88%) for x-rays up to about 120 kVp. However, for the 140 keV gamma rays from Technetium-99m, the attenuation of the 0.5 mm “lead-equivalent” aprons is in the range of 35 - 40 %, compared to 70 - 78% for the conventional 0.5 mm lead apron. A 140 keV gamma ray is roughly equivalent to a 280 kVp x-ray, much higher than the diagnostic x-ray. Thus lead gowns, and most specifically lead-equivalent gowns (lighter gowns), do not provide the wearer with adequate protection and may in fact provide a false sense of security. The important aspect of radiation safety in relation to nuclear medicine is TIME and DISTANCE as shielding does not provide adequate protection. In addition there are Occupation Health and Safety issues with respect to the wearing of lead aprons for prolonged periods especially given the questionable benefit from a radiation safety point of view.</p>	<p>Now a safety guide item. “Reasonable time” removed and monitoring with a survey meter is required under various veterinary uses eg C2.2(h)(ii).</p> <p>The Radiation Management Plan will need to include contamination procedures.</p> <p>Removed.</p>
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	<p>Therefore is this necessary? Apparently it is not a provision for being in the presence of people who have been given a radioactive source.</p> <p>5.2.2 Only in this section on Rad I 131 in cats that disposal of urine and faeces is referred to. This should also include vomit and where exhaled air and skin contact are also mentioned as potential contaminants for handlers.</p> <p>In this section there is only mention of ‘Instruction to Owners’ after administration of Rad I 131 to cats. There should be similar instructions after use of other radioactive products used.</p> <p>Schedule B Line 1271 “Survey monitors” are referred to in 5.1.7 NOT 4.2.1</p> <p>Annexe 1 Lines 1549 & 1550 Does this meet OHS standards?</p> <p>Annexe 3 Line 1747 Not many small animal practices have running water in their developing rooms</p> <p>Annexe 3 Line 1795 Most veterinary practitioners are not rinsing for 30 minutes in running water – particularly in the light of water shortages. How necessary is 30 minutes?</p> <p>Line 1836 Routine changing of developer every 8 weeks would be unacceptable in most veterinary practices. The time interval should be much less. This would depend on the number of radiographs taken and the frequency of replenishment of chemicals. Frequent changing of chemicals is necessary to comply with advice given earlier in Annexe 3 about proper processing of films to reduce unnecessary exposures.</p> <p>Line 1894 To rinse, wash, drain, clean and dry chemical tanks each night is impractical in practices. veterinary</p> <p>Further comment Reference should be made somewhere within the code for the requirement for all facilities to have a current Radiation Management Plan.</p>	<p>“vomit” added.</p> <p>Clause 3.1.27 addresses instructions to the owner although it is not as specific as that given for the radioiodine section.</p> <p>Now a safety guide item and not specific.</p> <p>This is standard wording in ionizing radiation RPS series publications.</p> <p>This is a Safety Guide item and therefore only guidance.</p> <p>Again, this is a Safety Guide item and therefore only guidance.</p> <p>This is a Safety Guide item and therefore only guidance. Further, it advises that it should be changed earlier if contaminated.</p> <p>This is a Safety Guide item and therefore only guidance.</p> <p>A Radiation Management Plan is now a requirement in the Code.</p>
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<p>18 Dr Bob Biddle Australian Deputy Chief Veterinary Officer, and General Manager Office of the Chief Veterinary Officer Product Integrity, Animal and Plant Health Agriculture, Fisheries and Forestry Australia</p>	<p>Thank you for the opportunity to comment on the draft <i>Code of Practice for Safe Use of Radiation in Veterinary Science</i>. The Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) has limited applied involvement in veterinary uses of radiation/radio-therapy, and we recommend that ARPANSA also approach the Australian Veterinary Association as a source of specialist veterinary comment.</p> <p>It is noted that the Regulation Impact Statement referred to in your letter of 28 February 2005 is not currently available on the ARPANSA website. This document should be made available prior to finalisation of the requirements to ensure that cost-benefit analysis is adequately addressed. We also reserve further comment based on our consideration of the RIS.</p> <p>The draft <i>Code</i> sets out to establish requirements for ensuring adequate radiation protection for veterinary staff, animal handlers, owners and bystanders during the use of X-ray equipment and nuclides for the diagnosis and treatment of animals, and in research in veterinary science. In regard to this mandate the draft <i>Code</i> appears to substantially address the necessary elements of these requirements.</p> <p>We see merit in this draft <i>Code</i> of Practice being elaborated in the <i>Australian Standard</i> series, especially were it considered that the draft <i>Code</i> be called up by legislation.</p> <p>The following comments are offered in response to the draft <i>Code</i>:</p> <p>In line 115, point <i>1.7 Categories of Exposed Person in Veterinary Science</i>, consideration should be given to expanding the scope of “<i>persons living adjacent to the premises where radiation is used</i>”, because often veterinary practices exist in commercial settings. The term “<i>living</i>” should be expanded to accommodate persons “<i>working, residing etc</i>” in adjacent premises.</p> <p>Issues faced in veterinary science often relate to manual handling and restraint of animals, especially in large animal work (eg horse, cattle etc). As addressed in the draft <i>Code</i>, reference is given to the use of appropriate immobilisation where practicable (line 429, point 3.7.1). However, in some circumstances, such immobilisation is not possible (eg handling young horses) and difficulties are encountered with directing X-ray machines. Consideration should be given to how to address this situation as currently hand holding X-ray machines is sometimes necessary (in particular in line 421, point 3.6.3(g)).</p>	<p>This Section has been removed.</p> <p>Now a Safety Guide item.</p>
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	<p>Annex 3 <i>Guide to Manual Processing of Radiographs</i> addresses many of the issues relating to ensuring consistency and quality of radiographs, however Occupational Health and Safety matters are not addressed in this document. It would appear prudent to include information on such matters (eg safe handling of chemicals during mixing, use and disposal) into this Annex, especially as the mandate of the draft <i>Code</i> is user safety.</p>	<p>This is a Safety Guide item. Further, the handling of chemical is outside the scope of this Code and Safety Guide.</p>
<p>019 E.M. Badawy Executive Officer Australian Institute of Radiography</p>	<p>We refer to your request for submissions on the above matter and thank you for allowing us the additional time for this late submission from the Australian Institute of Radiography (AIR).</p> <p>The Board has now endorsed the following comments from our specialist panel the Medical Imaging Advisory Panel No 1 (MIAP1) for your consideration:</p> <p>Computed Tomography (CT) is not mentioned at all in ARPANSA current draft document and the panel sees this as an oversight and there appears to be little regulation throughout Australia.</p> <p>As far as we aware the Australian Veterinary Association (AVA) has no current policy of their own on CT scanning. In Victoria there are currently 3 scanners and there is no regulation on operator training or exposure levels etc. The following applies in each of the other States:</p> <p>Queensland - vets need training, NSW- all registered vets can apply for irradiating apparatus licence and WA - individual licence is required.</p> <p>It was felt by the panel that ARPANSA as the National licensing authority would have the most impact by strengthening their new guidelines (i.e. including CT).</p> <p>1) CT should be included in training and image reading - MIAP1 supports increasing education especially because of risk to staff and clients.</p> <p>We urge the Board to write the AVA as one professional body to another encouraging the AVA to include this imaging modality in their training and also to encourage image reading as currently is seems to be very ad hoc.</p> <p>2) If training is not offered by the AVA and universities, then advice should be</p>	<p>CT could be seen as being radiography with a very big X-ray unit. Patient dose is not an issue for veterinary radiology, only occupational exposures (see comment 13).</p> <p>Training should be covered under the generic requirements that the Responsible Person must meet.</p>

	<p>sought from qualified radiographers and interested stakeholders.</p> <p>The Code of practice from ARPANSA currently does not have enough regulation regarding installation, training or management of CT services in Vet Practices.</p> <p>3) Ensure that all CT scanners used for animals are correctly shielded (i.e. operator and other staff working in the proximity)</p> <p>These changes need to be added to this draft document as this the first time in 20 years that this document has been updated. In the future, CT scanning of animals may become more popular and more scanners being installed by vets. If the document is being varied MRI could also be included (maybe a different document as it does not use ionising radiation).</p>	
<p>020 and 021 Associate Professor Richard Maxwell (Max) Zuber Gladesville Veterinary Hospital 449 Victoria Rd Gladesville NSW 2111</p>	<p>We have provided a veterinary nuclear medicine service to small animal only veterinary patients on a first opinion and referral basis in Australia commencing in 1986 and have had dedicated isolation area and Gamma camera facility since 1991.</p> <p>We have, in that period, virtually constantly employed a qualified nuclear medicine technician to assist in the provision of this service.</p> <p>I wish to make a few points in regard to the Draft Code of Practice for Safe Use of Radiation in Veterinary Science with particular reference to small animal diagnostic and therapeutic nuclear medicine.</p> <p>5.1.14 There are many new advances occurring in nuclear medicine in the techniques we use.</p> <p>If this is to be implanted then who is the “relevant regulatory authority” and what is the process that one will have to go through to obtain approval for development and use of new techniques/ protocols etc.</p> <p>5.2 Specific Nuclear Medicine Procedures Here the draft is only commenting on 2 procedures of the many we do.</p> <p>5.2.1 It would seem to me to indicate that this is written from the perspective that all bone scanning will be done in horses.</p> <p>Comments in 5.2.1 (c) to (f) on the use of coved flooring etc I feel should become part of the items in 5.1.12.</p>	<p>“approved by the relevant regulatory authority” has been removed.</p> <p>Tc-99m procedures have now been made more generic.</p>

	<p>While I agree in an ideal world, imaging and housing should be separate we have experience over many years of scanning and therapy to indicate that staffing exposure to radiation is acceptable in small animal nuclear medicine where scanning and housing are carried out in the same basic area utilising our current protocols.</p> <p>Overall this section should address small animal imaging as well as large animal (eg horse)</p> <p>5.2.2. This section has been written with the assumption that the I131 is administered exclusively orally. We have never used oral iodine in our facility we have treated more cats with radioactive Iodine than any other centre in Australia. We have treated over 1200 cats utilising and injectable form of I131 which we find effective and more “secure” that attempting to give oral therapy to these, often aggressive, cats.</p> <p>We also receive referral cases from all over the country of dogs with thyroid carcinoma and have this year published our results of I131 therapy on the largest series of dogs with thyroid carcinoma yet published in the veterinary literature.</p> <p>We also a clinical research project on the effectiveness of Sm153 in the palliation of disease in dogs with primary bone neoplasia.</p> <p>I mention these latter two matters to indicate that varied nature of use of nuclear medicine by admittedly only a small number of veterinarians in the country</p> <p>Overall therefore I feel these draft needs to be modified to allow for the diversity of studies, species and therapies encountered already in the Veterinary industry but also to allow for continued diversification in the use of this technology in the future.</p> <p>I do accept there are inherent risks in the safe use of these isotopes and the overall thrust of the draft document in ensuring adequate protection of humans from our use of these agents in our patients should not be diluted.</p> <p>(Submission No. 2) I wish to make comment on the Code of Practice for Safe Use of Radiation in Veterinary Science. Firstly I strongly support the development of a national code which updates the old codes with current radiation protection requirements and philosophies. In paragraph 63 page 13. The proposed Code requires: Approval of</p>	<p>Now Schedule C2.2: This section has been amended to include intravenous or subcutaneous injection.</p> <p>“Approval ... by the relevant authority” has been removed.</p>
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	<p>the design and the facilities by the relevant authority; I have already made a submission on the draft code but would recommend that some clearer guidelines are set for appropriate standards of design and facilities in the Code taking into account the variety of uses of nuclear medicine in veterinary science. Who is likely to be the relevant authority and what guidelines are they going to require one to conform to. I am unclear here as to if this is referring to local council building codes or in NSW, at least, the EPA. As there are so few people with experience in requirements in veterinary use of nuclear medicine that some clear National guidelines I think would be appreciated. It is difficult to comment on the initial and ongoing costs without a greater understanding of the likely requirements particularly as regards facilities.</p>	
<p>022 - Graeme S. Allan - Veterinary Imaging Associates</p>	<p>I have read and understand the RIS document relating to the safe use of radiation in Veterinary Science published by the Australian Radiation Protection And Nuclear Safety Agency (ARPANSA). The RIS addresses three options for regulating the safe use of radiation in veterinary practice.</p> <p>Option one is the status quo option which is to continue practicing under the existing regulations. This option is unacceptable because those regulations are based on information last updated in the mid 1980's.</p> <p>Second option is for the industry to self regulate. This option is unacceptable because industry can't be relied upon to effectively self regulate the safe use of radiation of Veterinary Science.</p> <p>Third option is to update the relevant codes of practice. This is the acceptable option and is the one foreshadowed as being the option to be put in place in the RIS. The proposed code will be published by ARPANSA under its radiation protection series and will be reviewed within ten years of its commencement. The code will be incorporated into the national directory for radiation protection. I support the RIS's summary and conclusions that implementations of an updated code is the appropriate action in this matter and recommend that the University of Sydney and the Australian Veterinary Association also support this action.</p>	<p>Noted.</p>
<p>023 Mark Lawrie President AVA NSW Division</p>	<p>Draft Regulatory Impact Statement - Code of Practice of Safe Use of Radiation in Veterinary Science We refer to your recent invitation to make submissions re the above and have canvassed comments from the NSW Division of Australian Veterinary Association members including specialist veterinary radiologists.</p>	

	<p>Opinion is that the third option is acceptable. The RIS's summary and conclusions that implementations of an updated code is the appropriate action in this matter and the AVA NSW Division supports this action.</p> <p>One suggestion was that an addendum to the current scheme be considered. This would cover those deemed to be in high risk arena's by ways of tighter control/thorough checking and reporting /improved methods of handling as proposed in some of the aspects of the third option without some of the more difficult to implement aspects such as the appointment of safety officers.</p> <p>The report covers radiography in detail and to a lesser extent, nuclear medicine. Fluoroscopy and CT are barely mentioned. It is thought that CT will be an integral part of Small Animal Veterinary Practice over the next 5-10 years and as a result thought it would have been granted a greater mention.</p>	<p>Noted.</p> <p>CT could be seen as being radiography with a very big X-ray unit. Patient dose is not an issue for veterinary radiology, only occupational exposures (see comment 13).</p>
<p>024 Richard Smart</p>	<p style="text-align: center;">Comments on Draft</p> <p style="text-align: center;">Code of Practice for Radiation Protection in Veterinary Science</p> <ol style="list-style-type: none"> 1. Line 5. This states that the Code may be cited as the <i>Code of Practice for Radiation Protection in Veterinary Science</i>. This is different from the name of the front of the document and the name in the footer on every page. Surely the two names should be the same or is there a specific reason why they are different? 2. Line 12. Suggest changing “radiation hazards” to “the potential hazards of ionizing radiation”. 3. Line 27. Suggest changing “the use of” to “the safe use of” 4. Line 57. Suggest changing “ that they issue” to “they must issue” 5. I query the need to list the sections (lines 65-70 and the annexes (lines 79-87). This is given in the Table of Contents, and is not consistent with the format of other ARPANSA Codes. 6. Section 1.6. This section is inconsistent with the meaning of a Code of Practice (see page 2). Codes should not have “should” statements – these are normally only found in Safety Guides (again see page 2). Apart from the Annexes (which are defined as non-mandatory) most of the “should” statements are in the footnotes – perhaps it needs to be clarified whether the footnotes form part of the Code. 7. Line 104 and 109. I do not agree with this definition of “occupational exposure”. As stated it would include the exposure of clerical staff whose exposure occurred as a result of their being in an adjacent area to where radiation is used. This definition does not agree with RPS1. Section 2.4 of RPS1 states that “Occupational exposures are incurred at work and principally <u>as a result of working directly with radiation</u>” (my underlining). 	<p>The name has been changed.</p> <p>“potential” is already in the sentence.</p> <p>Done. Most of this paragraph has been deleted. This section has been changed.</p> <p>Wording changed.</p> <p>Wording changed.</p>

	<p>Furthermore, in Section 2.5 of RPS1 it states “Exposure of employees who have no direct involvement in work which requires exposure to radiation should be controlled, where possible, in a manner similar to that employed for members of the public.”</p> <p>8. Line 132. Suggest changing “patient” to “animal”, as is used elsewhere in the Code</p> <p>9. Line 278. What is the purpose of section 3.3.1? Surely the requirements of 3.3.3 are sufficient? I suggest deleting 3.3.1</p> <p>10. Line 282. What is the purpose of section 3.3.2? Surely the requirements of 3.3.3 are sufficient? I suggest deleting 3.3.2 or combining it with 3.3.3</p> <p>11. Line 328. This is the first use of the term “collimator”. This should be in bold and written in full as “light beam collimator”. The bolding should be removed in line 563.</p> <p>12. Line 364. Remove orphan 0</p> <p>13. Line 631. Remove “and 0” or replace with relevant section number</p> <p>14. Line 804. Suggest changing “a dose rate monitoring instrument” to “a suitable radiation survey meter that meets the requirements of Schedule B of this Code” (as in section 5.1.7)</p> <p>15. Line 842. It is not the “mould” itself that is radioactive.</p> <p>16. Line 899. This sentence is incorrect. It implies that Au-198, referred to in section 4.3.3, does not emit beta particles. Au-198 emits betas with a maximum energy of 960 keV in 99% of its disintegration.</p> <p>17. Section 5.2.1 (line 1043). Why is this section restricted to bone scanning? The same precautions should apply to all diagnostic agents. (A useful summary of veterinary nuclear medicine procedures was recently published in the September 2005 issue of ANZ Nuclear Medicine and illustrates the range of radiopharmaceuticals that are being used).</p> <p>18. Line 1159 and 2238. AS/NZS 2211.1 publication date is now 2004</p> <p>19. Line 1271. Change “Clause 4.2.1” to “Clauses 4.3.1(c) and 5.1.7”</p> <p>20. Line 1972. I note that additional warning labels are to be illustrated. In NSW the Regulation requires the words “Caution Radiation” to be used with the trefoil.</p> <p>21. Line 2243. AS/NZS 3200.2.22 publication date is 1997, not 1993</p> <p>22. Line 2245. AS/NZS 4173 publication date is now 2004</p>	<p>Done for all occurrences.</p> <p>Done.</p> <p>A combination of both is now in place.</p> <p>“collimator” remains but the bolding has been removed as suggested.</p> <p>Done.</p> <p>Done.</p> <p>Done.</p> <p>Noted.</p> <p>Amended.</p> <p>Section amended to be more generic.</p> <p>Amended.</p> <p>Reference removed.</p> <p>Noted; these are Safety Guide items.</p> <p>Done.</p> <p>Done.</p>
<p>025 Mary Aerts Health Dept of WA</p>	<p>Comments on Draft Vet Code of Practice Section 5.2.1 Tc-99m labelled bone-seeking agent for bone imaging Section 5.2.2 Treatment of feline hyperthyroidism with iodine-131</p>	

	<p>Section 5.2.1 - Line 1043: Suggestion: Include a brief summary of the types of animals and activities</p> <p>Section 5.5.2 - Line 1097, 5.2.2 Suggestion: State that typical activities are up to 300 MBq or whatever.</p> <p>Line 1104 – 1105, 5.2.2 (a) “at least 5 days after the administration” needs expansion. Need to indicate something of what activity level or dose-rate is being <i>aimed at</i> before discharge, ie at what retained activity level (which might for example be approximated by a reference dose-rate at the skin surface of the thyroid) would discharge would be acceptable in relation to potential external dose to the owners and others, and pee-ing potential (in its owners or nearby properties)? [Note: According to the literature, urine produced by treated cats can contain several MBq per day a fortnight after treatment.]</p> <p>Line 1106 – 1107, 5.2.2 (b) Need to give air changes per hour as “extraction fan” and “very good natural ventilation” are too vague. Or could refer to another laboratory code or reference.</p> <p>Lines 113 – 1118, 5.2.2 (e), (f), & (g) These assume that oral administration is the <i>only</i> form of administration. In fact there are also IV and subcutaneous injection methods, with these being arguably superior in some cases in terms of radiation safety to administering the I-131 by oral route. Oral administration also requires higher activities.</p> <p>The other 2 methods must be included, and mention of their particular radiation safety considerations. For example, IV administration by pre-inserted catheter with care taken for extraction and disposal of the catheter after the administration.</p> <p>Section 4.3 Sealed Radioactive Sources – Gamma-Ray Emitters Section 4.4 Sealed Radioactive sources - Beta Particle Emitters</p> <p>Section 4.3 Line 788 Suggestion: A brief summary of the typical sources, with indication of whether used as removable sources or as permanent implants.</p>	<p>Note done as this would be seen as an all-inclusive list.</p> <p>Note done.</p> <p>Not done, this would most likely be covered by the instructions given to the owner.</p> <p>Not done in order to leave the requirement less prescriptive.</p> <p>Now Schedule C2.2: This section has been amended to include intravenous or subcutaneous injection.</p> <p>Lists are seen as all inclusive.</p>
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	<p>Line 800 4.3.1 (b) (iii) Is a photo/diagram required for gold seeds etc?</p> <p>Lines 833 – 838 4.3.2 (i) & (ii) & (iii) These points appear both too vague and, in the case of (i), too specific. It would be better to address these points in terms of expected outcome. For example, the access to the area should depend on time to reach a potential dose which depends on the dose-rate which in turn depends on what treatment and animal with what activity and isotope is being conducted.</p> <p>The reference to children and members of the public should be adequately covered by 4.3.2 (c). While it is perhaps advisable that pregnant women not be involved in the handling of animals undergoing radiotherapy with sealed sources, can this be precluded provided the occupational dose limits are followed?</p> <p>Lines 857& 860 4.3.3 (a) & (b) The discharge limits for Au-198 are given as 1200 MBq for companion animals and 6000 MBq for field animals.</p> <p>These seem large compared with the human patient discharge recommended activity given in RPS 4 of 400 MBq which corresponds to an ambient dose equivalent rate of approximately 25 µSv/h at 1m (with allowance made for limited patient body shielding).</p> <p>Many companion animals are in fact not very controllable (with respect to the public). Also we have in the past experienced situations where treated “field animals” were in fact accessible over fences to the public.</p> <p>Section 4.4 Lines 900 & 901 Need to indicate that treatment is by the source being briefly applied to the animal by an operator.</p> <p>Section 2 Sections 4 & 5 generally More comments on Section 5.2.1 Annex 5 Miscellaneous grammar / clarification comments</p>	<p>No.</p> <p>These are now Safety Guide items.</p> <p>Noted.</p> <p>Clause D4.1.</p>
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	<p><u>Section 2</u> Footnote to line 225: 2.2.2(b) Replace “its location” with “the location of the radiation facility”. It will then cover location in relation to radiotherapy sources and nuclear medicine as well as to x-ray equipment.</p> <p><u>Sections 4 & 5 generally</u> Many of the points in these sections seem to be “shoulds” or recommendations or guidelines, and perhaps for particular practices, and would be better in a Safety Guide; that is, they are not appropriate for a Code.</p> <p><u>Section 5.2.1</u> Lines 1047 – 1049 5.2.1 (a) It would be preferable to refer to dose-rates and/or retained activities for discharge, and link this in with how long before the animal may be discharged. The detail however may be better in a Safety Guide.</p> <p>Line 1057 5.2.1 (e) Important: We would not normally allow immediate “drainage to normal establishment waste” so that this should not be expressed as a mandatory statement. (For equine nuclear medicine in WA, a separate waste discharge line with delay tank is required given the large Tc-99m activities excreted from bone scintigraphy procedures.) There may also be situations where the “normal establishment waste” is via septic tanks or is recycled and therefore not suitable for contaminated waste.</p> <p><u>Annex 5 Strontium-90 Applicators</u> Description of the applicator It should include a mention of the expected life of the applicator – the manufacturers suggest 15 years although this may be able to be extended with careful handling.</p> <p>Line 2006 It would be useful to add “typically up to 15cGy/sec” after “may be very high.”</p> <p>Lines 2046 & 2047 After “cause a dangerous leakage of radioactive material” add “and also result in an uneven dose-rate from across the face of the plate.”</p> <p>Line 2047 and 2048</p>	<p>Footnote removed.</p> <p>“shoulds” have now been moved into the Safety Guide.</p> <p>Left as performance based requirements.</p> <p>Point noted but no change effected.</p> <p>Done.</p> <p>Done.</p> <p>Done.</p> <p>Done.</p>
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	<p>Replace “using an immersion test” with “using both wipe and immersion tests”.</p> <p>Line 2138 - 2139 Point 6 It could be worth re-iterating why here ie to prevent Sr-90 leakage and an uneven dose-rate from the plate.</p> <p>Line 2141 Point 7 Before giving examples of sterilisation methods, commence with a statement to the effect that sterilisation must be by chemical means and that the applicator must not be autoclaved or boiled. (Worth emphasizing – we once encountered a boiled-dry Sr-90 plaque – and a mess!)</p> <p><u>Miscellaneous grammar / clarification comments</u></p> <p>Lines 54 – 59 Section 1.4 Grammatical mis-match at end of line 57. Sentence may be better broken into two, eg: “Nevertheless, the implementation of these requirements must be achieved using sound judgement in specific situations. Consequently, establishments must draw up their own detailed working procedures based on relevant legislation and this Code, and they must issue appropriate instructions to all workers who may be exposed to radiation in the course of their duties.”</p> <p>Line 110 Section 1.7 Replace the comma after the word “students” with the word “and” so that it reads “all members of a department or practice, including veterinary students and temporary or visiting staff whose duties are likely . . . “</p> <p>Line 197 Section 2: 2.1.4 (p) Minor point for clarity: Add the word “as” after “designated” so that it reads “designated as ‘persons occupationally exposed to radiation’ under . . . “</p> <p>Line 710 Section 4: 4.1.6 Insert a comma after “expertise” or else full stop and new sentence.</p> <p>Lines 757 – 760 Section 4: 4.2.3 Does 4.2.3 belong as a subsection of 4.2.2 (in that it relates to the sentence introducing 4.2.2)?</p> <p>Line 829 Section 4: 4.3.2 (g) Replace the word “material” by “sources”.</p>	<p>Noted.</p> <p>Noted.</p> <p>Paragraph changed.</p> <p>Paragraph removed.</p> <p>Paragraph removed.</p> <p>“and” inserted.</p> <p>Noted.</p> <p>Done.</p>
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<p>026 Wayne Murray Registrar Veterinary Surgeons Board of Qld</p>	<p>The Veterinary Surgeons Board of Queensland has reviewed the Regulatory Impact Statement on the Code of Practice for Safe Use of Radiation in Veterinary Science and supports the replacement of the two Codes issued by NHMRC with an updated ARPANSA Code including guidelines on nuclear medicine and laser use in vet science. This option would appear to be the best for public health and safety and safety of users.</p>	<p>Noted.</p>
<p>Margaret B Wilson Registrar Veterinary Practitioners Registrations Board of Vic</p>	<p>Thank you for the opportunity to comment on this draft RIS.</p> <p>The Board makes the following comments:</p> <ol style="list-style-type: none"> 1. The costs of the impact of the proposed Code seem quite high however it is difficult for us to make meaningful comment without researching the methods for determining these. 2. The Board supports uniform standards across Australia as opposed to individual state legislation. 3. It is probably "cheaper" and preferable to have a Code for practice managers to work to, rather than having to establish their own standards and safety practices. 4. The Board recommends that training be made available to appointed Radiation Safety Officers to sit them with implementation of the Code. 5. The RIS is silent in respect to how the Code is to be enforced. Small businesses have limited resources to comply with onerous regulatory reporting. 	<p>Noted.</p> <p>Noted.</p> <p>Noted.</p> <p>Noted, however RSOs are no longer a mandatory requirement.</p> <p>Noted.</p>
<p>028 Peter Dagg Veterinary Officer Australian Government Department of Agriculture, Fisheries and Forestry</p>	<p>Thank you for the opportunity to comment on the draft Regulation Impact Statement - Code of Practice for Safe Use of Radiation in Veterinary Science (the draft RIS). The Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) has limited applied involvement in veterinary uses of radiation/radio-therapy, and we note that ARPANSA has also approached the Australian Veterinary Association as a source of specialist veterinary comment.</p> <p>Attached is a copy of the comments DAFF provided to ARPANSA on 4 August 2005 regarding the draft Code of Practice for Safe Use of Radiation in Veterinary Science, which ARPANSA released earlier this year.</p> <p>In relation to the draft RIS, DAFF notes the three options posed by ARPANSA for meeting the desired objective " to cost effectively protect persons, property and the environment from the adverse effects of radiation during, and as a result</p>	<p>Noted.</p>

	<p>of, the use of X-ray equipment, radioactive sources and lasers in veterinary science." DAFF assumes that the third option "Implementation of an updated Code of Practice" is the preferred option although this is not clearly stated in the draft RIS.</p> <p>DAFF agrees with the requests included in the draft RIS that stakeholders submit further details on the initial and ongoing costs of the requirements of the proposed new Code of Practice. Only after these details have been received from relevant organisations and stakeholders can a thorough and complete assessment be made of the cost-benefit analysis.</p> <p>We have no further specific comments to make on the draft RIS.</p>	<p>Noted.</p>
<p>029 Kathryn Kelly Registrar Veterinary Surgeons Board of the ACT</p>	<p>The ACT Veterinary Surgeons Board discussed the RIS at its last meeting and has the following comments:</p> <ul style="list-style-type: none"> • There is an error in the first table, column 7 – there is one practice in the ACT licensed for Nuclear Medicine; • Para 42 - The figure for the number of veterinarians undertaking equine radiological assessments in Australia appears to be too low at 20; • A member of the Board who has undertaken the Radiation Safety Officer training commented that the training for RSOs is at a lower standard than the veterinary undergraduate radiation safety course content and that veterinarians should not be required to undergo RSO training as the current university training is covers the field adequately. <p>Thank you for the opportunity to comment on the Impact Statement.</p>	<p>Corrected.</p> <p>“at least” added.</p> <p>Noted, although RSOs are no longer a mandatory requirement.</p>
<p>030 Dr Michael Sheedy Victorian AWAC Alt Rep Australian Veterinary Assoc (Victorian Division)</p>	<p>The Australian Veterinary Association (AVA) (Victorian Division) thank you for the opportunity to comment on the above and now, having sought comment from the appropriate members, we present the following response for your consideration:</p> <ul style="list-style-type: none"> • We support the decision to rewrite the Code of Practice in preference to status quo or self regulation. • While the current codes are clearly based on outdated information, the members take pride in the apparent compliance to existing legislation based on these codes, as indicated by the recorded low levels of exposure. We recognise the necessity for a current code to be the basis for legislation across Australia (i) to regulate for radiation safety; (ii) appropriate premises and equipment; and (iii) for maintenance and checking of equipment. This code 	<p>Noted.</p> <p>Noted.</p>

	<p>will enable legislation to effect a proper duty of care for practitioners, their staff, clients and the public alike.</p> <ul style="list-style-type: none"> • The Draft COP is quite good and all encompassing with the exception of Computerised Tomography (CT) and demonstrates an understanding of veterinary practice and the inherent difficulties dealing with animals. None the less our members do have some minor concerns. • There are already at least three CT machines in veterinary practices in Victoria at tire present time, with a forecasted increase in the number and use of these units for small animal patients over the next decade. We would thus request that CT technology be included in the COP in the near future. • 2.1.4 (a) There is an implied expectation that the Resident Safety Officer (RSO) will supervise all radiation use (this is not always logistically possible given clinic operating hours and the demand for radiography often exceeds a normal weekly shift, thus the RSO cannot always be on duty). We believe that this paragraph needs to clarify the intention of the writer as to the expectation of the RSO being able to "supervise radiation protection". • 2.1.4 (c) To what extent and in what form is the Radiation Safety Officer (RSO) to consult and liaise with a regulatory authority? This information should be provided within an annex. • None of the sections 3.1.1 (e), 3.7.2 (d) and 3. 3.5 on protective apparel refer to the use of thyroid protection collars. Thyroid protective collars are increasingly in use by small animal veterinary practitioners whilst radiographing and thus best practice guidelines to situations where the use may be preferred should be included. • 3.11.2. A dental unit is not always appropriate for radiographing a horse's tooth. Most practices are required, at least occasionally, to radiograph numerous teeth. Only a specialist dental referral practice is likely to have access to a dental x-ray machine and appropriate small area film. With respect to use of dental units in the Code we would request that "must" be changed to "should". • 4.1.4 Implies that veterinarians who use facilities and equipment designed for human treatment would be operating outside the Code. All veterinary radiotherapy treatment in Victoria utilizes equipment and facilities purpose 	<p>Noted.</p> <p>CT could be seen as being radiography with a very big X-ray unit. Patient dose is not an issue for veterinary radiology, only occupational exposures (see comment 13).</p> <p>RSOs are no longer a mandatory requirement in the Code.</p> <p>RSOs are no longer a mandatory requirement although suggested duties are outlined in the Safety Guide.</p> <p>Noted, but no change effected.</p> <p>This former requirement has been changed and a dental X-ray unit only needs to meet the specified requirements where one is actually used.</p> <p>Done.</p>
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	<p>designed for human use. We would thus request the words "on animals" be deleted.</p> <ul style="list-style-type: none"> • Line 1271 "Radiation survey meters" are referred to in 5.1.7 NOT 4.2.1. • Annex 3. Re line 1795 "rinsing for 30 mins in running water" is not always an appropriate use of a limited resource, particularly given stringent water restrictions in some localities. <p>Thank you again for the opportunity to comment on this RIS and the Victoria Division of the AVA is happy to provide further support should it be required, as you pursue revision and the upgrading of this Code of Practice.</p>	<p>Amended. Safety Guide item and no reference is now made. Changed to “several minutes”.</p>
<p>031 Michelle Rouffignac National President Veterinary Nurses Council of Australia</p>	<p>Thank you for the opportunity to submit comments on the above noted Drafts. The Veterinary Nurses Council of Australia is the peak representing body for Veterinary Nurses. As a major stakeholder in the veterinary industry we would like to note our support of a National Code of Practice for Safe Use of Radiation in Veterinary Science.</p> <p>Recognition of the veterinary nurses role in veterinary radiography has lead to recent significant changes in Australia with veterinary nurses now able to apply for an Operators Licence or operate x-ray equipment under the Licence of a Registered Veterinary Surgeon in practice. This change to Radiation Health and Safety Policy has been a positive industry step.</p> <p>Having read the two Draft documents and considered all possible issues, the VNCA wishes to submit the following comments:</p> <p>Draft Regulatory Impact Statement Page 5 – Possible Options, Point 26.</p> <p><i>Of the three options presented to industry for comment the VNCA believe <u>updating the current codes</u> is the preferred option. It is the opinion of the VNCA that industry is not in a position to facilitate self regulation and as we are aware the current status quo is not adequate by todays standards.</i></p> <p>Code of Practice for Safe Use of Radiation in Veterinary Science Page 12 – Responsibilities and Radiatio Surveillance, Point 2.1.4 line 162 & Page 47 – Responsible Person, lines 1456 to1466</p>	<p>Noted.</p>

	<p><i>Can we confirm that an appropriately Licensed (State dependant) Veterinary Nurse can perform the role of Safety Officer? In some situations a Veterinary Nurse will be the practice principle and will be the person responsible for staff safety.</i></p> <p>Page 25 line 620 Veterinary Dental X-ray Equipment, Point 3.11.12 line 620</p> <p><i>How this will be enforced. Many clinics will take dental ex-rays without a dental unit</i></p> <p>Page 27 – Ancillary Equipment, Point 3.13.5 line 664</p> <p><i>There is no mention of thyroid protectors in the list of protective garments</i></p> <p>Thank you for inclusion in the consultation process. The VNCA congratulates the ARPANSA on a very comprehensive Draft.</p>	<p>RSO is no longer mandated.</p> <p>Taking of veterinary dental X-rays without a dedicated dental X-ray unit is now permitted.</p> <p>Noted, but no change made.</p>
<p>032 Sally Boyle Victorian President Veterinary Nurses Council of Australia - Victoria</p>	<p>The Veterinary Nurses Council of Australia Victorian Division appreciates the opportunity to comment on the changes to the Code of Practice for Safe Use of Radiation in Veterinary Science.</p> <p>We agree strongly with the desired objective point number 23, 'to cost-effectively protect persons, property and the environment from the adverse effects of radiation during, and as a result of, the use of x-ray equipment, radioactive sources and lasers in veterinary science'. We have endeavoured to achieve that outcome by training veterinary nurses at seminars and also by encouraging nurses with the current National Qualification Certificate IV in Veterinary Nursing to apply for an operator's license.</p> <p>In relation to the three options in the Draft Regulatory Impact Statement the VNCA Victorian Division prefers option three <i>update the current codes</i>.</p> <p>The draft ARPANSA Code of Practice is very comprehensive and although implementation will come at a price the benefits to the standard of health and safety in veterinary practice will be tangible. It is also important that the Code maintains it's currency and regular reviewing will improve this.</p> <p>If the VNCA Victorian Division can be of further assistance please do not hesitate to contact us.</p>	<p>Noted.</p> <p>Noted.</p> <p>Noted.</p>

<p>033 Lorraine Plues Dept of Environment and Conservation NSW</p>	<p>Thank you for the opportunity to review the latest draft of the ARPANSA <i>Code of Practice for Safe Use of Radiation in Veterinary Science</i>, and the draft Regulatory Impact Statement on the estimated costs and benefits of the Code and alternatives.</p> <p>The Department of Environment and Conservation and the Radiation Advisory Council have reviewed the drafts and general and specific comments on these documents are provided in the attachment to this letter.</p> <p>The Code should be subject to the further quantitative analysis in particular justification for appointing Radiation and Laser Safety Officers, lead lining in examination tables, and special licensing for fluoroscopy. The RIS does not justify that the benefits exceed the costs.</p> <p>The data used for the report by the ARPANSA Personal Radiation Monitoring Service of doses to occupational groups may be useful in determining if veterinarians should have these conditions imposed. NSW is concerned that for the low doses reported that the Code seeks to impose additional unjustified regulation. Jurisdictions' resources should be focused on higher risk activities.</p> <p>(Attachment)</p> <p>GENERAL COMMENTS</p> <p>The NSW Department of Environment and Conservation (DEC) considers the requirement for each veterinary practice to appoint a radiation safety officer to be unduly onerous and inflict an unnecessary burden and expense on most practices. The DEC considers that this requirement should be removed for all practices except those where large numbers of radiological procedures are performed, for instance practices associated with the horse racing industry.</p> <p>All Australian Standard references need to be checked and where required be amended to reflect current versions.</p> <p>SPECIFIC COMMENTS</p> <p>Clause 2.2.1, Clause 5.1.5, Clause 5.5.10, Clause 5.1.12 and Clause 5.1.14. These clauses require the Responsible Person to notify or seek approval from the relevant regulatory authority before a specific task is undertaken. Specifically:</p>	<p>Noted.</p> <p>Noted. "Exemptions" for low dose situations is now incorporated into the requirement for personal monitoring.</p> <p>RSOs no longer mandated.</p> <p>Done.</p> <p>This has subsequently been changed.</p>
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	<ul style="list-style-type: none"> • Clause 2.2.1 requires the responsible person to submit plans for buildings that are to incorporate radiographic, radiotherapeutic or nuclear medicine facilities including details of shielding and/or other safety facilities. • Clause 5.1.5. Approval of the design must be obtained from the relevant regulatory authority before the commissioning of such facilities. • Clause 5.1.10. Detailed written procedures for decontamination and for the disposal of radioactive waste must be developed and approved by the relevant regulatory authority. • Clause 5.1.12. The facilities (dedicated facilities for nuclear medicine procedures) must be approved by the relevant regulatory authority before commissioning. • Clause 5.1.14. Written protocols for each type of nuclear medicine procedure must be developed and approved by the relevant regulatory authority before the procedures are implemented. <p>The above clauses should be amended to state '<i>relevant regulatory authority where required</i>' as there may be unique requirements in each jurisdiction, for example in NSW some of this is carried out by accredited third party service providers. This is also supported by Section 4.7 of the National Directory for Radiation Protection. If there is a need for each jurisdiction to approve particular tasks then these should be listed in the National directory to ensure consistency.</p> <p>Clauses 3.3.1 and 3.3.2 (b). These clauses require specific approval for veterinarians to conduct fluoroscopy procedures. The DEC does not support this on the basis that the costs imposed on regulators and veterinarian practices will far outweigh the potential benefits from a reduction in radiation dose.</p> <p>Clause 3.12.2. This clause requires advice to be sought from the relevant regulatory authority before a capacitor discharge X-ray unit is put into service. The DEC does not support this clause on the basis that the costs associated with its implementation far exceed the benefits expected.</p> <p>Clause 6.1.1 (d). This clause requires each operator of laser equipment to have undertaken laser safety training approved by the relevant regulatory authority. The DEC does not support the adoption of this clause again on a cost benefit basis.</p>	<p>The former requirement for each jurisdiction to approve particular task has been removed.</p> <p>Noted.</p> <p>Noted.</p> <p>Noted.</p>
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	<p>Responsibilities and Radiation Surveillance</p> <p>Clause 2.1.4 (g). This clause states that the RSO is to keep records of ‘<i>effective doses where determined for individuals</i>’. As occupational dose records are normally provided as ‘<i>personal dose equivalent</i>’ it is suggested that the Code substitute the words ‘<i>effective dose</i>’ for ‘<i>personal dose equivalent</i>’ otherwise the RSO will need to use conversion tables to calculate effective dose.</p> <p>Clause 2.2.2 (c) It is suggested that you delete ‘<i>or are higher than average doses received in similar departments and practices</i>’ as the requirement to find out these levels seems unnecessarily onerous.</p> <p>Clause 2.2.3. ‘<i>Dose constraints</i>’ are referred to in line 243. This appears to be the only place in the Code that they are referred to and they are not defined in the Glossary. It is not clear which ‘<i>relevant dose constraints</i>’ are being referred to or who is developing them.</p> <p>Clause 3.1.1. Personal radiation dosimeters are required to be worn by all staff handling radioactive material (lines 806 and 999) but are not mentioned in Part 3: Diagnostic Radiology. DEC considers it important to ensure that all staff likely to be exposed to non-trivial levels of ionising radiation be required to wear dosimeters, while those expected to receive negligible dose excluded. It is suggested that guidance be given on what should be done above and below a certain level. This guidance material should be incorporated in all codes of practice involving occupationally exposed persons.</p> <p>Clause 3.8.3. In this clause the Responsible Person must provide adequate facilities to ensure physical control over the animal as well as protection of the operator. This may not always be possible especially in visits to farms etc. It is suggested that the Responsible Person ‘<i>ensure facilities are available</i>’ rather than ‘<i>must provide</i>’ these facilities.</p> <p>Clause 3.10.1. With regard to the Air Kerma rates at the field input surface, the DEC suggests that these values should be non-mandatory.</p> <p>Clause 3.13.1. This clause requires lead lining of the examination table. The DEC questions the purpose of this requirement and consequently considers that it places unnecessary burden on veterinarians. It is also the DEC’s opinion that not many veterinarians would currently have such examination tables even though it is a requirement of the current Code. DEC also expects that regular examination tables would be expensive to refit. It is suggested that guidance</p>	<p>Noted, however doses need to be reported as “effective dose” to have any meaning.</p> <p>Now a Safety Guide item.</p> <p>“Dose constraint” now defined.</p> <p>Clause changed to allow for “exemption” for low dose situations.</p> <p>Change effected. Now a Schedule item.</p> <p>Noted, but no change made.</p> <p>Now a Safety Guide item.</p>
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	<p>material be included instead of this clause, for instance the veterinarian could be advised that laying a lead gown across the top of a normal examination table and under the animal being X-rayed would provide equivalent protection at less cost.</p> <p>Clause 3.13.6 (b). The requirement for personal protective devices to have a <i>'lead-equivalent thickness throughout of not less than 0.5 millimetres'</i>, when energies above 100 kV peak are used, is considered unnecessary. It is suggested that this requirement be deleted.</p> <p>Clause 3.13.7. The term <i>'testing'</i> needs clarification in this clause as it could be interpreted as either a visual inspection or a radiographic inspection.</p> <p>Radiotherapy</p> <p>Clause 4.1.3, line 132 and Table 3. The term <i>'patient'</i> is used instead of <i>'animal'</i>, for consistency it is suggested that <i>'animal'</i> be used to describe the subject.</p> <p>Clause 4.1.6. This clause seems to indicate that only experience is needed to carry out radiotherapy using sealed gamma sources. In NSW veterinarians require a licence to use radioactive sources. Although Clause 4.1.1 refers to licensing requirements, it is suggested that licensing requirements are mentioned again or alternatively the two clauses be brought closer together.</p> <p>Clause 4.2.1. It is unclear what is the difference between points (a) and (b).</p> <p>Diagnostic and Therapeutic Nuclear Medicine</p> <p>Clauses 5.1.1 and 5.1.2. As it is intended that the minimum competency requirements for use of radiation apparatus and sources are to be placed in the National Directory for Radiation Protection, the DEC considers that they should not be specified in the Code as well.</p> <p>Clause 5.1.2 (b) (111). It is suggested that the word <i>'mediation'</i> be inserted between <i>'spillage'</i> and <i>'procedures'</i> to clarify that it is a corrective action.</p> <p>Clause 5.1.10. It is suggested that a sentence stating that staff are to be trained in the decontamination and disposal procedures should be added to the end of this clause. It is also suggested that sufficiently detailed information on decontamination is included in an Annex to the Code to allow practitioners to</p>	<p>Now a Safety Guide item.</p> <p>Now a Safety Guide item.</p> <p>“animal” replaces “patient” throughout the document.</p> <p>Wording changed to make it clearer that a licence (authorisation) is mandatory.</p> <p>(b) effectively removed.</p> <p>Noted, but no change made.</p> <p>Done.</p> <p>Noted, but no change made.</p>
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	<p>develop the customised written procedures required by this and Clause 5.2.2 (k).</p> <p>Lasers</p> <p>Clause 6.1.1 (a). The Australian 1 New Zealand Standard AS/NZS 2211.1 - Part 1:1997 has been superseded. Further analysis is needed before the compliance with the new Australian Standard is made mandatory to ensure that it does not result in non-compliance due to technicalities rather than radiation safety issues.</p> <p>Clause 6.1.3 The DEC does not support the appointment of a Laser Safety Officer to supervise the use of laser equipment, again for cost benefit reasons.</p> <p>Personal Radiation Monitoring</p> <p>The comments on Clauses 7.1.1 and 7.1.3 below should be read in conjunction with DEC’s comment regarding Clause 3.1.1.</p> <p>Clause 7.1.1. In this clause responsibilities conferred to the Responsible Person need to be confined to occupationally exposed people within their sphere of control and likely to receive non-trivial levels of radiation dose. It is suggested that the word ‘<i>person</i>’ in the phrase ‘<i>received by each person</i>’ be qualified to ‘<i>occupationally exposed person</i>’ as it is not practical to provide personal monitoring devices to visitors to the centre. It is also suggested that Clause 7.1.1 (c) be removed, as the Responsible Person cannot be held responsible for contactors that service or repair veterinary radiation equipment or radioactive sources unless they are employees.</p> <p>Clause 7.1.3. Similarly, ‘<i>personal monitoring devices provided to each person</i>’ should be qualified to read ‘<i>personal monitoring devices provided to each occupationally exposed person in their employ</i>’.</p> <p>The Annexes</p> <p>Annex 2. In Line 1660 ‘<i>employer</i>’ should be replaced by ‘<i>person holding the device</i>’. Annex 4. The radiation warning sign is currently prescribed in NSW legislation. This legislation currently requires the words ‘<i>Caution Radiation</i>’ rather than ‘<i>Radiation Source</i>’. If a warning sign is prescribed here, it needs to be consistent with all other Codes or the National Directory for Radiation Protection or left to each jurisdiction. Annex 6. The Australian Standards</p>	<p>Title correct.</p> <p>Noted.</p> <p>Clause changed to allow for “exemption” for low dose situations. Clause relating to contractors has also been removed.</p> <p>Safety Guide item.</p> <p>Done.</p> <p>Warning signs are only examples and are Safety Guide items.</p>
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	<p>referenced in this Annex have been superseded by the following updated versions:</p> <ul style="list-style-type: none"> • AS/NZS 2211.1:2004 Safety of laser products - Equipment classification, requirements and user's guide. • AS/NZS 3200.2.22:1997 Approval and test specification - Medical electric equipment - Diagnostic and therapeutic laser equipment. • AS/NZS 4173:2004 Guide to the safe use of lasers in health care. <p>Annex 7. Please note that our email address for radiation concerns has now changed to radiation@environment.nsw.gov.au</p> <p>REGULATORY IMPACT STATEMENT</p> <p>The Regulatory Impact Statement (RIS) is lacking in the quantitative assessment of the costs and benefits of introducing the Code. More detailed quantitative studies should be included to enable a clear decision to be made as to whether the benefits of introducing the revised Code outweigh the costs to the regulated community. I note that you have invited stakeholders to submit details on initial and ongoing costs and trust that the DEC will see the result of further analysis as it forms an intrinsic part of the RIS.</p> <p>The DEC considers that the estimated cost of appointing a Radiation Safety Officer of \$125 per practice significantly underestimates the true cost. Many of the Radiation Safety Officer responsibilities are considered quite onerous and would take the veterinarian considerable time and effort to become familiar with. On this basis, many hours of the veterinarian's time and the possible cost of a training course, or alternatively the appointment of an external contractor, will equate to significantly more than the estimated \$125 per practice. The DEC reiterates that it considers the requirement to appoint a Radiation Safety Officer an unnecessary burden on most veterinarian practices.</p> <p>Other issues of particular concern to the DEC are the requirement for lead lining in the examination table, the need for specific approval for veterinarians to conduct fluoroscopy procedures, and for veterinarian practices using lasers, the need for a laser safety officer and specific laser safety training. DEC considers that these requirements are almost certainly too costly to justify and need to be specifically examined in the RIS.</p>	<p>Change of title effected.</p> <p>Change of title effected.</p> <p>Change of title effected.</p> <p>Change effected.</p> <p>Noted.</p> <p>RSOs are no longer mandated.</p> <p>Lead lining is a Safety Guide item now. Specific approval will be a local regulatory issue. LSOs are a requirement of the Standard.</p>
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<p>34 Dr Linda Selvey - Public Health Services Branch, Qld Health</p>	<p>If you require an additional person on the working group to re-draft the Code, a representative from Radiation Health, Environmental Health Unit would be pleased to assist.</p> <p>Comments on the draft <i>Code of Practice for the safe use of radiation in veterinary science</i></p> <p>General comments</p> <ol style="list-style-type: none"> 1. The whole structure of this Code is dated and inconsistent with the general structure which is emerging from other Codes published by ARPANSA. It would be beneficial if the structure was consistent. 2. It should be a requirement that the Responsible Person develop a detailed radiation management plan which details how that particular practice will be conducted to achieve the desired outcomes not only of the Code, but also of the regulatory authority. There should be a separate section which exclusively specifies the minimum content of such a plan. Such a requirement is consistent with the path being taken in drafting other ARPANSA Codes. 3. The way reference is made to the authorities required before veterinary procedures are allowed to be performed needs to be reviewed throughout the document to ensure consistency with other documents, such as the National Directory for Radiation Protection, thereby ensuring clarity in the information provided. 4. All statements should be carefully examined and re-written to ensure that it is clear who has the responsibility to perform the stated action and what that action is. The whole Code must be re-drafted to ensure statements are written in the form: "The responsible person must ensure that...". Such a re-draft would be consistent with the path being taken in drafting other ARPANSA Codes. 6. It is not clear when it is expected that personal radiation monitoring is required for veterinary diagnostic radiography procedures. The section which deals with personal radiation monitoring should be further developed and the responsibilities borne by the responsible person in relation to personal monitoring should be more clearly specified. I also suggest that personal monitoring be required for persons involved in large animal radiography because of the increased probability of unintended exposure of personnel. 	<p>The structure has now been changed.</p> <p>Radiation Management Plans now required.</p> <p>This type of referencing has now been removed (see earlier comments).</p> <p>Passive voice statements have been removed.</p> <p>This has now been clarified with small dose centres no longer required to provide them.</p>
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	<p>Specific comments:</p> <p>Lines 29 - 30 The term "appropriate regulatory authority" is inconsistent with terms used elsewhere in the ARPANSA documents and elsewhere in this document. I suggest it be replaced by "relevant regulatory authority".</p> <p>Lines 117 - 139 The whole concept of a person sustaining "radiation injury" is dated. It is suggested that it be changed so that the focus is on the optimisation of practices and dose constraints so that exposure to radiation is minimized.</p> <p>Lines 162 - 201 While the radiation safety officer may have <u>duties</u> and <u>functions</u> which result in him or her reporting events to the relevant regulatory authority or maintaining records etc., we must be quite clear that it is the responsibility of the responsible person to ensure that these functions or duties are undertaken. This section needs to be reviewed to ensure the responsible person's responsibilities are clearly annunciated and differentiated from the duties and advisory functions of the radiation safety officer.</p> <p>Lines 214 - 217 It is unlikely that the regulatory authority will be needing details of radiation shielding plans etc. Instead, they will be seeking to ensure that a third party assessor has certified that the premises meet specified radiation safety standards, including those relating to radiation shielding. These standards should be specified, in some way, in this Code or if they are more general in nature, in the National Directory for Radiation Protection.</p> <p>Lines 235 -- 236 In other Codes produced recently the rules relating to persons supplying and servicing equipment have been specified in some detail. I believe similar sections relating to these aspects of ownership and maintenance need to be detailed in this Code so that veterinary surgeons can be clear about such matters.</p> <p>Lines 272 - 274 These lines imply that a veterinary surgeon will always be the person in charge of the procedure. This may not necessarily be the case.</p> <p>Lines 341- 346, 421</p>	<p>Now “relevant regulatory authority”, which is defined, throughout.</p> <p>This is now in the Safety Guide but radiation injuries can certainly be received from some of the therapy sources used in veterinary medicine.</p> <p>RSOs no longer mandated in the Code. Now a Safety Guide item.</p> <p>Approval of the relevant regulatory authority is no longer required.</p> <p>Noted, but no change made. It is the Responsible Person who needs to ensure that their equipment is up to standard.</p> <p>The “operator” is now in charge of the procedure and will need to meet these requirements.</p>
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	<p>These statements should be revisited in the light of recent discussions. Any replacement statement should emphasise that the X-ray tube must not be held unless circumstances indicate that the risk of physical injury to personnel from an animal is significant, or the specific view required is otherwise very difficult using other equipment configurations, thereby making holding the tube necessary. However, such a relaxation must be accompanied by a statement specifying that even under such circumstances, only X-ray tubes specifically made with handles allowing them to be held safely must be used for such activities.</p> <p>Line 422 Change "alignment" to "aligned".</p> <p>Lines 468 - 472 It is quite correct to say that the illumination of the light beam collimator could be ineffective when out doors, but there needs to be a requirement for the person who performs radiography under such circumstances to adopt procedures which compensate for this reduction in safeguards or, alternatively, for other engineered safeguards to be put in place such as an appropriate laser marking system (as is used on some equipment).</p> <p>Lines 509 - 682 The majority of these requirements are requirements which equipment must meet rather than requirements to be met by persons. It would be appropriate for the requirements which equipment must meet (such as the performance standards of the X-ray equipment) to be placed in a schedule so that any requirements on persons can be clearly seen in the main body of the Code. Again, this would ensure consistency with other recently developed Codes.</p> <p>Lines 715 - 786 Refer to my comments about lines 509 - 682.</p> <p>Lines 956 -1152 It might be appropriate for there to be a schedule containing the information which the treating veterinary surgeon must provide to the owner of the animal to ensure exposures are minimized while the animal is being treated.</p> <p>Lines 1157 -1183 AS2211 contains material relating to the design of equipment and premises. While this material is important, I believe it would be very beneficial to mention</p>	<p>This is actually a Safety Guide item now.</p> <p>Done.</p> <p>Wording changed to ensure that it is visible under all conditions.</p> <p>Now in a Schedule.</p> <p>Now in a Schedule.</p> <p>Some of this information is provided in the Safety Guide.</p> <p>Noted.</p>
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	<p>that the procedures followed in the use of the lasers should be consistent with the guidance provided by AS4173. There is some very sound advice in AS4173 which ought to be followed by anyone using lasers on animals.</p>	
<p>035 Dr Jonathan Lumsden President, Australian Equine Veterinary Association</p>	<p>Further to our submission to the Radiation Health Committee on 9 November 2004, the Australian Equine Veterinary Association (AEVA) would like to make the following submission.</p> <p>The AEVA feels very strongly that the requirements of the current draft Code of Practice - February 2005 are associated with potentially serious workplace safety concerns with regard to equine radiography.</p> <p>The work safety issues arise from the unpredictable and dangerous nature of horses that may lead to injuries to those people attempting to comply with the several impractical requirements of the code. Specifically, we feel that in those circumstances where the patient's nature indicates potential for unpredictable behaviour, the code of practice should allow the veterinarian the options of (a) holding the x-ray tube assembly and (b) having cassette holders shorter than one metre.</p> <p>The members of AEVA are and are being actively made aware of the occupational health and safety issues involved in working with both horses and radiation. They understand that they are required to conduct a risk assessment of each veterinary activity and make suitable arrangements for all participants' safety prior to performing the activity. We believe that there should be provision in the code for the veterinarian to use their professional judgment to determine the safest method to achieve quality radiographs.</p> <p>In our previous submission we presented data collected from two large practices, which perform a large number of yearling radiographic examinations and we pointed out that none of the participants had come close to exceeding the NHMRC annual dose limits (updated data attached for your information - Appendix A). In fact, the vast percentage of participants had received less than the recommended maximum dose for the general public.</p> <p>It should be noted that this data was generated from people intermittently hand-holding the x-ray tube assembly and using cassette holders shorter than one metre (notwithstanding we appreciate that these practices contravene the current code). It is our contention that this data, collected over a number of years and from a large number of patients provides very good evidence for allowing these practices to continue. The AEVA is prepared to fund and organise independent</p>	<p>The requirements have been changed and those suggested here are now permitted.</p> <p>Noted.</p> <p>Noted.</p> <p>Noted.</p>

exposure data under the current Code of Practice and under common practice situations if the committee is of the opinion that such data would assist in determining their position on this issue.

It should also be noted that this data was generated by veterinary practices which comply with the AEVA draft Radiography Protocol (following - Appendix B) which sets out principles for safe use of radiation apparatus and gives practical guidelines for personnel, monitoring, radiographic technique, equipment and records. This Radiography Protocol, while not as exhaustive, has substantially the same requirements as the draft Code of Practice, (with the exception of the options of holding the x-ray tube assembly and using cassette holders shorter than one metre). We therefore submit that the alterations we are suggesting will not significantly affect the radiation exposure of participants. Following is a list of those specific points in the draft Code of Practice -February 2005 which deal with the holding of x-ray tube assembly and cassette holders which we feel place unreasonable requirements on the practice of equine radiography.

3.4.2. The veterinary surgeon in charge of a radiology procedure must ensure that:

- (f) Any person supporting a cassette holder remains as far as practicable, and in any case at least one metre, from the edge of the primary beam;
- (g) No person holds the X-ray tube assembly or the cassette during radiography;
- (h) The X-ray tube assembly is rigidly supported by a mechanical holder, stand or wall mounted arm that:
 - (i) Provides adequate stability; and
 - (ii) Does not allow movement blurring of the radiograph.

3.6.3. When radiography is carried out outside defined X-ray rooms or areas, the veterinary surgeon in charge of a radiology procedure must ensure that:

- (g) No person holds the X-ray tube assembly and cassettes directly

3.7.4. Radiographic examinations of large animals, for regions other than the lower limbs, require the use of considerably greater exposure factors that increases the hazard from both the primary beam and scattered radiation and must only be carried out using high powered X-ray equipment at a fixed installation.

	<p>3.13.4 Where cassette holders are not self-supporting, they must be fitted with: (a) handles at least one metre long; and (b) a ground support, To ensure that a person holding them can remain well outside the primary beam.</p> <p>We submit that these statements may be altered to the following:</p> <p>3.4.2. The veterinary surgeon in charge of a radiology procedure must ensure that:</p> <p>3.4.2. (f) any person supporting a cassette holder remains out of and as far as practicable from the edge of the primary beam, preferably at least 1 metre.</p> <p>4.3.2. (g) no person holds the x-ray tube assembly or the cassette during radiography except in those circumstances where the view required or the patient's nature indicates the potential for unpredictable behaviour which may endanger the safety of the participants.</p> <p>3.4.2. (h) whenever practicable (taking 3.4.2. (g) into account) the x-ray tube assembly should be rigidly supported by a mechanical holder, stand or wall mounted arm that: (i) provides adequate stability; and (ii) does not allow movement resulting in blurring of the radiograph.</p> <p>3.6.3. (g) as for 3.4.2. (g)</p> <p>3.7.4. Radiographic examinations of adult large animals, for regions other than the limbs and head require the use of considerably greater exposure factors that increases the hazard from both the primary beam and scattered radiation and should only be carried out using screen/cassette combinations that minimize exposures from high powered x-ray equipment.</p> <p>3.13.4 Where cassette holders are not self-supporting, they should be fitted with: (a) handles; and (b) where practicable a ground support, to ensure that a person</p>	<p>“preferably” added.</p> <p>Now a Safety Guide item.</p> <p>Now a Safety Guide item.</p> <p>Now a Safety Guide item.</p> <p>Now a Safety Guide item.</p> <p>Now a Safety Guide item.</p>
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holding them can remain well outside the primary beam.

We note also that the draft Code of Practice makes no mention of the position on the body that personal monitors should be worn. The previous code (1995) contains two statements: 2.5.1 and Annex III. We submit that a clarification on this matter would be a useful addition to the draft code.

Appendix B

Radiography Protocol

1. *General Principles*

1. Only authorised and trained staff are to be involved in radiography. Operators of X-ray equipment must hold a current Licence to Use radiation apparatus as required within the jurisdiction of their practice.
2. Everyone involved in radiography must wear an approved radiation monitor for the recording of occupational exposures.
3. The distance between radiation sources and personnel should be maximised as much as practical. Only those persons directly required for the performance of radiography and restraint of the subject are permitted within the X-ray area.
4. No part of any person must ever be exposed to the primary beam.
5. The amount of radiation dose to subject and personnel should be minimised as much as possible, by:
 - (a) using the shortest exposure times possible,
 - (b) using the highest speed film and intensifying screens compatible with good detail,
 - (c) sedation or restraint that will minimize the need for repeat exposures,
 - (d) Processing of radiographs using standardized time/temperature techniques appropriately mixed and agitated chemistry according to manufacturer's specifications, by adequately trained staff, in properly ventilated facilities.
6. Appropriate equipment must be provided and maintained for the immobilization of image receptors and radiation apparatus and for the

Noted, but no change made. This advice will come from the provider.

processing of radiographs.

7. Detailed records must be kept for all radiographic procedures.
8. The physical safety of the personnel and the horse must be considered during radiography as well as the radiation safety.

2. Personnel

1. Only authorised and trained staff is to be involved in radiography. Operators of Xray units must hold a License to Use ionizing radiation apparatus as required by the jurisdiction in the area of practice.
2. No one under the age of 18 is to be involved in radiography.
3. No pregnant person is to be involved in radiography.
4. The number of people involved in the radiography of any one patient should be minimised to that which is safely practical.
5. All people involved in radiography must wear a thyroid shield and a lead protective gown.
6. The cassette holder must wear radiation safety gloves and where practical, radiation safety spectacles or goggles are advisable.

3. Monitoring

1. Everyone involved in radiography must wear an approved radiation monitor which is regularly assessed and reported on by a personal dosimeter service approved in the local jurisdiction of practice.
2. The radiation monitor must be worn under the protective gown on the waist or chest.
3. The radiation monitor must be stored in an approved manner when not in use. Radiation monitors must not be worn outside the hours of employment.
4. Each person must have a specific radiation monitor assigned to them and monitors must not be shared.

5. If monitoring devices indicate exposure limits have been exceeded, or a level inconsistent with expected results is recorded, this incident must be reported to the radiation authority in the place of practice and investigated.

4. *Radiographic Technique*

1. The amount of radiation used should be minimised as much as is practical, by:
 - a. Using the shortest exposure time practical at an appropriate kVp to produce films of adequate detail.
 - b. Using the highest speed film and intensifying screens practical to produce films of adequate detail
2. All horses should be adequately restrained and sedated to ensure the safety of personnel, and the horse, and to minimise the requirements for repeat films.
3. Personnel holding cassettes must use holders or vice grips, they must not hold the cassette directly.
4. No part of any person must ever be exposed to the primary beam even if covered by protective clothing and/or equipment.
5. The primary beam must be collimated to fall within the limits of the cassette.
6. Radiation tube assemblies must be supported in/on a stable holding device whenever practical. A radiographer may deem that in the interests of physical safety and reduced exposure it would be better to hold the radiation apparatus. Such decisions must be made in consultation with the supervising veterinary surgeon and be recorded as such in the record of examination.
7. An assessment of the temperament of the horse and the conditions under which the radiography is to be performed should be made by the radiographer and all steps necessary to ensure the physical safety of the personnel and the patient should be taken.
8. The minimum series of films required for the export horse protocols and yearling sales are detailed in an Addendum 1 and 2 respectively. The series must be minimized where possible. The supervising Equine Veterinary Surgeon must authorize in writing any additions or variations from the standard series.

5. Equipment

1. All equipment involved in radiography must be maintained and serviced regularly by appropriately trained and licensed personnel.
2. Protective equipment must be at least 0.25mm lead equivalent
3. All protective equipment must be visually examined prior to use and radiographically examined annually for signs of damage or deterioration. The results of such inspections must be maintained in a log and check by an external source as required by the Code of Practice.
4. All protective equipment must be stored correctly to maintain effectiveness (i.e. they must be hung, not folded or rolled).
5. Plate holders must allow the operator's hands to be a minimum of 150mm from the edge of the cassette.
6. All ionizing radiation apparatus must be registered with the appropriate State authority (e.g. EPA in NSW) in the jurisdiction of practice and where required, be regularly tested for compliance with radiation safety standards by an accredited tester

6. Records

1. Records must be kept for all radiographic procedures, these should include:
Name of subject
Name of radiographer
Name of cassette holder
Name of horse handler
Names of any other assistants
Dose and name of sedative
Signature of radiographer
Model of radiation source
Views and regions radiographed
Additional comments such as: *X-ray stand not used.*
2. Records of all servicing and maintenance of radiographic equipment must be kept, including the radiographs taken under 5.3
3. Records of all staff training in radiography technique and regulations must be

	kept, and certificates of competency issued after attendance at appropriate training sessions. Records of processing chemistry mix, and processor cleaning including date, time and persons responsible.	
	4. Records of Quality Assurance checks on processing equipment.	

APPENDIX A

Radiation Exposure Data from Two Equine Practices Conducting Yearling Radiography Examinations

PRACTICE A

2003					
Badge 1	20	1552	1552		45
Badge 2	30	3650	3562	88	107
Badge 3	30	330		330	10
Badge 6	20	1496	1474	22	44
Badge 7		1561		1561	46
Badge 8		242	242		7
Badge 10		220	198	22	10
Badge 11	80	5020	2640	2380	148
Badge 12		860		860	25
Badge 13	940	8060	2960	5100	237
Badge 14	20	5516	3204	2312	162
Badge 15		987	987		29
Badge 16	150	8788		8788	258
Badge 17	60	88		88	8
Badge 18	40	3289	3289		97
Badge 19	200	2550	680	1870	75
Badge 20	100	5310	5310		156
Badge 21	370	2366		2366	69

2004 (JANUARY -JUNE 2004)					
Badge 1	30	374	374		11
Badge 2	20	670	670		20
Badge 4	50	2152	238	1914	63
Badge 6	90	1290	1290		38
Badge 8		374	374		11
Badge 10	20	154	154		4
Badge 12	20	1498		1498	44
Badge 13	30	1918	1774	144	56
Badge 14	50	3336	3336		98
Badge 15		136	136		4
Badge 16	60	5502		5502	162
Badge 17		170		170	5
Badge 18	70	2038	2038		60
Badge 23		22	22		1
Badge 20	110	1656	1656		49

PRACTICE A (JULY 2004 – MARCH 2005)

	5.7.04-26.9.04	27.9.04-19.12.04	20.12.04-13.3.05	12 Month Dose		Incurred as:	
Number Identifier	MicroSv Period	MicroSv Period	MicroSv Period	to 13.3.05	Total Exposures	Radiographer	Plateholder
1	10	10		30	881	881	
2		10		10	1806	1794	12
27		10	20	30	115		115
28	10	10		30	153	145	8
6					484	472	12
32					43	43	
9					5651	5510	141
10					273	254	19
33	10	10			51		51
12	10	10		40	3831	650	3181
13	20	50		90	2019	1903	116
35			10	10	0		
14	10				4706	4701	5
36					54		54
16	10	10	20	80	9748		9748
38	10	10		30	21		21
46					4	4	
43	10	10		40	167		167
17			10	10	646		646
18	20			70	1886	1883	3
44					7	7	
23		20	10	30	8335	8225	110
47					1194	1160	34
24		20		20	7292		7292
45	20	10		50	224		224
41		20	20	40	376		376
20		10		20	1233	1229	4
42	10	10	10	40	186	153	33
21	10	10		20	814		814
TOTAL NUMBER OF EXPOSURES 5.7.04 -13.3.05					52200		

PRACTICE B

BADGE TOTALS 2003	microSv	TOTAL HORSES PER PLATEHOLDER BADGE
Badge A	2200	133
Badge B	530	84
Badge C	160	30
Badge D	120	39
Badge E	180	54
Badge F	90	58
Badge G	170	22
Badge H	150	10
Badge I	110	18

2004 (June)	microSv				Yearly Total	Total Exposures (including extra exposures)	Radio-grapher Exposures	Plateholder Exposures	Non-holder Exposures	No. of Horses
	1st 1/4 22.03-13.06	2nd 1/4 14.6-05.09	3rd 1/4 29.11-20.02	4th 1/4 21.2-15.05						
Badge A	10		20		30	10536	10336			304
Badge B	10		10	30	140	10451	8908			262
Badge C		40	40		150	4658			4658	139
Badge D			10		10	4870		348	4522	135
Badge E	260	70	10		350	12951		6562	6222	267
Badge F	30	30	20		90	4242		2142	2100	98
Badge G	30	40	350	90	520	9804		3163	4012	253
Badge H	30	10			50	2859		541	2318	82
Badge I	90	10	20		120	3892		1665	2958	134
Badge J	30	80	30		140	11933		3431	6732	230
Badge K	60	20	10		90	1382		462	920	38
Badge L	10	10	10		30	392			392	8
Badge M			200	40	240	4182	2074	1271	612	131