

**NUCLEAR ENERGY AGENCY
COMMITTEE ON RADIOLOGICAL PROTECTION AND PUBLIC HEALTH**

Expert Group on the Implications of Recommendations

EGIR on ICRP TG-93 Recommendations

Second stage of the review process on the ICRP TG-93 work

Comments on ICRP Publication under Public Consultation
Radiological Protection of People and the Environment in the event of a Large Nuclear
Accident –Update of the ICRP Publications 109 and 111

Comments from CRPPH/EGIR members collected in September 2019

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1. Background and process

Last year, the ICRP has launched a pre-consultation within its “Special Liaison Organisations” (SLO) on the ICRP draft recommendations “Application of the Commission’s Recommendations for the Protection of People and the Environment in the Event of a Large Nuclear Accident” – Update of ICRP Publications 109 and 111, developed by the ICRP Task Group n° 93, i.e. TG-93.

The NEA through its Committee on Radiological Protection and Public Health (CRPPH) has launched an Expert Group on International Recommendations (EGIR) to review the above-mentioned document. As a result, a document compiling more than 200 general or more specific comments was produced by the secretariat and reviewed and discussed during the EGIR meeting held on 26 February 2019 at the NEA premises, in Boulogne-Billancourt ([NEA/CRPPH/EGIR\(2019\)1](#)).

After examination of the comments received from its SLOs, the ICRP released a new revised version on its website for public consultation on the 17 June 2019 (ICRP, 201X) with a deadline for comments of 20 September 2019, extended to 25 October 2019. At the beginning of August 2019, EGIR members, as well as CRPPH members, were invited by the CRPPH secretariat to provide a comprehensive set of specific comments on the text. It was also requested to consider whether the general comments sent previously were taken into consideration.

Three sets of comments (UK, the Netherlands, Argentina) were collected in due time and completed by the CRPPH secretariat for a final approval of the present version by the EGIR.

The general comments are summarised in section 2 and detailed specific ones are reported in section 3. The present document was uploaded on the ICRP website before the ICRP deadline on behalf the CRPPH/EGIR.

2. General comments

This section highlights the main remaining points to be improved or added as approved by the CRPPH/EGIR members (list with no specific order).

- Globally, the document has been much improved in terms of legibility and coherence. Most comments appear to have been addressed. Reprocessing facilities are still however implicitly excluded from the scope, there is no justification for this and it should be corrected.
- To enhance understanding of the scope, it would be helpful if the document quoted INES numbers that it applied to (e.g., just INES 7 or INES 6 and 7). The IAEA document defining the INES scale is actually referenced (Scope p 9 line 200). Currently it is unclear exactly what “large nuclear accident” means.
- Preparedness for recovery is crucial to anticipate the implications of protective options at medium- and long-term. Additionally, this is a must to establish trust between authorities, experts and stakeholders beforehand in order to enhance the efficiency of this so-called “co-expertise approach”. In other words, the success of such an approach should benefit largely from preparedness. These key messages should be added throughout the general chapters (Abstract, Executive summary, chapters 1, 2, 6) in addition to the dedicated chapter 5.
- A clear definition of “non-radiological impacts” is needed from the beginning of the document. It should be clearly stated that it refers to impacts from other hazards. In chapter 2 on general considerations, clear recommendations about this topic are missing mainly for justification of protective decisions. Regarding optimisation of protective actions, this is mentioned in Fig 2.2 with some guidance developed in the text.
- Similarly, mental health and psychological impacts should be more explicitly listed, highlighting that protective actions have both short-term impacts (e.g., reduce the exposure level) but also long-term implications (e.g., evacuation affects mental health and psycho-social well-being of affected people). Globally, the text deserves to integrate in a more systematic fashion mental health and psychosocial impacts that may potentially be indirectly related to protective strategy.
- For optimisation, the commission defines that it is the result of an evaluation that carefully balances the detriment from the exposure with the relevant economic, societal and environmental factors. Mental health and psychosocial impacts should be cited systematically besides the radiation-induced health detriment (e.g., L707-708).
- Recommendation for an “all-hazards” approach is mentioned several times (e.g., Line 15 page 3; item (a) and (i) of the executive summary; line 275 page 11). However the approach proposed deals with protective actions to reduce radiological exposures, rather than to all exposures. This must be clearly stated.
- The timeline for managing a nuclear accident adopted by the commission is different from the one selected by various other organisations. Even though it is recognised by the ICRP, examples of reasons for choosing the most appropriate terminology according to national considerations as recommended by the Commission, should be given.

- In case the overall protective strategy requires to define several geographical areas for *ad hoc* protective actions, the reasoning and adopted criteria that led to the division of the affected territories into specific areas should be elaborated in a transparent manner to avoid any feeling of inequity among affected communities. A discussion should be added on this difficult issue in section 2.
- The report should integrate a number of important references in order to better position its recommendations with regard to its own previous publications (e.g. Publication 104) and with the relevant ones reflecting the international state-of-the-art¹. This is particularly needed regarding the issues of stakeholders involvement and foodstuff management.

Among the general comments previously sent by the EGIR members ([NEA/CRPPH/EGIR\(2019\)1](#)), some recalled below are still not sufficiently integrated into the present version and would deserve to be addressed in a more obvious fashion.

- Scope
 - the possibility to include any release of radiation of similar magnitude as during an NPP accident, e.g. reprocessing plant accident, should be considered;
 - the case of large nuclear accidents occurring at the same time as natural disasters is not sufficiently addressed; and
 - ICRP should consider extending the scope to areas further away from the accident but where response and recovery actions are still required.
- Reference Levels:
 - The difference between results from modelling and measurements (clearly illustrated in Chernobyl and Fukushima) needs to be addressed in the document
- Balancing radiological and non-radiological risks:
 - EGIR welcomes the consideration of these aspects but there is room to refine some of the language to better reflect the idea of balancing radiological and non-radiological risks
- International cooperation and transboundary coordination
 - EGIR members (in particular European ones) feel that the need for international cooperation and transboundary coordination is not sufficiently addressed. There is a request to integrate experiences and recommendations by fora who have already agreed on these aspects, e.g. HERCA-WENRA; and
 - The impact on countries further away from the accident country is not addressed.

Overall, the CRPPH/EGIR recognises the continuous effort by ICRP to produce these types of recommendations and comprehensive guidance. This publication clearly highlights the complexity of managing the consequences of large nuclear accidents in a holistic and consistent approach, respectful of the fundamental requirements, the values and principles constituting the basis of the system of radiological

¹ For example, OECD/NEA (2017). Post accident recovery planning and management: stakeholders involvement lessons from Fukushima. [NEA/CRPPH/R\(2017\)1](#), 39 p.; OECD/NEA (2018). Summary Report of the International Workshop on Post-Accident Food Safety Science 8-10 November 2016 Fukushima, Japan. Radiological Protection [NEA/CRPPH/R\(2018\)1](#) September 2018, 64 p.; ARN and IAEA (2019). Radioactivity in Products Supplied for Public Consumption or Use: Towards an Internationally Harmonized Regulatory Framework, a discussion document prepared jointly by ARN and IAEA, 39 pages. https://www.iaea.org/sites/default/files/19/02/iaea-am_document_on_consumer_goods.pdf

protection. The integration of this new set of comments from the EGIR as detailed in this report would be highly appreciated.

3. List of specific comments

Section/page/line	Description of the comment
Abstract - main points – Executive Summary	
Missing point	The document is still clearly aimed at a large scale nuclear accident involving fission product releases and potential core damage. This should be stated in the abstract and Exec Summary.
P4 L44-45 P6 L107-108	The reference limit of 100 mSv should also state the integration time consistently with the main text. Suggested changes are as follows (add <u>underlined characters</u>): For protection of responders and the population during the emergency response, the reference level should not generally exceed 100 mSv (<u>short-term or annual dose</u>),...
P5 L64	Please define (somewhere) what is considered to be a nuclear accident: nuclear power reactor, or also research reactor, nuclear powered satellite re-entry, nuclear fuel production/enrichment, nuclear bomb?
P3 L10	Avoid shortcuts: instead of “the immediate response is an emergency exposure situation”, say “The immediate response needs to be managed in the framework of an emergency exposure situation “
P3 L14	Precise “ <u>people</u> ” radiation exposure
P3 L24-28	Insist more on preparedness: preparedness for recovery is crucial to anticipate the implications of protective options at medium- and longer-term; it is also needed to establish trust beforehand. L28, add “...at all stages <u>including preparedness</u> ...”
P4 L40	Precise all impacts at short and longer terms – If “non-radiological impacts” means due to other hazards, mental health and psychological impacts are missing. If not, define appropriately
P4 L46	Give the order of magnitude when referring to higher values for reference levels – same comment for bullet (i) page 6
P4 L61	Mention in this main point that this aspect should benefit largely from preparedness
P5 L64	Need to define / clarify ‘nuclear accident’
P5 L70	Need to define / clarify ‘large nuclear accident’
P5 L75-77	Make clear what “other types of events” refers to. Are they radiological or smaller scale nuclear accidents? To answer this comment and the 2 previous ones, one should consider to give the definition at the very beginning of the report (see definition P9 L199-200). Also state at the beginning what is not consider in the report (P9 L201-202)
P5 L82	Would normally only expect radioiodine to be associated with a NPP reactor accident. Clarity required
P5 L 86-87	“Radiation exposure is relatively straightforward to reduce although it is impossible to remove it completely.” - This is a sweeping and unqualified statement. Is it appropriate in this document?
P5 L93-96	L94 : precise “ <u>radiological</u> exposure reduction” Add the mental health and psychosocial impacts in the list of potential disrupted aspects. Those two changes also apply to point (g) (i.e. all radiological exposures” , taking account <u>metal health and psychosocial impacts</u> , as well as economic...”
P6 L116	Remove text ‘or below’ – idem P4 L52 (4 th main points)
P7 L144	List also mental health and psychosocial impacts that may potentially be indirectly related to protective strategy
2.2. Consequences of a large nuclear accident	
P11 L272	Add at the end of the first sentence: “...and may result in acute societal disruptions”.

2.1 P10 L259	Having different reference levels in adjacent areas can be useful, but please point out that this is, from a communications point of view, a complicated situation.
P12 L335-345	Change the sentence to be more accurate with the 2 cases of large nuclear accidents we know ie Chernobyl and Fukushima: “although..., <u>as observed in the case of the Chernobyl and Fukushima accidents</u> , any direct <u>radiation-induced</u> observable effects on <u>fauna or flora</u> would tend to be limited to the area where <u>concentrations</u> of radioactive materials were the greatest....”
P13 L355	Suggest to rename the heading “ <u>psychosocial impact and societal consequences</u> ” To our understanding, social refers to an individual who interacts with others // societal refers to a group or networks of social individuals.
P14 L413	Suggest to rename the heading “ <u>mental health and psychological stress</u> ”
2.3. Principles for protection of people and the environment	
P15 Paragraph (42) L473	Suggested change in the following statement (add <u>underlined characters</u>): “This means managing human exposures so that severe tissue/organ damage is prevented, and cancer and heritable diseases are reduced to the extent reasonably achievable, and the frequency of deleterious radiation effects on <u>non-human</u> biota is prevented or reduced.”
P16 L481	Add “... <u>biological diversity and environmental resources</u> ...”
2.3.1 The justification of protective decisions	
P 17 L528 - 530	“Decisions should be based on a reasonably conservative approach” As an assumption that is conservative in one direction (e.g. radiological protection) may not be conservative in another (e.g. psychological stress), a best estimate rather than a conservative approach will be required in some circumstances. This should be made clear.
P17 L530	A sentence should be added referring to preparedness where “how reasonable is an approach” has to be discussed and co-built between authorities, experts and stakeholders. This will be consistent with L540-542 where the Commission should not limit the process used to involve stakeholders to public consultation. Other mechanisms may be more efficient to build consensus and/or elaborate jointly decisions.
2.3.2. The optimisation of protective actions	
P20 L653	Different risks associated with doses to different demographic groups of otherwise similar populations are not discussed here. Should this be a consideration in populations moving back to an affected area?
2.3.3 Optimisation and the use of reference levels	
P23 L801	Typo – ICPR should be ICRP
P25 L866-880	It should be made clearer what environmental reference value is and how it is derived for optimisation purpose on the basis of DCRL. This has to be consistent with item (179) only referring to DCRL.
P23 L810	Item (78) - Experience from e.g. Fukushima has shown that increasing reference level during the development of an accident may lead to mistrust of the government by the population. This process should be thought well in advance in order to be better understood by affected stakeholders. This should also be taken into consideration when selecting the scenario that is used to derive the reference level.
3.1 Characteristics of the early and intermediate phases:	
P26 L886 - 888	In Section 1.2 Scope and structure of the publication, paragraph 6, lines 201 to 202, it is stated that malicious act are outside the scope of the publication. In section 3.1 lines 886 to 888, there is a statement regarding intentional misuse of a source, which is at odds with the statement in Section 1.2.

	1. These are part of the definition of emergency exposure situations and therefore are not needed herein since the glossary is at the end of the report.
P26 L886 - 890	In this section a 'source' has been introduced. There should be a clear definition that this is <u>the source term</u> associated with the event and not a sealed source, as many will assume.
P26 L924	The wording of radiological and non radiological health effects should be avoided since the meaning of non-radiological health effects could be misunderstood and limited to health detriment induced by exposure to non radioactive stressors. It is more appropriate to change into " <u>radiation induced health effects either directly related to the exposure level or indirectly through psychosocial effects associated to protective actions</u> "
3.2.1 Exposure pathways	
P27 L955	Again the focus is on a large scale nuclear accident, which is not a problem, but should be clearly stated within the document what is considered to be a large scale accident.
3.4. protection of the public and the environment	
P36 1314	The paragraph talks about the passage of a plume above people's homes but it could also be workplaces or other places they are visiting at the time when they would equally need to shelter, not only residents in the area. For clarity that it applies to everyone within a particular geographic area it would be helpful to expand the description beyond "people's homes".
P36 L1320	Again this paragraph talks about the sheltering of residents but it would be anyone in the affected area whether they were residents, workers or visitors. For clarity that it applies to everyone within a particular geographic area it would be helpful to expand the description beyond "residents".
P36 L1322	This paragraph says that "sheltering is easy to implement" which it may be, but the challenge will be communicating the message to everyone within the sheltering area especially if are not local, outdoors or in transit at the time. It may also be that people do not have access to adequate shelter, e.g. if they are camping/caravanning in the area, involved in outdoor pursuits or in transit, they may not have adequate protected places to shelter in. For clarity it may help to include the need to consider "a mechanism for communicating with those who need to shelter is essential" similar to what is included in line 1535 for the lifting of sheltering advice. It would also be helpful to include a requirement to consider what advice should be given to those who do not have a suitable place to shelter that will provide adequate protection.
P36 L1336-1359	Items (130) and (131) deserves appropriate references.
P38 L1413-1423	Item (138) should be expanded and changed as follows (remove red characters , add <u>underlined characters</u>) (138) In the intermediate phase, <u>aspects such as the radiological characterisation of food production and its potential evolution depending on season, radionuclides released to the agricultural environment, environmental characteristics, etc.</u> will allow the definition of <u>frame a more detailed and adapted strategy for foodstuff management, starting with the most affected areas.</u> For this purpose, it is also necessary to assess the overall impacts of <u>agricultural contamination</u> on the life of local affected communities (e.g. agricultural, cultural, image, societal, economic considerations). This is generally achieved through <u>dialogues with affected stakeholders.</u> Once the characterisation is sufficiently advanced for the <u>responsible authorities and affected stakeholder</u> to need to build <u>have</u> a relatively good <u>and common</u> understanding of the overall situation., t The Commission recommends that radiological criteria <u>to allow food consumption</u> should be based on directly measurable levels of radionuclides in foodstuffs (expressed as Bq kg-1 or Bq L-1) <u>calculated based on an agreed, annual dose criteria and on food consumption data for</u>

	<p>the area(s) most at risk. This would generally be the affected area(s), where residents may consume more contaminated food (locally grown) than residents of unaffected areas. Generally, although not always, social and image considerations could suggest that the radiological criteria for food consumption fixed for affected areas could be used for the marketing of food within and from affected areas to other, non-affected areas of an affected country. Further, social and image considerations may suggest that the consumption and marketing criteria used nationally could also be used for the export of food from the affected country. In Japan following the Fukushima accident the same criteria was used for all domestic consumption and export of food (Kai, 2015), and in Norway for all domestic consumption of reindeer meat produced by the Sami population after the Chernobyl accident (Skuterud et al., 2005). The radiological monitoring of foodstuffs, based on <u>these agreed</u> criteria, is key to facilitating <u>their commercial movement of foodstuffs from affected areas</u> exchange inside and outside affected areas, while guaranteeing protection of the people.</p>
P38 L1432 1435	<p>Give the following precisions in item (140) remove red characters, add <u>underlined characters</u> (140) Guideline levels <u>for the importation of food</u> have been developed by the Codex Alimentarius Commission for use in international trade (FAO/WHO, 2006). These levels are based on a dose criterion of 1 mSv per year assuming that a maximum of 10% of the diet consists of contaminated food. The assumptions may not be valid for some local affected communities</p>
P39 L1443-1444	<p>Give the following precisions in item (141) remove red characters, add <u>underlined characters</u> (141) Consequently, the radiological criteria for foodstuffs set for managing <u>the consumption and marketing of food in and from affected areas</u>, the local situation may be specific and different from <u>as well as</u> those adopted for international trade, should be developed considering radiological, social and economic aspects.</p>
P39 L1464	<p>The heading of 3.4.2.4 should be changed into “decontamination strategy and radioactive waste issue” to better fit with the content of (145) and (146)</p>
3.5.1. Termination of protective actions	
P40 L1511	<p>This title should read as “Termination of <u>emergency phase</u> protective actions”. Protective actions will be applied in the longer-term so this is misleading as currently written.</p>
4.1. Characteristics of the long-term phase	
P44 Paragraph 165	<p>The comment on when and how the recovery phase begins has not been addressed – the specific issue is section 4.1 para 165 (similar text is also repeated in para 164). This states “Off-site, the recovery process begins when the authorities have made their decisions concerning the future of affected areas, <u>and have decided to allow residents, who wish to do so, to stay permanently in these areas.</u>” The underlined statement infers that recovery can only begin when residents are allowed to reside/work in the area – if this were true, areas surrounding Chernobyl and Fukushima where living restrictions are still imposed, would not yet have entered the recovery phase. I don’t think this aligns to the intention of the commission. Suggest deleting the underlined text as it allows the authorities flexibility to decide when the recovery phase can start. Alternatively, the definition provided in para 13 for when the longer-term recovery phase begins off-site is much clearer and should/could be used throughout.</p>
Chapter 5	
P54 L2045	<p>Vulnerability is a term aggregating multiple facets and should be defined</p>
P54 L2076	<p>Reference is OECD/NEA rather than NEA-OECD (this is to be in agreement with the list of references)</p>

P54 L2081	The terminology of “correctional institutions” should be clarified in the context where it is used
Conclusion	
	<p>Item (222) should integrate explicitly that mental health and psychosocial effects need to be considered</p> <p>Item (223) should also mention the usefulness of preparedness for the overall protective strategy</p> <p>An Item should be added to conclude about justification of decisions and optimisation of protective actions to deal with the environment, in an integrated, consistent and well balanced fashion with human health protection</p>
Glossary	
P88 L3338 - 3341	The definition covers the intentional misuse of a source, which although can be considered correct, is at odds with the statement that malicious acts are not considered in the document.
	Consider adding Emergency Responder to the glossary.
	Consider adding Environmental Reference level to the glossary

ANNEX I - Composition of the EGIR on ICRP TG 93

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