

**2<sup>nd</sup> Round Public Submissions on  
RECOMMENDATIONS FOR INTERVENTION IN EMERGENCY SITUATIONS INVOLVING RADIATION EXPOSURE,  
PUBLIC CONSULTATION DRAFT May 2004**

Submission from	General Comments	Working Group Response
<p>01 Dr Bill Williams Medical Association for Prevention of War, Australia</p>	<p>There are persisting fundamental deficiencies in the draft ARPANSA document entitled “Intervention in Emergency Situations Involving Radiation Exposure”:</p> <p><b>1. PUBLIC INFORMATION:</b></p> <p>The public has been invited to comment on information to which they have inadequate access, particularly in relation to the ‘Radiological Consequence Analysis’ for deliberately caused nuclear emergencies involving HIFAR and the Replacement Research Reactor. This is patronising and unacceptable: the radiological consequence analyses must be released so the public can assess their adequacy and accuracy.</p> <p><b>2. INTERNATIONAL BEST PRACTICE:</b></p> <p><i>“Intervention levels for emergency response are for national authorities to decide, but <b>the latest information suggests that stable iodine prophylaxis for children up to the age of 18 years be considered at 10 mGy, that is 1/10th of the generic intervention level expressed in the International basic safety standards for protection against ionizing radiation and for the safety of radiation sources.</b>”</i></p> <p>“Guidelines for Iodine Prophylaxis following Nuclear Accidents” (W.H.O. 1999).</p> <p>and</p> <p><i>“...as there are strong indications of an age dependence of the risk of induction of thyroid cancer by radioiodine, the administration of stable iodine at significantly lower levels of dose to the thyroid may be recommended in order to take into account the higher sensitivity to radioiodine of children and the embryo or foetus.</i></p> <p><i>...relevant <b>operating and response organizations with responsibilities for the formulation of emergency plans may wish to take it into consideration, in particular the need to give priority to the protection of children, newborn babies and the embryo or foetus.</b></i> International Atomic Energy Agency (IAEA) <i>Safety Standards Series No. Gs-R-2, Preparedness And Response For A Nuclear Or Radiological Emergency Safety Requirements.</i> November 2002.</p> <p>It is alarming that ARPANSA is proposing to adopt a level for stable potassium iodide intervention in children (30 mSv) which is inferior to that recommended by the World Health Organisation and that adopted by several nations (Norway, Austria and Finland) (10 mSv). Australia should adopt best practice: “... in particular the need to give priority to the protection of children, newborn babies and the embryo or foetus.”</p> <p><b>3. ‘TERRORIST’ SCENARIOS:</b></p>	<p>Not relevant to development of Recommendations, since guidelines are applicable to any scenario.</p> <p>WHO document is not the latest document on these issues, and more recent IAEA and ICRP guidance cautions against inappropriately low intervention levels for iodine prophylaxis.</p> <p>These Recommendations take account of current knowledge on child thyroid cancer risk and are consistent with the guidance in GS-R-2.</p> <p>The Recommendations aim to ensure that the practical application of interventions provide an appropriate level of protection and do more good than harm. (see Section 3.1b in Recommendations)</p>

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	<p>The recommendations contained in the document, whilst professing to be generic in nature are heavily reliant on a small number of carefully selected <i>accident</i> scenarios. This skews the conclusions and recommendations of the authors of the document and results in deficient safety provisions, particularly in the recommendations relating to the administration of stable potassium iodide.</p> <p>The supporting technical documents provided by Drs. Solomon and Burns (“Technical Considerations for the Use of Stable Iodine after a Nuclear Reactor Accident in Australia” &amp; “Doses from Radioiodine”) are dominated by an anachronistic adherence to pre-9/11 emergency planning. There is no reference to <i>deliberately-caused</i> nuclear emergencies in their calculations. The “Interventions” document fails to allow for the possibility – no longer unrealistic – of a catastrophic deliberate event involving a nuclear reactor which would have grave long term consequences for a substantial proportion of the Australian populace.</p> <p><b>4. NUCLEAR POWERED WARSHIP EMERGENCIES:</b></p> <p>The supporting technical documents refer to modeled emergency scenarios which involve large nuclear reactors (i.e. in NPW’s) which do not involve damage to the secondary containment structure (i.e. the vessel hull):</p> <p><i>“The 2000 Reference Accident scenario was chosen to represent an <b>upper bound risk</b> to the surrounding population. This accident is assumed sufficiently severe to result in a full core meltdown, that is, melting of all fuel in the reactor core. The reactor primary and secondary containments are <b>assumed to remain intact</b>, and thus limit the fraction of fission products released to the atmosphere. The 2000 Reference Accident scenario, therefore, describes a ‘contained accident’, in that it gives credit to the containment” (Solomon, 24/52)</i></p> <p>This allows the maximum projected radioiodine release - upper bound risk - in these NPW scenarios to be a trivial <b>0.1%</b> of the I-131 inventory</p> <p>Ever since the terrorist assault on the USS Cole, where a large hole was blown in the hull of a major warship, the bells should have been ringing loud and clear in the minds of all emergency planners. However it is not clear from the “Interventions” document that the possibility of terrorist activity penetrating the secondary containment of a water-borne nuclear reactor in an Australian harbour has been considered by ARPANSA.</p> <p>As the NPW scenarios alluded to in the Solomon/Burns papers do not involve - do not even <i>contemplate</i> - damage to the secondary containment, they are dangerously misleading.</p> <p>ARPANSA is duty-bound to present the public with a realistic appraisal of situations which qualify as genuine “upper bound risk scenarios”.</p> <p>NPW’s are stationed within a few kms of major Australian urban centres and deliberate damage needs to be factored into planning scenarios. If such realistic emergency scenarios</p>	<p>The intervention levels are radiation risk based and are independent of the scenario.</p> <p>Comment noted to be considered in the context of the draft TR136 report. The intervention levels are radiation risk based and are independent of the scenario.</p> <p>The intervention levels are radiation risk based and are independent of the scenario.</p> <p>These are not relevant to the content of the Recommendations, comments will be passed to the appropriate Committee responsible for oversight and planning for NPW visits to Australian ports.</p> <p>The intervention levels are radiation risk based and are independent of the scenario.</p>

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	<p>were factored in, then the benefit from dropping the intervention level for administration of stable iodine down to 10 mSv would certainly be significant.</p> <p><b>5. RESEARCH REACTOR EMERGENCIES:</b></p> <p>Similarly, the HIFAR and RRR scenarios Drs Solomon and Burns have considered in their calculations involve sufficiently ‘trivial’ releases of radioiodine to dubiously justify their assertion that an intervention level for administration of stable iodine at 10 mGy (versus 30 mGy) derives little extra benefit.</p> <p><i>“In 2000, the Australian Nuclear Science and Technology Organisation (ANSTO) used a design-based accident to re-assess planning zones around the ANSTO the HIFAR Research Reactor at the Lucas Heights site (ANSTO 2002). This model is a loss-of-coolant accident involving a release of radioactive material to the environment and it is considered that this model provides <u>the best estimates</u> of radiation doses for an accident at HIFAR Research Reactor” (SOLOMON-20/52).</i></p> <p>These so-called “best estimates” simply ignore other release scenarios (e.g. HIFAR SAFETY ANALYSIS DR.22, 1986 or NSB SITING RE-ASSESSMENT HIFAR 1995) that cause larger radiation exposures and which <i>would</i> certainly justify adopting the more cautious level of 10 mGy.</p> <p><i><b><u>“For the range of Australian radiation emergency scenarios involving the release of radioactive iodine from a loss of coolant accident, the application of protective measures at 10 mGy intervention level could result in a reduction of a maximum of 1.4 cases from the expected 3 cases expected over the next 50 years. There is a small health benefit in using a lower value than 100 mGy for the Intervention Level for child iodine prophylaxis, <u>but there is minimal benefit in using 10 mGy over 30 mGy.</u>” (SOLOMON - 30/52)</u></b></i></p> <p>This is again misleading: the so-called “range of ... scenarios” is selectively restricted so as to sanction the author’s conclusion that ARPANSA should ignore the W.H.O. Guideline. That conclusion simply follows on from the use of calculations supplied by the <i>operators</i> of Australia’s only land-based nuclear reactor, ignoring other ‘emergency scenarios’ that do generate higher radiation exposures to the public and would therefore proportionately enhance the benefits of intervening at the 10mSv level.</p> <p>Furthermore, there has been no opportunity for the public to scrutinise the terrorist/sabotage scenario (i.e. the “Radiological Consequence Analysis”), which we are encouraged to believe couldn’t possibly have off-site consequences. If that is true, surely it would be logical to release the data to the public – and to would-be terrorists - to demonstrate that there is no point in sabotaging the reactor. The release of well-documented data showing that no assault on the reactor could harm the public might even act as a <i>deterrent</i> to potential saboteurs. Concealing this information simply encourages any would-be terrorists to think that ARPANSA/ANSTO are hiding something.</p>	<p>Comment noted to be considered in the context of the draft TR136 report. The intervention levels are radiation risk based and are independent of the scenario.</p>

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	<p><b>6. STABLE IODINE PREDISTRIBUTION:</b></p> <p><i>“For maximum reduction in radiation dose to the thyroid stable iodine should <b><u>be administered before any uptake</u></b> of radioactive iodine” (RECOMMENDATIONS-L.375)</i></p> <p>The document, though an improvement on the previous draft, is still too weak in its recommendations re the effectiveness of predistribution of stable potassium iodide. One gains the disturbing impression from the “Recommendations” that ARPANSA has an institutional resistance to the pre-distribution of stable potassium iodide, revealed by the intimation that stable potassium iodide administration and evacuation and sheltering are somehow mutually exclusive, as illustrated by the following:</p> <p><i>“... there may be <b><u>more benefit</u></b> in adopting intervention measures such as sheltering and evacuation. Iodine prophylaxis should however not be seen as the only counter measure that should be adopted. A reduction in thyroid dose as well as a reduction in whole body dose, which would be more beneficial in terms of reducing the number of fatal cancers, could be achieved by sheltering or by evacuation. (S &amp; B 48/52)</i></p> <p>Similarly, the wording here reveals an underlying assumption that stable iodine will not be pre-distributed (as it is in many nations):</p> <p><i>“A reduction to less than 30 mGy would provide only a small additional protection to exposed children, <b><u>to be balanced against</u></b> the implementation of emergency plans – for example, <b><u>a possible delay</u></b> in protection for those most at risk resulting from the requirements for the administration of stable iodine tablets to a larger population. On balance, issuing stable iodine at an Intervention Level of 30 mGy provides an adequate level of protection for children and would be more likely to be effectively implemented than an Intervention Level of 10 mGy”. (RECS - L. 2124)</i></p> <p>In addition to both evacuation and sheltering, a substantial proportion of the target population could be assured of ‘timely’ stable potassium iodide administration if they already had the stable potassium iodide in their medicine cabinets.</p> <p>The following is a clear argument for ensuring widespread, including household, pre-distribution of potassium iodide, and the Intervention Guidelines document should strongly advocate pre-distribution as the most obvious and effective means of ensuring prompt administration.</p> <p><i>“...The estimates of reduced thyroid cancer risk in the previous section assume that iodine prophylaxis is 100% efficient in reducing the thyroid cancer risk, and that 100% of the predicted thyroid dose can be averted. <b><u>In practice, it will take some time to initiate a protective measure, so not all the radiation dose can be avoided.</u></b>” (Solomon &amp; Burns)</i></p>	<p>The Working Group will examine the relevant text to ensure that the methods of distribution are treated without bias. What matters is not the method of distribution but its effectiveness and timeliness.</p> <p>The paragraph cited does not preclude the pre-distribution of stable iodine, but the use of other protective measures as a means of minimising radiation risk is the important concept in this paragraph</p> <p>Comment noted.</p> <p>What matters is not the method of distribution but its effectiveness and timeliness. Pre-distribution does not ensure that this will be achieved, and the relevant planning authority needs to determine the optimum method of distribution.</p>

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	<p><b>7. IODINE DEFICIENCY:</b></p> <p><i>...Iodine deficiency can be a problem in some regions where there are low natural levels of iodine in the soil. In this situation a thyroid could take up more iodine per day than otherwise possible. <b><u>Iodine deficiency is a problem in some areas of Australia.</u></b> (S &amp; B - 42/52)</i></p> <p>Iodine deficiency is well-documented in the Sydney area (MJA 1999; 171: 467-470, Asia Pacific J Clin Nutr 2001;10 (3): 200-203), including amongst pregnant women and children. This has not been factored into the ARPANSA recommendations and provides further scientific backing to adoption of the W.H.O. KI intervention level.</p> <p><b><u>RECOMMENDATIONS:</u></b></p> <p><b>ARPANSA must</b></p> <ol style="list-style-type: none"> <li><b>1. Strongly advocate PRE-distribution as part of emergency preparations</b></li> <li><b>2. adopt W.H.O. recommended KI intervention level for children of 10 mSv</b></li> <li><b>3. address sabotage terrorism scenarios</b></li> <li><b>4. ensure public access to NPW and research reactor Radiological Consequence Analyses before inviting further public consultation</b></li> <li><b>5. factor in documented iodine deficiency</b></li> </ol>	<p>While iodine deficiency in Australia is documented the implications for stable iodine administration is less clear. The effects will include not only increased uptake, but also increased sensitivity to the stable iodine. This comment is relevant to Technical document and will be considered for the final draft of TR136. The net balance of risks is unclear.</p> <p>These recommendations addressed above.</p>

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<p>02 P Laut Executive Director Public Health Assoc of Aust</p>	<p>Thank you for your letter of 12 May, providing the Public Health Association of Australia (PHAA) with the opportunity to provide comments on the draft recommendations for intervention in emergency situations involving radiation exposure.</p> <p>The PHAA is a forum for the promotion of the health of the public as well as serving as a professional resource for public health personnel. The Association provides opportunities for the exchange of ideas, knowledge and information on public health and actively undertakes advocacy for public health policy, development, research and training. The PHAA is a non-party political organization.</p> <p>As a general comment, the PHAA believes that comments on this paper are very difficult to provide, due to the level of scientific information that has been released – it is certainly not in a format which one would expect the person in the street to be able to follow. Further, it is made more difficult due to the information that has not been made available – the information contained in the document “<i>Radiological Consequences Analysis</i>” should be provided as a readable document that the average person could use to understand the impacts of a deliberately caused nuclear emergency.</p> <p>The PHAA is deeply concerned that ARPANSA is proposing to adopt a level for potassium iodide intervention in children that is inferior to that recommended by the World Health Organisation (WHO). The WHO recommended intervention at 10 mSv, while ARPANSA are not recommending intervention until the level has reach 30 mSv. In the “<i>Guidelines for Iodine Prophylaxis following Nuclear Accidents</i>” (WHO, 1999) the WHO states “...the latest information suggests that iodine prophylaxis for children up to the age of 1 S years be considered at 10 mGv...”. The PHAA believes that in developing standards for intervention, Australia must take the most precautionary approach and adopt the lower (10 mSv) level.</p> <p>The PHAA believes that the basis for the analysis underpinning “<i>Intervention in Emergency Situations Involving Radiation Exposure</i>” fails to take account of the potential for increased prevalence of terrorism in the world since 2002 and subsequently does not address deliberately caused nuclear emergencies. This failure in the analysis means that the risk to which Australian communities are exposed cannot have been correctly calculated, and must be understated in the document. Consequently, the need for and level of intervention may well be understated.</p> <p>Similarly, the PHAA believes that the analysis falsely suggests that a full core meltdown on a nuclear powered warship would not involve damage to the vessel hull. This seems highly unlikely, especially given the damage that terrorists were able to inflict on the USS Cole. Again PHAA believes that this failure in the analysis has led to an underestimate in the calculation of the risks and the subsequent level of intervention that might be required in an emergency.</p> <p>Again, the PHAA is not convinced that the scenario used to calculate the effects of a research reactor emergency have taken sufficient information into account. It would seem that the estimate has been based on one scenario – one that is at the lower end of</p>	<p>These <i>Recommendations</i> are aimed at appropriately qualified radiation protection experts assisting in the emergency planning and response. The intervention levels are radiation risk based and are independent of the scenario.</p> <p>WHO document is not the latest document on these issues, and more recent IAEA and ICRP guidance cautions against inappropriately low intervention levels for iodine prophylaxis. These Recommendations take account of current knowledge on child thyroid cancer risk and are consistent with this recent guidance. The doses are estimated doses that can be averted, not doses actually received. The Recommendations aim to ensure that the practical application of interventions provide an appropriate level of protection and do more good than harm. (see Section 3.1b in Recommendations)</p> <p>The intervention levels are radiation risk based and are independent of the scenario.</p> <p>The intervention levels are radiation risk based and are independent of the scenario.</p> <p>The intervention levels are radiation risk based and are independent of the scenario.</p>

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	<p>the scale, when other recent scenarios (HIFAR Safety Analysis DR.22, 1986 or NSB Siting Re-assessment HIFAR 1995) provide higher estimates. If the later estimates are technically more accurate then this must be explained as part of the justification for using only one scenario. Again, this looks like a factor that is likely to produce an underestimate of the level of intervention that would be required in the case of an emergency.</p> <p>Finally, there are two medical issues that the PHAA believes should be considered more fully before the current analysis is accepted. These are:</p> <ul style="list-style-type: none"> <li>• Stable iodine pre-distribution – the PHAA believes that in order to gain the maximum reduction in radiation dose to the thyroid, stable iodine should be administered before any uptake of radioactive iodine, ie iodine should be distributed to all people in the hazard area so that they can take it immediately upon any announcement of a radiation hazard. This approach does not. exclude other interventions but would serve as one aspect of providing maximum protection to Australian communities.</li> <li>• Iodine Deficiency – The PHAA believes that iodine deficiency is a problem in some regions in, Australia, and that this issue is well documented in Sydney. This does not appear to have been factored into ARPANSA’s recommended potassium iodine intervention dosages in children. Given this, the use of an inferior level to that recommended by the WHO would seem unconscionable.</li> </ul>	<p>Stable iodine is only effective for exposure to radioiodine which may not be present in all radiation emergencies. The method of distribution should be effective and timely. Pre-distribution does not ensure that stable iodine will be available when required, and the relevant planning authority needs to determine the optimum method of distribution.</p> <p>While iodine deficiency in Australia is documented, the implications for stable iodine administration is less clear. The effects will include not only increased uptake, but also increased sensitivity to the stable iodine. This comment is relevant to Technical document and will be considered for the final draft of TR136.</p>
<p>03 George Larcos President ANZAPNM</p>	<p>In general, the document suffers from an American or European bias and needs to be more specifically written with regard to the Australian situation.</p> <p>As an illustration, this country has a single small research reactor in Sydney and is occasionally visited by nuclear powered warships. There are no nuclear power reactors in Australia, yet much of the draft addresses issues related to these. Similarly, there are no local or dairy industries in or near Lucas Heights and thus, references to cow transfer factors and food preparation guidelines are not relevant. Our advice would be that the document is expanded in regard to nuclear powered warships and matters related to nuclear power plants are relegated to an appendix.</p> <p>We also recommend specific changes and consideration of additional issues as follows:</p> <ol style="list-style-type: none"> <li>1. That Section 2.4 (Types of Protective Measures) be re-written to consider accidents that may occur in Australia.</li> <li>2. In Section 2.4, line 347, the recommendation that evacuation to emergency facilities should not exceed 7 days, is too short a time period, since some accidents may require weeks or months evacuation from the affected area.</li> </ol>	<p>The Recommendations provide guidance on protective measures for all types of radiation emergencies. NPW are a special case of nuclear power reactors and are covered by the Recommendations. The text was reviewed to ensure clarity on this issue.</p> <p>NPW visits occur at a number of locations around Australia where transfer of radioactivity to food is relevant.</p> <p>Section 2.4 provides details of a range of protective measures applicable to a wide range of possible radiation emergency scenarios in Australia.</p> <p>Evacuation for longer periods are covered under re-location .</p>

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	<p>3. That in Section 2.5.3, the term "<i>radiation accidents</i>" be modified to accord with the convention used by Standards Australia, since the words "<i>radiological</i>", "<i>radiation</i>" and "<i>radionuclide</i>" offer greater specificity.</p> <p>4. In Section 3, the information regarding basic principles for intervention could be made more robust by inserting a reference to ICRP #82.</p> <p>5. In Section 4.3, line 784, the dose rate of 10 uSv/h is considerably lower than the international standard.</p> <p>The Association believes that the dose rate should be set much higher, partly to avoid public misconception about medical procedures requiring ionising radiation, but also to assist better planning for emergency situations in accordance with international standards.</p> <p>6. Table 1 on page 32 should also include medical supervision, counselling and triage, and treatment of persons who receive significant exposure.</p> <p>7. Table 9, page 42, refers to occupational and public dose limits and is not appropriate in the document.</p> <p>8. In Annex A, there is reference to potassium iodate (line 2215). To our knowledge, this is not available in Australia.</p> <p>9. Annex B repeats material elsewhere in the document and could be deleted.</p>	<p>Section 2.5.3 does not exist in Version 12.</p> <p>Agree. Text modified to include reference.</p> <p>Set for Australian operational requirements.</p> <p>The value is an "indicator" level.</p> <p>Table 1 modified to include reduction of internal contamination as a protective measure.</p> <p>Disagree. Occupational limits are relevant for emergency personnel. Included for completeness.</p> <p>ANNEX B provides more detail.</p>
<p>04 Australian Conservation Foundation</p>	<p>The Australian Conservation Foundation (ACF) has been a leading national environment organisation for over 30 years with active conservation programs and representatives in all States and Territories. ACF promotes, defends and celebrates our environment and our shared natural and cultural inheritance.</p> <p>An important focus of ACF's work is campaigning for a sustainable and a nuclear free future for Australia. ACF contends that there is no net benefit from our involvement with the nuclear industry and shares the deep community concern over the actual and potential impacts of such actions and facilities as the operation of a nuclear reactor in suburban Sydney, radioactive waste generation, transport and storage and visits by nuclear armed/powering sub and surface vessels.</p> <p>In this context ACF welcomes the opportunity to comment and urges the favourable consideration of the measures outlined in this submission to enhance Australia's regime of radiological protection. In particular ACF requests attention to the following initiatives on stable iodine and emergency response measures:</p> <ul style="list-style-type: none"> <li>Adopting the WHO (1999) recommended standard of 10 mGy radiation exposure as the intervention level for the administration of stable iodine to children to effectively block uptake of radioactive iodine. This is particularly important given the view expressed in the November 2002 IAEA Safety Standards Series No. GS-R-2 on the "need to give priority to the protection of children, newborn babies and the embryo or</li> </ul>	<p>WHO document is not the only document providing guidance on these issues, and more recent IAEA and ICRP guidance cautions against inappropriately low intervention levels for iodine prophylaxis. These draft Recommendations take account of current knowledge on child thyroid cancer risk and are consistent with the guidance in GS-R-2. The Recommendations aim to</p>

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	<p>foetus.”</p> <ul style="list-style-type: none"> <li>• ACF strongly maintains that the ARPANSA proposed 'standard' for intervention only after children have been exposed to 30 mGy of radiation, some three times the WHO recommended level, is inconsistent with both best international practise and ARPANSA’s responsibility to protect the health and safety of people from the harmful effects of radiation.</li> <li>• A clear commitment to the pre-distribution of stable iodine tablets to the general public and to schools/reception centres. Clarity in this from the national regulator would provide greater certainty for planning on the part of the relevant public health authority or implementing agency.</li> <li>• Providing clarity and frameworks for public education and stable iodine administration plans for schools and reception centres so that the population can be protected from thyroid cancer by administration of stable iodine to children within the first hour of radiation exposure. This is the response time that the World Health Organisation (WHO) says is required for an 85 % success rate of the treatment to prevent thyroid cancer in children.</li> <li>• Updating the Sydney nuclear reactor emergency plans to comply with the WHO recommended standard of 10 mGy as the intervention level to administer stable iodine to children, and for administration within the first one hour period of radiation exposure and prior to any evacuation that may be ordered</li> <li>• Enhancing public transparency and access to information that is fundamental to emergency planning and community safety. ACF is deeply concerned by the absence of such key data and documentation, and in particular by the continuing withholding of the Radiation Consequences Analysis (RCA) for the planned new nuclear reactor in Sydney. This is despite earlier commitments by the ARPANSA CEO Dr John Loy to provide this document. ACF accepts that the current security climate means that some sensitive material will remain restricted however we do not accept that a consequence analysis is in this category. A consequence analysis is not a terrorist “how-to” guide and the absence of the RCA undermines both the ability for detailed engagement in this process and wider community confidence in the reactor project.</li> <li>• Advising the population to shelter immediately after it is known that there has been a radiation release in a nuclear accident at Lucas Heights or elsewhere to limit radiation exposures to the population especially those potentially received by children. ACF sees this as prudent and consistent with other emergency measures. ACF urges against an approach that is based on waiting until radiation exposures reach 10 mSv before sheltering as ARPANSA currently propose.</li> <li>• The importance of adopting a precautionary approach in relation to sheltering is highlighted in the context of current regulations recognise that public radiation doses under routine reactor operations should not exceed 1 mSv per annum. This represents</li> </ul>	<p>ensure that the practical application of interventions provide an appropriate level of protection and do more good than harm. (see Section 3.1b in Recommendations)</p> <p>The doses are estimated doses that can be averted, not doses actually received</p> <p>Stable iodine is only effective for exposure to radioiodine which may not be present in all radiation emergencies. The method of distribution should be effective and timely. Pre-distribution does not ensure that stable iodine will be available when required, and the relevant planning authority needs to determine the optimum method of distribution.</p> <p>While important, public education is not within the scope of this document and is the responsibility of the relevant planning authority.</p> <p>Not within the scope of this document and is the responsibility of the relevant planning authority.</p> <p>Not within the scope of this document. The intervention levels are radiation risk based and are independent of the scenario.</p> <p>The doses are estimated doses that can be averted, not doses actually received</p> <p>The 1 mSv per year limit applies to practices:, not to emergency interventions, where the considerations are different. Intervention levels seek to balance the risk of the protective measure against the radiation risk.. This is in line with international guidance for</p>

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	<p>the maximum acceptable dose, granted that intervention levels are more focussed on the risk of implementation ACF maintains that some cross referencing with dose limits can help contextualise appropriate emergency responses. Further to this the WHO recommendations for the administration of stable iodine to prevent thyroid cancer recognises that emergency planning responses should take steps to minimise radiation exposures to children.</p> <ul style="list-style-type: none"> <li>No cost provision of stable iodine to the general population and to schools and reception centres, as is the case in the USA where the Federal Government has offered States two free tablets per person in reactor emergency planning zones.</li> </ul> <p>ACF believes there is inadequate attention and unacceptably constrained assumptions in relation to the risks posed by either an accident or a deliberate attack and subsequent breach of containment facilities on visiting nuclear powered or armed sub or surface vessels. ACF maintain there is an urgent need to upgrade the existing emergency plans for all Australian ports and harbours currently approved to accept nuclear powered/armed vessels. This upgrade would include the adoption of WHO intervention standards, increased defined emergency response zones, the pre-distribution of stable iodine for these areas and the holding of a readily distributable stock for non- residents that may be in these areas at the time of any incident.</p> <p>The drafts failure to adequately address this real risk and serious potential exposure pathway cannot be justified in the current global political and security climate.</p>	<p>all types of radiation emergencies. No changes required to document</p> <p>Outside of scope.</p> <p>Specific site planning are outside of scope of this document.</p> <p>The intervention levels are radiation risk based and these Recommendations are line with international guidance.</p>
<p>05 Sutherland Shire Council</p>	<p>Council takes the opportunity to provide further comment, beyond those comments on the original exhibition of the Draft Recommendations, on the occasion of the second exhibition of the Draft.</p> <ol style="list-style-type: none"> <li>Council notes that there are few changes to the original Draft in the re-issued document. In the ARPANSA responses to the original Draft, General Comments Section, Submission No. 10 from Sutherland Shire Council, ARPANSA noted that information regarding the consequences of a serious reactor accident was yet to be published. This information has not been forthcoming. However, ARPANSA committees have discussed some generic accident impact information. This should be made public so that comment on the re-exhibited Draft Recommendations can be fully informed.</li> <li>Council Notes from Radiation and Health Committee Letters and Minutes that the RHC is still discussing with a marginal improved health impact of moving the iodine intervention level from 30mGy to 10mGy is justified. It is important that a decision on the final content of the Draft Recommendations is not taken until the RHC consideration is finalised and fully justified.</li> <li>With respect to the intervention levels set for iodine and other radio nuclides, Council observes that in light of uncertainties in measurement of the risk benefits, and of potential population density increases around urban nuclear plants in Australia, the</li> </ol>	<p>Outside of scope. The intervention levels are radiation risk based and are independent of the scenario.</p> <p>The RHC have to approve the final Recommendations before they can be issued.</p> <p>Observation noted.</p>

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	<p>establishment of a conservative intervention level for the long term would benefit the public.</p> <p>4. Council is aware that the Nuclear Safety Committee has been copied with a summary document of ARPANSA Technical Report 136 as part of the deliberative process on the Draft Recommendations. The summary states that “no statistically significant increase in thyroid cancers has been found from [Chernobyl-derived] adult exposure”. This position conflicts with, for example, the British Medical Journal 12<sup>th</sup> June, 2004 reporting an increase in women up to twelve fold.</p> <p>5. The Summary of ARPANSA Technical Report 136 identifies an age-adjusted spontaneous thyroid rate of 40 cases per million per year. There appears to be a discrepancy with respect to the child incidence rate of 1-2 cases per million per year, also quoted in the document.</p> <p>6. The thyroid rate estimates in the Summary of Technical Report 136 should include foetal exposure for pregnant women.</p> <p>7. The summary tables accompanying Technical Report 136 refer to an estimated 10mGy exposed population of 8,000 people for the HIFAR 2002 Reference Accident. What are the ARPANSA 10mGy and 30mGy estimated exposure radii? for the Replacement Reactor upon which NSW Health based their strategy for iodine distribution and how does this compare with ARPANSA recommendations in the Draft Recommendations document?</p>	<p>Comments on the Technical document are out of scope, but issue will be addressed separately.</p> <p>Comments on the Technical document are out of scope, but no discrepancy exists: child incidence rate applies to one sub-group , age-adjusted is averaged over all age groups.</p> <p>Comments on the Technical document are out of scope, but issue will be addressed separately.</p> <p>Comments on the Technical document are out of scope of this document.</p>
<p>06 Samantha van de Geest ANSTO.doc</p>	<p>Please note that as ANSTO as commented extensively on the previous draft and was involved in the Working Group for these recommendations, we have no further comment on this version.</p>	<p>Comment noted.</p>
<p>07 Mary Aerts, Physicist Radiation Health Br Dept of Health, WA</p>	<p><b>(Comments covering Sections 1 &amp; 2, also Table 6 and Annex A)</b></p> <p><b>Potential reactions to stable iodine tablets</b></p> <p>Reference to the following should be included (or elaborated on, in the case of the first dot point): (maybe in Annex A under Information to be Provided with Stable Iodine Tablets lines 2247 - 2266)</p> <ul style="list-style-type: none"> <li>• Potential reactions to iodine must be covered in the public instructions. Notwithstanding any relative risk arguments, a huge public outcry could be anticipated over any severe reaction, particularly if fatal and if to a child.</li> <li>• It must be established and <i>clearly stated in the dispensing instructions</i> that the tablets are “gluten-free” since lack of information for querying members of the public at the time of emergency could severely hamper the distribution process. A simple statement with all dispensing packets would avoid this hiccup.</li> </ul> <p>Note 1: My information when I enquired several years ago as to the gluten-free status of the current supply of these tablets was that they were in fact</p>	<p>Agree, but requirement for public information is covered in Annex A. The responsibility for the production and content of this information rests with the relevant planning authority.</p> <p>Wording in text has been modified to include possible adverse reactions. The responsibility for the production and content of this information rests with the relevant planning authority.</p>

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	<p>gluten-free.</p> <p>Note 2: The incidence in Australia of the coeliac condition (which occurs across all age groups and requires a permanent strict avoidance of all gluten) has been estimated from a recent Busselton (Western Australia) survey to be 1 in 250. The diagnosed incidence is currently more than 1 in 1,000 and is steadily increasing with more awareness of the condition.</p> <p><b>Table 6, Page 36, Lines 1461 – 1468</b></p> <p>Some comments from Public Comment Round 1 that do not seem to have been adequately addressed in this draft:</p> <p>Lorraine Plues NSW EPA (Submission 13) drew attention to the inappropriate example of “an undamaged smoke detector” as a “Situation” in a “Radiological Accident”. This received the Working Group Response “Not of itself, but may be part of a broader accident situation.”</p> <p>I would support Lorraine’s comment. A smoke detector would not constitute a “radiological hazard” whether undamaged or even damaged (unless possibly for the older type with much larger activity). We must get away from inappropriate concern about smoke detectors and similar items, and therefore it seems inappropriate to even mention the words “smoke detectors” in the context of these Recommendations.</p> <p>What “broader situation” is the Working group considering? This needs to be clarified. It may be best to simply remove the third example situation from Table 6.</p> <p><b>Other Comments on Public Comment Draft 2:</b></p> <p>Note: Many of these comments are simply minor editorial points for clarity.</p> <p>Lines 136-137: Change to “Most of these activities are of considerable benefit to mankind, but some, if not kept under strict control, have the potential to be very detrimental.”</p> <p>(This brings both clauses into the simple present tense. And is perhaps thus slightly better expressed in view of some the previous public submissions on Draft 1.)</p> <p>Line 150: Change “radiological” to “radiation” (in line with previous submissions and WG decision.)</p> <p>Lines 165-170: Delete (repetition).</p> <p>Line 192: Change “radiation sources” to “sources of radiation”.</p> <p>(The old problem with the ambiguous meaning of the word “source”. Even though these recommendations are written primarily for qualified radiation protection experts, they will be read</p>	<p>Reference to smoke detector on Table 6 removed.</p> <p>Agree, text changed.</p> <p>Agree, text changed</p> <p>Agree, text changed</p>

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	by others. The term “radiation sources” sounds a little too like “radioactive sources” to the non-expert. “Sources of radiation” is a slight improvement.)	
Line 202:	comma after “teaching”.	Agree, text changed
Line 206:	Delete “in place” (it’s sort of unhinged). Or else add “which are” after “radiation safety controls”. Or perhaps insert a word such as “applied” before “radiation safety controls”.	Text changed
Line 209:	colon not semi-colon after “categories”.	Agree, text changed
Lines 208, 218, 220, 247,260, 339, 427:	Since electrically generated sources of radiation have been excluded, perhaps it would be better to thereafter refer to “radioactive sources” rather than “radiation sources”?	Agree, text changed
Line 218:	Insert “those” after “including”.	Agree, text changed
Line 237:	Replace “in re-entry” by “during re-entry”	Agree, text changed
Line 255:	Change “with” to “for”	Agree, text changed
Line 266:	“hazard <del>s</del> ”	Agree, text changed
Line 291:	Comma after “authorities” to get the meaning presumably intended.	Agree, text changed
Line 295:	Second “radiation” should be “radioactivity”.	Text changed.
Lines 323-325:	Add “and” after exposure and put a comma after “effective”. Or (better) just put “Effective protective measures . . .” and remove “that have been shown to be effective”.	Agree, text changed
Lines 342 & 343:	Insert the word “radiation” before “dose” (clarity).	
Lines 347-348:	The “this” after “smaller scale is unspecified. Sentence needs rewording. Or a word such as “exclusion” inserted after “this”.	Agree, text changed
Lines 362 & 364:	Insert the word “radiation” before “dose” (clarity).	Agree, text changed
Line 378:	Comma after “thyroid”.	Agree, text changed
Line 380:	Replace “otherwise” by “or”.	Agree, text changed
Line 383:	Insert the word “radiation” before “dose” (clarity – don’t want confusion with dosage of stable iodine).	Agree, text changed
Line 404:	Insert the word “radioactive” before “source” (clarity).	Agree, text changed
Line 413:	Insert the word “radioactive” before “decay” (clarity)	Agree, text changed
Line 427:	Delete first “radiation”. Change second “radiation” to “radioactive”.	Agree, text changed

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	<p>Line 432: “Accidents”. Delete “types”. Comma after “facility”.</p> <p>Line 438: Is “designated” or “designed” meant?</p> <p>Line 439: Insert “industrial” before “radiography” (clarity).</p> <p>Lines 440-441: Sounds like responsible person for the user. Reword eg switch “user” &amp; “responsible person for the facility” and insert an extra “of”:</p> <p>“ . . control of the user or <u>of</u> the responsible person for the facility. . “</p> <p>Line 443: New paragraph for “For transportation accidents . . “</p> <p>Lines 448-453: Should read:</p> <p>“ . . . control of the user or responsible person for the facility and the actions. . . However, the user or responsible person may still . . . “</p> <p>(See comment for 440-441 above. )</p> <p>There are a number of places where it would be preferable to insert the word “radiation” before “dose” or the word “radioactive” before “source”. Also “radioactive” before “decay”. Though it may be fairly obvious what is meant, I think this is desirable in the interests of immediate clarity, especially with ambiguously used words such as “dose” (radiation dose, iodine dosage, etc) and “source” (radioactive source, source of radiation, origin of something, etc).</p> <p>Particular cases are:</p> <p>Lines 342, 343, 362, 364, 383 Insert the word “radiation” before “dose”.</p> <p>Lines 404 Insert the word “radioactive” before “source”.</p> <p>Line 413: Insert the word “radioactive” before “decay”.</p>	<p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p>
<p>08 Brendon Kearney Department of Health, SA</p>	<p>On behalf of the Department of Health the following comments on the "Intervention in Emergency Situations Involving Radiation Exposure" are given and it should be noted that Mr Gavin Doherty, SAMFS, and Jill Fitch EPA, have submitted comments previously.</p> <p>It is noted that radiation exposure is dealt with from a preventative aspect and that the scope of the document is to provide guidance on the application of protective measures in the planning form responding to emergency situations. Guidance regarding the medical and psychological care of exposed individuals is expressly</p>	

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	<p>excluded.</p> <p>South Australia has had input to previous drafts and the current draft appears appropriate for a South Australian management process.</p> <p>We have no further comments.</p>	
<p>09 Simon Critchley Director, Radiation Health, Qld</p>	<p><b><u>General Comments</u></b></p> <p><b>Scope</b> - The scope states that the recommendations outlined in this document will be most useful for radiation experts. This is easy to forget when reading the text especially since much of the document is able to be properly used and adopted by emergency services personnel. There are, however, areas where it should be made obvious that the input of a radiation expert is required during decision making because, without this input, important radiation safety matters may be inadvertently overlooked.</p> <p><b>Definition of <i>accident</i> and <i>incident</i></b> – It would appear the definition of these words in this document is not consistent with definition given in the National Directory. Further these terms have been used interchangeably throughout the document.</p> <p><b>Contamination of crops and pastures</b> – In the Australian context are there any places where the contamination of crops and pastures will be an important consideration? It may be more useful to include consideration about how to deal with foodstuffs (e.g. vegetables) which are on display at shops such as green grocers during an incident and how we will deal with those to ensure they are not purchased and consume.</p> <p><b>Specific comments</b></p> <p><b>Line 162</b> “... preventing serious deterministic effects...”. Delete the word “serious”. It is redundant as most deterministic effects are probably regarded as serious.</p> <p><b>Lines 165 to 170</b> Delete the paragraph as it is a repeat of the previous paragraph starting on line 158.</p> <p><b>Line 177</b> Suggest that “...most useful for appropriately qualified radiation protection experts...” be changed to “...most useful when interpreted by appropriately qualified radiation protection experts...” because this document is useful for all emergency services providers.</p>	<p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p>



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	<p>careful with our nomenclature.</p> <p><b>Line 218</b> Change "...including lost..." to "...including those lost...".</p> <p><b>Line 221</b> Change "...Accident in an..." to "An accident in an...". Also, it is suggested that the rest of the item be reworded so that it becomes: "An accident involving radioactive material used in an industrial facility or a laboratory. Note: accidents at regulated facilities should be catered for by the licensee's safety and protection plans under most circumstances."</p> <p><b>Lines 231 to 236</b> It seems redundant to speak about these two nuclear activities as if they are different. The document already implicitly suffers from looking overtly like its purpose is to deal with reactor situations. In any case, the inclusion of the word "research" in line 232 implies that if a power reactor was constructed, this document would not apply. It is suggested that these two dot points be merged into one as follows:  "Uncontrolled releases of radioactive contaminants from a nuclear reactor, with dispersion of the contaminants over a region downwind from the reactor".</p> <p><b>Line 279</b> Change "...involving from uncontrolled sources..." to "...involving uncontrolled sources...".</p> <p>Also, the Macquarie Dictionary definition of "emergency" is "an unforeseen occurrence; a sudden and urgent occasion for action". Is it appropriate to use the term emergency when most of the radiation related response actions are likely to be protracted? The context of use of the term emergency in this document usually refers to uncontrolled or out of control release of high activity radioactive material. Perhaps for the purpose of this document it would be useful to define the term emergency.</p> <p><b>Line 323</b> Change "...radiation exposure that have been..." to "...radiation exposure and that have been...".</p> <p><b>Line 327</b> It is suggested that, at this point in the document, the reader be given a reminder that decisions on which actions to take must be informed by the advice or opinion of a qualified radiation protection expert.</p>	<p>Agree, text changed</p> <p>Text changed</p> <p>Disagree, these are different scenarios relevant for Australia.</p> <p>Agree, text changed</p> <p>"Emergency" will be added to glossary</p> <p>Text changed</p> <p>Disagree at this point. This section details principals not application.</p>

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	<p><b>Line 331</b> The use of the word “accident” is inadequate - indeed the matter causing concern could have been initiated deliberately. It is suggested that the word “incident” or “event” be used and that equivalent terminology is used consistently throughout the document.</p> <p><b>Line 336</b> Change “...in avoiding any radiation exposure...” to “...in avoiding or minimising radiation exposure....”.</p> <p><b>Line 354</b> Change “ground shine” to “ground or sky shine”.</p> <p><b>Lines 363 to 364</b> The document needs to be consistent in the way it describes numbers. In these lines the words “factor of 2” are used and then “factor of ten”. Are we going to use numerals or words?</p> <p><b>Line 396</b> What is external clothing? Do we mean overalls? Presumably there is no such thing as internal clothing! Do we mean outer garments or outer clothing?</p> <p><b>Line 404</b> Change “...the placing of a physical barrier of appropriate material...” to “...the placing of appropriate radiation shielding material...”.</p> <p><b>Line 426</b> Again, the use of the word “accident” limits the scope of the statement. The word “incident” or “event” should be used instead.</p> <p><b>Line 429</b> It is necessary at this point to remind the reader that decisions about the extent of each of these areas must be informed by the advice and opinion of a qualified radiation safety expert.</p> <p><b>Lines 421 to 458</b> In this section of the document the terms “areas” and “zones” are used seemingly interchangeably. Is there a reason for this? If not, then the consistent use of only of these terms would be preferred.</p> <p><b>Lines 431 to 454</b> This section of the text described two areas, the names of which and the implications of which are self explanatory. Is it really necessary to describe these areas in detail as these descriptions seem to add little value and, if anything, may</p>	<p>Text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Disagree, as the use of commonly available material should not be precluded.</p> <p>Agree, text changed</p> <p>Not appropriate at this point.</p> <p>Zones and areas have different meanings in this section. Area is used as a general term, zones have a special meaning for planning purposes.</p> <p>The two areas are the responsibility of different authorities or responsible persons.</p>

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	<p>be distracting?</p> <p><b>Lines 439 to 440</b> Is this responsible person the same responsible person described in Codes of Practice? If it is then the exact same term should be used otherwise it may be preferable to use a more clearly distinct term. In any case, Queensland (and probably other jurisdictions) has emergency provisions which, if activated, make the emergency controller the person with the responsibility.</p> <p><b>Lines 442 to 443</b> What “territories”? It is suggested this word be changed to “in other publicly accessible places”.</p> <p><b>Line 450</b> Here the words “responsible person or user” are used. Are these terms the same as those described in Codes of Practice? If they are then the exact same terms should be used otherwise it may be preferable to use different, more clearly distinct, terms.</p> <p><b>Line 478</b> Change “...some radiation may enter the environment in an uncontrolled....” to “...some radiation exposure of persons and the environment may occur in an uncontrolled...”.</p> <p><b>Line 482</b> Change “Typical interventions include...” to “The interventions selected could include one or more of the following:”.</p> <p><b>Lines 486 to 489</b> Is this paragraph intended to be part of (b) Interventions or is it intended to be merely the next statement in section 3.1 System for Radiation Protection? The formatting is incorrect either way. It needs to be correctly formatted to help indicate how it is to be read.</p> <p><b>Line 496</b> Change “...reduce any adverse...” to “...reduce adverse...”.</p> <p><b>Lines 539 to 550</b> Are these items intended to be in order of importance or in chronological order as they would be considered during the progress of an emergency? Irrespective of the answer, if they are intended to be in some order then the text should state what order it is or, alternatively, if they are not in any order, the text should make such a statement.</p>	<p>The planning process should identify the responsible person. It may or not be the same person under the Code of Practice</p> <p>Agree, text changed .</p> <p>Same as for on-site use.</p> <p>Text changed</p> <p>Disagree, WG prefer existing words.</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Direct copy of GS-R-2 points.</p>

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	<p><b>Line 578</b> It is suggested that this is an important point in the document at which the reader should be advised that consideration of these principles must be informed by the advice and opinion of a qualified radiation protection expert both during planning and implementation processes.</p> <p><b>Line 635 and line 636</b> Change “period of time” to “period” in both instances. The words “of time” are redundant.</p> <p><b>Line 636</b> Change “...no protective action.” To “...no protective action taken.”.</p> <p><b>Line 666 to 667</b> Change “time period” to “period”. The word “time” is redundant.</p> <p><b>Line 670</b> Change “...averted by that...” to “...averted by invoking that...”.</p> <p><b>Line 673</b> Change “...cloud gamma, deposited gamma...” to “...airborne and deposited gamma radiation emitting isotopes...”.</p> <p><b>Line 692 to 693</b> The first sentence is awkward. Suggest it be changed to “The dose associated with an action level for controls on food consumption may be varied according to the situation.”</p> <p><b>Line 701</b> This section should include a subsection which deals with actions to be taken where crime scene investigation or forensic activities are to take place because this seems to be where a lot of the radiation safety issues are.</p> <p><b>Line 708 to 709</b> In these lines the term “in the far field” is used. What is it intended to mean? This is a term usually used in describing places around a non-ionising radiation source. Perhaps another term could be used.</p> <p><b>Line 734</b> In this line the term “radiation expert” is used. Do we really mean a “qualified radiation protection expert”? If the answer is “yes” then the name given to this person must be the same name given to the person elsewhere in the text.</p> <p><b>Line 740 and line 744</b></p>	<p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Text changed</p> <p>WG disagrees. Crime scene management is not a protective measure and is out of scope. The crime scene investigation and the forensic investigation would take place within the radiation protection controls for a practice.</p> <p>Text changed.</p> <p>Agree, text changed</p>

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	<p>Change “conventional” to “other” or “non-radiation related”.</p> <p><b>Line 770</b> Change “deposit” to “deposits”.</p> <p><b>Line 771</b> Change “...guidance to types...” to “...guidance as to types...”.</p> <p><b>Line 774</b> Change “...the strength of the radiation field...” to “...the nature of the radiation hazard...”.</p> <p><b>Lines 781 and 782</b> The text is, again, unnecessarily self restricting. Change “...a terrorist Radiological Dispersive Device (RDD) additional...” to “...a terrorist incident (or event) additional...”.</p> <p><b>Line 783</b> Change “...identify that a terrorist...” to “...identify whether the terrorist...”.</p> <p><b>Line 791 to 792</b> Change “...monitoring can commence.” to “...monitoring is commenced.”.</p> <p><b>Line 794</b> Change “...responders or members...” to “...responders, police, or members...”.</p> <p><b>Lines 804 to 805</b> Decide whether the word “checkpoint” should be singular or plural and construct the sentence accordingly. Typically, the singular should be used. It does not mean the plural is not allowed or cannot be inferred.</p> <p><b>Line 821</b> Figure 1 is messy and needs careful review. For instance, it might be helpful to provide a legend to clarify the terms used in the figure. It may also be useful to provide details of what is expected i.e. the nature of the activities proposed to be undertaken in the different areas. What does the circle with the “H” in it mean? What are the ovals on the arrows where “fire staging”, “workers” and “AMB” intended to represent? At present, the figure is very confusing and, unless greatly improved, should be omitted.</p> <p><b>Line 844</b> Why are we being instructed to take “urgent protective action” in the Precautionary Action Zone? Surely any “urgent protective action” must be taken in the Urgent Protective Action Zone. This is very confusing and must be</p>	<p>Text changed</p> <p>Text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Text changed</p> <p>Agree, text changed</p> <p>Disagree, (s) used to imply multiple options.</p> <p>Under review</p> <p>Agree, text changed</p>

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	<p>rectified because, whether or not it is intended, it looks like a typographical error and will be interpreted as such.</p> <p><b>Lines 852 to 853</b> Why are we being asked to take “urgent protective <u>measures</u>” in an “Urgent Protective <u>Action Zone</u>”? Is it an action zone or isn’t it? This is confusing. In any case, what is a measure? This inconsistency must either be rectified or explained.</p> <p><b>Line 857</b> Change “In a...” to “However, in a...”.</p> <p><b>Line 861</b> This is yet another key area where the input of a radiation expert is required. It is suggested that the following sentence be added: “The implementation of, and especially any variation to, established plans should only proceed with the advice and opinion of a qualified radiation protection expert.”</p> <p><b>Lines 864 to 865</b> Are we implementing actions or measures? If we are implementing measures, then call the zone the “Urgent Protective Measure Zone”.</p> <p><b>Line 876</b> This is yet another key area where the input of a radiation expert is required. It is suggested that the following sentence be added: “These decisions should be made with the advice and opinion of a qualified radiation protection expert.”</p> <p><b>Line 881</b> Change “...and including the...” to “...and includes the...” or “...and surrounds the...”. It is not clear what is intended by the text.</p> <p><b>Line 883</b> Change “It is the...” to “The LPZ is the...”. Also, are we talking about zones or areas? The consistent use of the more appropriate term should be checked.</p> <p><b>Line 886</b> Are we really ever likely to have a problem where food is grown? Aren’t we more likely to have a problem where food is sold? If this is the case, then this sentence should acknowledge this more likely occurrence.</p> <p><b>Line 892</b> Change “...these zones...” to “...these three zones...”.</p> <p><b>Line 895</b></p>	<p>Agree, text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Text changed</p> <p>Agree, text changed</p> <p>Agree, text changed</p> <p>Text changed</p> <p>Disagree, this relates to LPZ.</p>

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	<p>Change “The size of...” to “For planning purposes, the size of...”. However if this is intended to be a continuation of the previous sentence where the actual incident is being described, then an appropriate starting phrase should be used to ensure clarity.</p> <p><b>Line 915 to 918</b> The meaning and intent of this sentence is not clear at all. It needs to be revised. We cannot even offer any comments on how to rectify it because we are not clear about what was intended.</p> <p><b>Line 953</b> The concept of a “large damaged alpha source” is intriguing. There are not very many sealed sources which could be considered “alpha sources”. Do we mean a large damaged sealed source that contains alpha emitting isotopes? Do we mean a large amount of an unsealed alpha emitting radioisotope? Please clarify.</p> <p><b>Line 988</b> Change “andOIL7” to “and OIL7”.</p> <p><b>Line 989</b> Is there a need for an OIL for which the marker radionuclide is Sr90?</p> <p><b>Line 1035</b> Change “...OILs with consideration of the...” to “...OILs. However, consideration must be given to the...”.</p> <p><b>Line 1039</b> Following the sentence that ends with the words “warning of people.” It is suggested that the following sentence be added: “These variations must be informed by the advice and opinion of a qualified radiation protection expert.”.</p> <p><b>Line 1062</b> Figure 3 is complex and confusing. When is the release really under control? Perhaps an example may help clarify. Also, reference is made to averting 100mGy radioiodine dose. Is this the figure we want to use here?</p> <p><b>Line 1069</b> Change “...measurements to the...” to “...measurements with the...”.</p> <p><b>Line 1086 to 1087</b> This is not really a comment about the document but is more a question for Dr Solomon. Why in our procedures do we spend time trying to determine whether radioiodine is present in the air? Testing for radioiodine is relatively difficult but testing for iodine is not so difficult. As iodine is not a normal constituent of air,</p>	<p>Agree, text changed</p> <p>Text change to clarify.</p> <p>Text change to clarify.</p> <p>Text changed</p> <p>No not here for a reactor accident, particularly as Sr90 is difficult to measure.</p> <p>Text changed</p> <p>Text changed</p> <p>Flowchart is from IAEA document and could be useful Reference to 30 mGy now in place.</p> <p>Text changed</p> <p>Testing for radioiodine provides information on whether plume is present or not (ie is there an inhalation pathway). This determines which set of OILs to use. Chemical detection of iodine is less sensitive than radioactive detection</p>

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	<p>why, then, do we not just test for the presence of iodine and, if it is present, assume it is radioiodine.</p> <p><b>Line 1090</b> Change “...associated in implementing...” to “...associated with implementing...”.</p> <p><b>Line 1102</b> The words “early in the PAZ and UPZ” are used. We do not understand the concept of “early in a zone”. What is really intended here.</p> <p><b>Line 1110 to 1111</b> Change “...satisfactorily low.” to “...satisfactorily reduced.”.</p> <p><b>Line 1112</b> Change “remain” to “remained”.</p> <p><b>Line 1114</b> Are we talking about “measures” or “actions”. Please check that the terms used are those intended.</p> <p><b>Line 1117</b> Change “...periods of time.” to “...periods.”.</p> <p><b>Line 1122</b> Change “...timescale over which...” to “...timescale during which...”.</p> <p><b>Line 1128</b> Change “radio iodine” to either “radioiodine” or “radioactive iodine”.</p> <p><b>Lines 1132 to 1133</b> The first sentence of this paragraph is made unclear due to poor grammar. Please re-word this sentence to make its meaning clearer and the sentence construction more straightforward.</p> <p><b>Line 1145</b> Change “...be compared with other...” to “...be considered in the context of other...”.</p> <p><b>Line 1157</b> Change “...sources are likely to require...” to “sources may require...”.</p> <p><b>Line 1253 to 1254</b> Change “...an independent technical adviser to advise...” to “...an independent radiation protection expert to advise...”.</p>	<p>Text changed</p> <p>Text modified to clarify ...</p> <p>Low has a stronger meaning here: no change to text</p> <p>Text changed</p> <p>“Actions” is meant here. Text changed</p> <p>Text changed</p> <p>Text changed</p> <p>Text changed for consistency</p> <p>Text changed for clarity</p> <p>Text changed</p> <p>Text changed</p> <p>Text changed for consistency</p>

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	<p><b>Lines 1259 to 1262</b> Perhaps one of the examples included here should be a terrorist event.</p> <p><b>Line 1273</b> Change "...transport and other..." to "...transport emergency or other...".</p> <p><b>Line 1292</b> Change "...above, general..." to "...above general...".</p> <p><b>Line 1293</b> In this line the word "applicable" is used. Is this really what is intended or, rather, should the word "available" be used?</p> <p><b>Lines 1305 to 1341</b> These lines contain a mix of the following words: "must" and "should". The mix is inappropriate and internally inconsistent. The whole document should be checked for the use of the word "must" – after all, these are recommendations. If we really need to be persuasive about some matter being attended to we should use different language that would be consistent with the overall status of the document.</p> <p><b>Lines 1314 to 1315</b> Are these dosimeters intended to be passive or active dosimeters? It is suggested that only active dosimeters should be used.</p> <p><b>Lines 1316 to 1317</b> It would be pointless requiring the use of a gamma ray survey meter if the isotope being investigated was plutonium, for example. The requirement for the use of a gamma ray survey meter may therefore give a false negative – a potentially dangerous result...</p> <p><b>Line 1323</b> Change "...and used when necessary." to "...and used when advised that they are necessary by a radiation protection expert."</p> <p><b>Line 1345</b> Change "...include police, medical..." to "...include fire service personnel, police, medical...".</p> <p><b>Line 1372</b> In Table 2, the third and fourth rows should be merged. They are both about nuclear reactors and both, essentially, say the same thing. Merging these rows will assist in removing the still considerable (but necessary) emphasis on reactors.</p>	<p>Text changed</p> <p>Text changed</p> <p>Text changed</p> <p>Applicable is appropriate here</p> <p>Agree. Text changed</p> <p>Agree. Text modified.</p> <p>Text modified to clarify.</p> <p>Use of PPE is part of SOPs for other emergency services and may not require radiation expert input . No text change.</p> <p>Text modified.</p> <p>Agree, Table modified.</p>

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	<p>Previous discussion has led us to believe that emergency response personnel may be unwilling to perform rescue operations where a radiation hazard has been declared. The use of radiation levels of the order of 500 mSv as threshold level for rescue operations will not be acceptable. It is suggested that a more practical solution be developed in consultation with relevant agencies.</p>	<p>The recommended levels are consistent with international guidance and are based on the need to avoid deterministic effects. Relevant agencies can choose lower values. No change to text.</p>
<p>10 Lisa Corbyn Director General NSW Department of Environment and Conservation</p>	<p><b>A. RECOMMENDATIONS FOR INTERVENTION IN EMERGENCY SITUATIONS INVOLVING RADIATION EXPOSURE</b></p> <p><b>General Comments</b></p> <p>The clarity of the document is such that readers are left confused by the different levels of radiation, their meaning and in what circumstances each is used. For example, there is no clear explanation as to why in Table 8 a dose rate of 10 milliSv/h to evacuate is acceptable for a reactor accident not involving core damage or release of radioiodine and 1 milliSv/h in circumstance where the accident involves core damage or the release of radioiodine. The risk from radiation exposure does alter. One can only assume after looking at typical radionuclides released by a reactor that the reason is due to dose pathways and the lower dose rate is used because of the higher exposure from inhalation as well as from direct radiation exposure eg radiation shine. The reader is left wondering as to the reasons behind some of the recommendations.</p> <p>The document will benefit from an editorial review so recommendations are explained logically, and expressed clearly in plain English to make it an effective communication tool.</p> <p>Section 4 of the Draft Recommendations be reviewed with reference to the National Occupational Health and Safety Commission’s National Code of Practice and <i>National Standard for the Control of Major Hazard Facilities</i> (NOHSC:1014/02) to include a requirement for community consultation (section 9.1d) during the development of emergency response plans. Section 12 of the standard places a general obligation on operators to ensure up-to-date information is freely available on safety measures and how to respond in the event of a major accident.</p> <p>The emergency response plan in place for Lucas Heights could be considered more protective of human health than the current Draft Recommendations and for the foreseeable future NSW will follow this plan. Individual jurisdictions should</p>	<p>Derivation of OILs covered in detail in ANNEX C. Table 8 footnote has been modified to clarify pathways.</p> <p>The Recommendations have been out to public comment on two occasions and the text modified to improve clarity and effectiveness.</p> <p>Responsibility of the planners using these Recommendations</p> <p>The Recommendations are just that – and do not preclude local planners taking the recommendations into account and then ignoring them.</p>

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	<p>be free to adopt strategies that are more protective than those contained within the Draft Recommendations, particularly where these pre-date the Draft Recommendations.</p> <p><b>Detailed Comments</b></p> <p>Introduction. 1.2 Purpose. Lines 164 – 170 should be deleted, as they are an exact repeat of lines 157 – 163.</p> <p>Section 2.1 Lines 218 – 240. It would be helpful if the scenarios listed were placed in some type of order. For example, from most likely to least likely, or from most potentially harmful to least potentially harmful.</p> <p>Section 2.3 <i>Timescales</i>. Lines 277 – 279. This sentence would be clearer if amended to ‘<i>Some emergencies involving radiation are identified very rapidly and should be responded to within hours in the interests of the health and safety of people and the environment.</i>’</p> <p>Section 2.3 <i>Timescales</i>. Line 279. The word ‘involving’ does not appear to be correct in this context. Perhaps it was intended to be ‘evolving’. Alternatively, the word ‘from’ needs to be deleted.</p> <p>Section 2.4. Lines 324 – 325. Tables 2 and 2 are presented 27 pages further into the Recommendations. To assist the reader, they would be better placed nearer to the reference to them on page 5, or the page number at which they occur should be added to the text here.</p> <p>Section 2.5(a) <i>On-site area</i>. Line 438. The use of the word ‘radiography’ in this context is ambiguous and should be clarified. Does it refer to radiation apparatus or a radioactive source?</p> <p>Section 3.1.1(a) <i>Deterministic Effects</i>. The term ‘radiation sickness’ is often applied to more than nausea and may include bone marrow failure and gastrointestinal malfunction. A better term would be ‘radiation syndrome’ for the acute effects of overexposure to radiation. Cataracts usually develop after a delay of several years and the sterility resulting from radiation exposure is temporary as an acute effect. It would be helpful to note these here in the text.</p> <p>Section 3.1.1(b) ‘<i>Stochastic Effects</i>’. No mention is made here of the increased risk of stochastic effects among children and adolescents, particularly in relation</p>	<p>Agree, text changed.</p> <p>Re-ordering is subjective and has not been attempted.</p> <p>Leave as is to preserve the meaning</p> <p>Agree, text changed.</p> <p>Standard practice to have Tables at end of document.</p> <p>Agree, text changed.</p> <p>Agree, text changed.</p> <p>Agree – deterministic effects may be delayed</p> <p>Leave unchanged. General explanation of stochastic effects does not require expansion. References are given. Also Annex B has additional info (seen as redundant by one other commentator)</p>

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	<p>to the development of leukaemia and thyroid cancer. In addition, the special susceptibility of the unborn child to the effects of radiation should be mentioned. The probability of development of some of these effects may also be dependent on the type of radiation.</p> <p>Section 3.2 <i>Application of Principles</i>. Line 596. The use of the term ‘collective detriment’ should be qualified. In addition to its application to only ‘<i>cost-benefit considerations at the stage of withdrawal of protective measures</i>’, the inaccuracies inherent in the use of this term for estimates at low doses of radiation should be noted.</p> <p>Section 3.2. Line 601. The word ‘prevented’ should be used rather than ‘saved’.</p> <p>Section 3.2. Lines 601 – 605. The meaning of this sentence is unclear and it should be simplified. In addition, the interpretation of the term ‘<i>source-related</i>’ in the sentence is not clear.</p> <p>If the emergency is the result of a Radiation Dispersal Device it should be treated as a forensic situation at whatever radiation levels are experienced irrespective of the dose rates produced.</p> <p>Section 3.2.1 <i>Intervention Level and Action Level</i>. Line 627. The use of the word ‘foodstuff’ should be further defined to clarify when the exposure of some foodstuff is not relevant, for example, in the case of processed or wrapped food, or food sealed in tins or plastic bottles. This has not been addressed at any point and yet the significance of exposure is very different, for example, when reference is made to the milk from a cow that ate grass with fallout pollution, or to milk that is already on supermarket shelves.</p> <p>Section 4.3 <i>Planning for Emergencies Involving Radiation Exposure</i>. Line 784. The dose rate of 10µSv/h is lower than the dose rate used in the international guidance. It is not clear why this rate should have been chosen and an explanation or reference would be beneficial.</p> <p>Section 4.4(b) <i>Urgent Protective Action Zone</i>. Lines 855 – 857. This sentence should be made clearer. For example, ‘<i>The choice of the size of the protective action planning zones should be made to cover all possible actions needed to ensure an effective response.</i>’</p>	<p>“Collective detriment” removed from text.</p> <p>Agree, text changed.</p> <p>WG disagrees about clarity: no change to text.</p> <p>Agree with comment, no change to text.</p> <p>Salient words here are “action level”. Pre-wrapped foodstuff cannot exceed the action level. No change to text.</p> <p>This level was agreed by the RHC members as an indicator that an emergency involves radioactive material.</p> <p>WG prefer original since “all possible actions” is too broad. No change to text.</p>

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	<p>Section 4.5 <i>Operational Intervention Levels</i>. Line 910. The meaning of the word ‘facility’ is unclear and the word ‘local’ would be better in this context.</p> <p>Section 4.5. Line 926. The use of the word ‘term’ is not clear here.</p> <p>Section 4.6.1. Figure 3 <i>Flowchart</i>. Line 1061. This flow chart is not very clear or easy to interpret. It may have been clearer if the estimated dose values were placed at the start of the diagram. In addition, the phrase <i>Sheltering will avert 10mSv?</i> It is not clear if this means a reduction of 10mSv or a reduction to below 10mSv.</p> <p>Section 4.8 <i>Control of Foodstuff</i> see comments on Section 3.2.1. Line 627</p> <p>Section 5 <i>Protection of Emergency Personnel</i>. Line 1335. This states that a dose rate of 10µSv/h should be used to indicate that an emergency involving radiation exposure has occurred and a response plan implemented. This should be qualified because many items such as industrial radiography cameras and persons who have recently undergone a bone scan may exceed this radiation level (see also the previous comments on line 784).</p> <p>Table 6 <i>Examples of Initial Safe Distances in Radiological Accidents</i>. Line 1469. The entry for <i>undamaged common source (consumer item) such as smoke detector</i> appears to be out of place with the other examples in this table and may not be appropriate. The remaining examples are approximately in order of hazard levels.</p> <p>Annex B <i>Health Effects of Ionizing Radiation and Standards for Control of Exposure</i>. Line 2272. It is inappropriate to give estimates of expected cancer rates with low doses of radiation in a general population. This difficulty should be noted in the text or such estimates should be avoided.</p> <p>In the explanation of the terms of the equation at line 2720, the term <math>H_{thy}</math> is included (line 2727), notwithstanding that it does not occur in the equation.</p> <p>Annex C Table C7 <i>Reduction Factors for Processing or Filtering for Food</i>. Line 3134. At the two places in this table where cauliflower is mentioned, reference is made to ‘peeling’. This is not a customary operation with this vegetable and it is uncertain if this entry in the table is true, incorrect, or should rather be ‘outer leaves removing’.</p>	<p>Agree, text changed.</p> <p>Agree, text modified.</p> <p>Avertable dose is defined in the text. A reduction of at least 10 mSv is meant. No change to text.</p> <p>See response above</p> <p>This level was agreed by the RHC members as an indicator that an emergency involves radioactive material. The subsequent response will need to determine the actual source of radiation, including possible medical treatment. No change to text.</p> <p>Agree, reference to smoke detector removed.</p> <p>Annex B is a standard add-on, no change to text.</p> <p>Agree, reference to term removed.</p> <p>Agree, text changed</p>

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	<p data-bbox="383 153 770 180"><b>General Comment on Symbols</b></p> <p data-bbox="383 220 1359 451">In the electronic versions of the documents supplied to members of the Radiation Health Committee and available at the ARPANSA web site, many of the symbols used in the equations in these documents are missing. This may have occurred as a result of the limitations of the software for people receiving these documents electronically. It is therefore important that at least the lead radiation protection agencies in each jurisdiction be supplied with a printed copy of such documents for assessment in the future.</p> <p data-bbox="383 491 1359 555">The following are examples of problems experienced with the versions of the <i>Recommendations</i> and the Iodine Prophylaxis drafts available to the DEC.</p> <ul data-bbox="383 595 1359 1449" style="list-style-type: none"> <li data-bbox="383 595 1359 730">• Table 3 <i>Thresholds</i>. Line 1388. Lifetime risk of stochastic effects. The multiplication symbol is missing from the printed version of the text in this table, making them difficult to interpret. For example, in the case of the figure of <math>1 \times 10^{-1}</math> given in the row ‘<i>Whole Body (Bone Marrow)</i>’ should be <math>1 \times 10^{-1}</math>.</li> <li data-bbox="383 770 1359 866">• The symbol <math>\mu</math> is missing from the printed version of the Recommendations in this table. For clarity it may be better to use the full text version of this (ie, microseiverts or microSv).</li> <li data-bbox="383 906 1359 1177">• Annex C <i>Equations</i>. In the printed version of the document supplied to the EPA all the equations are missing several symbols. The two major symbols that are missing from each of the equations given in this Annex are that for <i>sum of</i> (<math>\Sigma</math>) and for the operation of multiplication (<math>\times</math>). This is the case at lines 2440, 2458 – 2460, 2486 – 2488, 2506, 2539, 2541, 2545, 2546, 2614, 2642, 2667, 2697, 2720, 2747, 2787, 2797 (where the symbol for the operation of addition is also missing), 2880, 2931, 2968, 2988, 3020, 3040, 3079, and 3099 &amp; 3120 (where the symbol <math>\Pi</math> is also missing).</li> <li data-bbox="383 1217 1359 1281">• The symbol for <i>approximately equal to</i> (<math>\approx</math>) is also missing from several equations in the printed text (lines 2440, 2458 – 2460, and 2486 – 2488).</li> <li data-bbox="383 1321 1359 1449">• The numbering of the lines at many of these equations is also inconsistent in both the printed version of the text and in the on-line (at ARPANSA’s web site) *.pdf version of the Recommendations. For example, the equation at line 2440 is numbered with this line, while the subsequent equation covers lines</li> </ul>	

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	<p>2457 – 2461. This is the case with several other of these equations in Annex C. This should be altered to make the line numbering of these equations consistent.</p> <ul style="list-style-type: none"> <li>• The on-line (*.pdf) version of the draft Recommendations also has an additional symbol (&amp;) (which does not belong in the equations) covering some of the symbols and this causes some confusion in their interpretation.</li> </ul> <p><b>B. RADIATION AND THYROID CANCER – TECHNICAL CONSIDERATIONS FOR THE USE OF STABLE IODINE AFTER A NUCLEAR REACTOR ACCIDENT IN AUSTRALIA</b></p> <p>This document, as in the case of the <i>Recommendations</i>, has a number of typographic errors. For example:</p> <ul style="list-style-type: none"> <li>• Executive Summary, paragraph 2. <i>‘Studies on individuals exposed to external radiation or internal exposure...’</i></li> <li>• Executive Summary, paragraph 6. <i>‘...as a function [of] time and distance from the release.’</i></li> <li>• Executive Summary, last paragraph. <i>‘...from the expected 3 cases expected...’</i></li> <li>• Introduction, paragraph 3. <i>‘The Report of the United [Nations] Scientific Committee...’</i></li> <li>• Section 2.2, paragraph 2. <i>‘Iodine intake, diet and other factors can affect risk factors.’</i></li> <li>• Section 3.0, Radiation Induced Thyroid Cancer, paragraph 3. <i>‘...at maturity the thyroid gland it weighs...’</i></li> <li>• Section 3.5, Internal Exposure Studies, paragraph 2. <i>‘The principal exposure pathway for exposure...’</i></li> <li>• Section 3.5, paragraph 3. <i>‘...there was an increase in the [recorded incidence of] child thyroid cancer, due to improved screening and detection...’</i></li> </ul>	<p>Comments not for these Recommendations.</p>

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	<ul style="list-style-type: none"> <li>• Section 4.1 Reference Accident, paragraph 6. ‘...to a each possible reactor accident scenarios...’</li> <li>• Appendix 1, Table 2. The reference to RHS1 should be changed to RPS1.</li> </ul> <p>In addition, there is variable use of the comma in the large numbers quoted in the text. The same problem with the missing mathematical symbols that occurs in the <i>Recommendations</i> also has occurred in this document. In particular, the symbol <math>\mu</math> (micro) is missing.</p> <p>The Executive Summary makes no mention of the changing incidence of thyroid cancer in Australia and this should have been included in the <i>Technical Considerations</i>, since any future accident statistics will need to include this variation.<sup>123</sup></p> <p>Executive Summary, paragraph 5. The information that adult risk is less than that for children after exposure to radiation is more up to date than the information in other parts of the Executive Summary<sup>4</sup>.</p> <p>There is no general comment on the efficacy of stable iodine prophylaxis and the critical time period during which it should be administered to be effective in reduction of the dose to the thyroid from radioactive iodine. A statement similar to that in the draft IAEA document <i>Development of Emergency Response Preparedness for Nuclear or Radiological Emergency</i>, paragraph 2.39 would be appropriate in this context.</p> <p>Sections 3.2 &amp; 3.3. The symbol * is used in the equations in these sections, presumably to indicate the operation of multiplication, and this may cause some confusion. In other parts of the document the ‘x’ symbol is used for multiplication (for example, the Summary Table at the end of the Executive Summary). It is recommended that x be used for consistency and for better comprehension.</p> <p>Section 4.5, Table 15. The repetitive use of mGy in each of the examples given (100 mGy, 50 mGy, 30 mGy, and 10 mGy) is redundant. It is sufficient to refer to mGy in the column heading.</p> <p>Section 4.6, Table 19. The same comment applies here on the use of mGy, as for Table 15 above.</p>	<p>Agree</p> <p>Agree</p> <p>Annex A (d) refers but could be expanded</p> <p>OK</p>

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	<p>Executive Summary, paragraph 1 and others. The terms ‘incidence’ and ‘risk’ are used interchangeably in the document. For example, in paragraph 1 of the Executive Summary, the figures quoted are for the ‘incidence rate’ for children under the age of 12 years, while the incidence figures for adults and adolescents are quoted as ‘risk’. The use of both terms should be clearer.</p> <p>While the term ‘averted dose’ is defined in the <i>Recommendations</i>, there is no definition in the Thyroid Cancer document. It would be helpful if a Glossary of Terms were added to the <i>Technical Considerations</i>’.</p> <p>Section 2.1 Thyroid Gland, paragraph 4. The information provided on thyroxine production is excessive. While the comments on thyroid stimulating hormone may be of interest, there is limited relevance to the final sentence of this paragraph on papillary and follicular thyroid cancers. This comment also applies to the first paragraph of the following section (2.2 Thyroid Cancer), where <i>C-cell thyroid cancers</i> and the <i>rapidly fatal anaplastic type</i> are mentioned without any explanation of what they are or why they should be important to the <i>Technical Considerations</i>.</p> <p>Section 2.2 Thyroid Cancer, paragraph 2 and Table 1. The text states that ‘<i>Follicular cancer rarely occurs in Iceland where, due to high dietary intake of fish, there is high iodine intake</i>’. However, the table lists the thyroid cancer incidence rate for Icelandic males as being in the ‘High Range’. This difference may be due to the incidence of non-follicular and non-papillary cancers and, if this is so, it should be made clear in the text.</p> <p>Section 4.1 Reference Accident, paragraph 3. The last sentence of this paragraph states that ‘...<i>each accident could result in the release of a cloud of volatile radionuclides and noble gases</i>’. It is assumed that the ‘noble gases’ referred to are the radionuclides <sup>41</sup>Ar and various radioisotopes of xenon that are released from the fission of <sup>235</sup>U. The text should be amended to ‘...<i>and radioactive noble gases</i>’.</p> <p>The title of Appendix I refers to ‘<i>Adsorbed Dose</i>’ where it should be ‘<i>Absorbed Dose</i>’.</p> <p>The dot point format in Appendix III should be made consistent with other parts of the document.</p>	<p>Agree</p> <p>What another one?</p> <p>Agree</p> <p>OK</p> <p>OK</p>

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<sup>1</sup>Cancer in New South Wales – Incidence and Mortality 2001. Published by the NSW Cancer Council and NSW Health Department, May 2003.

<sup>2</sup>Cancer in New South Wales – Incidence and Mortality 1996. Published by the NSW Cancer Council and NSW Health Department, July 1999.

<sup>3</sup>Burgess JR, Temporal trends for thyroid carcinoma in Australia: An increasing incidence of papillary thyroid carcinoma (1982 – 1997). *Thyroid* 2(12): 141 – 149, 2002.

<sup>4</sup>Xiaonan Xue and Roy E Shore, Assessing excess lifetime risk for disease after radiation exposure. *Health Physics* 80(5), May 2001.