NDAWG
National Dose Assessment Working Group

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NDAWG Comments on the ICRP Draft 2005 Recommendations

NDAWG

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1 Introduction

The National Dose Assessment Working Group (NDAWG) was established in the UK in 2002. The aim of NDAWG is to bring together people and organisations with responsibility for, and/or an interest in, the assessment of radiation doses from the operation of the nuclear industry and from minor users of radioactivity. The main focus of the work of NDAWG is past, present and future authorised discharges and direct radiation; initially the Group's scope does not include accidents or solid waste disposal. Membership of the group is by invitation and is drawn from regulators and Government agencies, industry, non-Governmental organisations and specialists. Further information on the work of NDAWG, including the current membership, is available on the website, www.ndawg.org.

Members of NDAWG have considered the draft 2005 recommendations of the International Commission on Radiological Protection (ICRP) as published on the ICRP website. The following set of comments were compiled and discussed at the November meeting of NDAWG. They represent the views of the majority of members but not necessarily the organisations that they represent.

2 General comments

- It is important that the 2005 recommendations of ICRP are clear and give practical guidance on their implementation. As written the draft guidance lacks clarity and in parts is difficult to read, as some sections are too long and repetitive. It would be helpful if ICRP could clarify the role of this document and its relationships with other documents, such as the foundation reports to be written by the ICRP Working Groups.

- It also needs to be clear which earlier ICRP documents are still valid.

- It is hard to produce full comments on the draft recommendations without also seeing the proposed foundation documents from the ICRP Committees. NDAWG, therefore, feel that another period of consultation is required on a revised draft of the recommendations following consultation on the supporting documents.

- NDAWG agrees that there is a need for stability in recommendations and does not think that there is any evidence leading to the need to relax or significantly tighten regulatory controls.

- The draft ICRP recommendations place great emphasis on the future use of dose constraints but it is not clear what a dose constraint actually represents and little practical guidance is given on how to determine its value. The recommended maximum values of the dose constraints appear to be solely based on multiples of natural background. ICRP should also consider and discuss the risk associated with the different levels of dose, how such values are derived and what the implication is for the setting of dose constraints.

- The recommended dose constraints appear to match existing dose limits. This has the potential to cause confusion and can lead to the view that ICRP are advocating a relaxation in standards. Practical guidance on setting and using dose constraints is required. Overall the practical difference between a constraint and a limit is less clear than previously.

3 Specific comments

3.1 Scope of recommendations

- Paragraph 18 states that justification is largely outside the scope of the recommendations. It is not clear why this should be the case and recommendations ought to cover the whole framework of radiological protection.

- If the concept of a 'practice' is used then some reference to the alternative is required. This was referred to as 'intervention' and it is not clear whether this concept has now been largely dropped in these recommendations.

3.2 Quantities used in radiological protection

- Paragraph 53 states 'The averaging of doses for defining quantities in radiation protection is a widely accepted approach.' However, it might be helpful to provide some text that explains or reiterates how the use of the quantity 'effective dose' and effective dose constraints and limits provide sufficient protection of organs and even cells. This is particularly the case because constraints can now range up to an effective dose of 100 mSv.

- The restrictions on the use of effective dose seem too strong (e.g. in paragraph 54). It is valid to use effective dose retrospectively, for example when demonstrating compliance with a dose limit or dose constraint and when assessing doses associated with measured values. Important considerations are the level of the dose (well below thresholds for deterministic effects) and the purpose of the assessment but not whether it is prospective or retrospective.

- There is a case for a different radiation weighting factor for low energy beta emitters, particularly tritium given its association with DNA and recent studies indicating an RBE of about 2.

3.3 Dose constraints and limits

- As already noted there is a need for greater clarity in the use of dose constraints. It is noted that as well as defining a wider range of maximum dose constraints, the existing dose limits in ICRP Publication 60 also apply. This has the potential to cause confusion as the public dose limits and worker dose limits are numerically the same as the maximum dose constraints, although some averaging is allowed for in the ICRP recommendations. It would be clearer to reproduce limits in the recommendations rather than cross-referring to ICRP Publication 60.

- It is perhaps surprising that maximum source dose constraints are not lower than limits given possible other sources contributing to exposure. It is noted that national authorities may set lower constraints and a value of the public dose constraint of 0.3 mSv/y may be used for multiple sources.

- The draft recommendations on dose constraints can be interpreted in different ways. The maximum value of a dose constraint for the public of 1.0 mSv y^{-1} is higher than the currently accepted dose constraint for new single sources of 0.3 mSv y^{-1}, and so this can be interpreted as a relaxation of standards. On the other hand statements in the text imply the need for a more restrictive regime than currently. For example, the statements in paragraph 132 regarding the dose constraints that 'not maintaining these levels of protection should be regarded as a failure' and in paragraph 195 'have I done all that I reasonably can to reduce these doses'.

- There is also the need to clarify if the dose limits for members of the public include exposure from past controlled releases.

- Is there a case for a collective dose criterion of 1 manSv y^{-1} along with the minimum value constraint of 0.01 mSv y^{-1}, given the linear no threshold assumption?

3.4 Dose assessment

- More guidance on defining a critical group would be welcome. In particular, guidance on the homogeneity of habits and doses would be useful and whether there needs to be homogeneity in both. What does a 'sustainable' group mean? It would also help to clarify the situation regarding the assessment of external radiation doses for the critical group. External radiation doses at different locations are not usually averaged but the dose at the single critical location is used; is this consistent with the advice in paragraph 172?

- The introduction of age-averaged dose coefficients and habits is a major change to the system of protection and having discussed this idea before we feel it is inappropriate. It is important that the document being developed by the Task Group of ICRP Committee 4 is made available for comment.

- NDAWG supports the retention of the concept of collective dose and agrees that it is important to disaggregate it. However, the idea of a 'matrix' needs clarification and it is important to recognise that there are practical limitations to what can be calculated. Again it is hard to comment without seeing the supporting document being prepared by ICRP Committee 4.

- It is important to recognise that although the definition of collective dose is as given in paragraph 198, collective doses are not calculated this way in practice. For estimating doses from consumption of radioactivity in food account has to be taken of the fact that people do not obtain their food from where they live. For both aquatic and terrestrial foods collective doses are estimated based on distributions of the production of the food and do not give information on who eats the food. It is not therefore possible to obtain accurate information on the breakdown of the collective dose into the contributing individual doses. The timescales of collective dose estimation are also generally longer than individual lifetimes which further complicates the issue.

- More advice on handling uncertainty and variability in dose assessments would be welcome.

- NDAWG is very conscious of the limited discussion of uncertainty in ICRP's consultation document in contrast to the extended treatment of this subject, with particular reference to internally incorporated radionuclides, in the recent reports of the CERRIE and COMARE committees in the UK. NDAWG understand ICRP's position to be that its dose constraints, coefficients of radiation risk, and published dose coefficients are regarded as 'reference values' purely for use in the control and limitation of radiation dose, and in that limited context that it is not necessary explicitly to consider uncertainties. Nonetheless NDAWG urges ICRP to consider the CERRIE and COMARE reports in further developing its Recommendations and, in particular, that:

    - ICRP's position on 'reference values' and their use in radiological protection should be stated more clearly, and justified in the context of a quantitative discussion of the degrees of uncertainty which are involved;
    - A more extended discussion than that offered in paragraph 102 of ICRP's position on advances in radiobiology since its 1990 Recommendations would be helpful;

- In future evolutions of its biokinetic and dosimetric models quantitative information on uncertainty around the 'reference values' should be provided.

3.5 Exclusion

- It would be helpful to clarify in the summary and in Section 8 of the ICRP recommendations that these are exclusion levels and that exemption levels could be higher (as in paragraph 25). There is the scope for confusion between the two concepts. There are a number of omissions from Table S2, notably tritium and carbon-14, which occur naturally but can also be produced artificially and uranium-235. It is also not clear what the adoption of an exclusion activity concentration for ^{40}K will achieve. Pure natural potassium contains about 30 Bq/g and does not pose any significant hazard. This is because internal exposures to ^{40}K are homeostatically controlled so that the activity concentration is irrelevant, and the external dose from pure potassium is very low and is unlikely to warrant any controls.

- The distinction between natural and artificial radionuclides is not necessarily helpful, as it is the immediate source that is important.

- The proposed exclusion levels differ in some cases from those proposed in the Codex on foodstuffs and values recently adopted by IAEA. The interrelationships between the different exclusion levels need to be resolved. If ICRP are recommending exclusion levels then they should be based on objective arguments rather than taking the lowest of the proposals made by other bodies.

- The use of such exclusion levels implies a de minimis dose level below which there is no concern and this has implications for the collective dose concept; this requires further discussion.

3.6 Protection of non-human species

- Consideration by ICRP of protection of non-human species in its recommendations is welcomed.

- It seems strange to include future intentions in a recommendations document. If ICRP are still formulating their recommendations on protection of the environment, it would be better to state the principles they are adopting and the intended approach and leave everything else to a supporting document or future advice.

- The guidance needs to be clear whether the aim is to protect ecosystems/habitats, species populations or individual organisms.

- The list of proposed reference groups given in Paragraph B15 is too limited given the need to provide credible assessments for real ecological systems.

- It is not clear whether ICRP intend to develop dose rates per unit environmental concentration for different classes of organisms. This would be most useful for environmental regulators. Similarly, it is assumed that dose rate constraints will be developed for each reference organism, in a similar manner to the maximum source dose constraints.

- In developing derived consideration levels it is important to take account of the different natural radiation levels experienced by different taxa and the different radiosensitivities of different taxa.

- Guidance on how to undertake assessment for specific species based on the reference organisms would be valuable.

4 Conclusions

Members of the UK National Dose Assessment Working Group have considered the draft 2005 recommendations of ICRP and have made a number of comments. It is important that the ICRP recommendations are clearly stated and that they have practical application. The terms used should be clearly defined and there is particular need for clarification of the distinction between dose limits and dose constraints. Further explanation of the basis for the recommended maximum dose constraints is also required. Further consultation is essential once the foundation documents are available.