Technical Meeting on Harmonization of Reference Levels for Foodstuffs and Drinking Water Contaminated Following a Nuclear Accident

8 to 12 September 2014

Report of the Chairperson

1. A technical meeting on Harmonization of Reference Levels for Foodstuffs and Drinking Water Contaminated Following a Nuclear Accident was held at the IAEA Headquarters in Vienna on 8 - 12 September 2014 under the chairmanship of Ciara McMahon (Ireland).

2. The meeting was attended by 45 experts from 37 Member States of the IAEA, including Albania, Algeria, Armenia, Austria, Benin, Brazil, Bulgaria, Canada, China, Cuba, Czech Republic, Egypt, France, Ghana, Hungary, India, Indonesia, Islamic Republic of Iran, Iraq, Ireland, Japan, Kenya, Lithuania, Malaysia, Mexico, Montenegro, Pakistan, Poland, Qatar, Romania, Russian Federation, Saudi Arabia, Slovakia, Sweden, Thailand, The Former Yugoslav Republic of Macedonia, Turkey, United Kingdom, along with observers from the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

3. The purpose of the meeting was to provide guidance on the development of an IAEA Technical Document (TECDOC) on the control of foodstuffs and drinking water contaminated as a result of a nuclear or radiological emergency, which the IAEA was requested to prepare by the Radiation Safety Standards Committee (RASSC) at its 35th meeting in November 2013. The IAEA TECDOC does not apply to the response and controls put in place during the emergency exposure situation but rather to the longer-term post-accident radionuclide concentrations that are used once the emergency has been declared as ended to ensure that food and drinking water consumed in the affected area and food exports from the affected area are suitable for public consumption.

Opening Session: Introduction

4. The meeting was opened by an address from Mr. Pil-Soo Hahn, Director, Division of Radiation, Transport and Waste Safety, who briefly described radiation safety issues confronting the radioactive contamination of foodstuffs and drinking water as a potential source of public radiation exposure in the event of a nuclear accident involving the release of radionuclides to the environment. This is a source of concern for the public, who are worried about which foods are safe to eat and for National authorities, who are sometimes unsure of the need to implement controls, and what any such controls should be. These concerns are not limited to the Accident State; the globalization of international trade means that every State, no matter how remote, can potentially be affected by a nuclear accident occurring anywhere in the world.

5. While internationally-agreed standards have been developed for managing the food and drinking water contamination in the affected States in the immediate aftermath of a nuclear accident for the international trade following the emergency, there are no such international standards for the existing exposure situations. There are however standards that apply to drinking water in the existing exposure situation. The activity concentrations contained in the various implemented standards differ due to a number of factors and assumptions underlying the common objective of protecting consumers under different circumstances. The reasons for having these different activity concentration values, the criteria on which they are derived and the circumstances under which they are intended to be applied are not always clearly
understood. The meeting and the TECDOC also aim to promote better understanding of these current standards by providing an overview and information on situations where existing standards are intended to be applied.

The IAEA standards for emergency exposure situations

6. The IAEA safety standards for emergency exposure situations were addressed in the presentation of Ms Nestoroska -Madjunarova (IAEA-IEC). The IAEA safety standards for emergency exposure situations were described with special emphasis on generic criteria and operational intervention levels for imposing restrictions on food, milk and drinking water in a nuclear or radiological emergency. Generic criteria in terms of projected dose for restrictions on food, milk and drinking water for use in the affected States and intended for international trade were presented. Operational Intervention Levels (OILs) in terms of gross alpha and beta activity as well as radionuclide concentrations were addressed explaining how they were to be applied. In addition, the basis on how these OILs were derived such as the selection of representative person and the assumptions made were elaborated.

Current International Standards for existing exposure situations

7. The international standards for existing (post-accident) exposure situations were addressed in the presentation of Mr Gusev (IAEA-NSRW). Current international standards and their applicability, as identified by the Inter-Agency Working Group were presented. Audience questions were related to clarifications on the Codex (Codex Alimentarius) guideline levels for radionuclides levels in food intended for international trade (CODEX STAN 193-1995) and the application of these guideline levels for organ-seeking radionuclides such as iodine.

WHO guidelines for drinking water

8. An overview of the WHO guidelines for radiological aspects of drinking water was presented by Mr Fawell. As the WHO guidelines refer to radioactivity generally, whether naturally occurring or due to human activities, aspects of natural radioactivity in drinking water were also presented. The fact that many treatments used to produce clean drinking water also serve to decontaminate the water of radionuclides (this has the side-effect of potentially causing contaminated sludge accumulation which may need to be dealt with). The use of water for purposes other than drinking (such as crop irrigation, food manufacturing, washing and cooking food) was also noted as important. Therefore advice to consumers should be clear, not only in terms of drinking the water but also in relation to other uses. The need to confirm the accuracy of measurement was noted as an important first step for dealing with any apparent exceedance of the WHO Drinking Water Guidelines.

9. Current work to draft an Addendum to the Drinking Water Guidelines which is to be prepared by WHO was mentioned – this addendum will include further clarification on the application of the 0.1 mSv/year guideline public dose level (and its relationship with the 1 mSv/year reference dose in the Basic Safety Standards). It was suggested that examples of actions that might be taken in cases where there is an exceedance of the drinking water Guideline Levels (GLs) would be useful for this Addendum. National experiences in dealing with exceedances (corresponding to doses of 0.2 – 0.3 mSv/year) above the 0.1 mSv/year guidance were noted; it was also apparent that many countries/national authorities are applying the guidance levels as strict limits that are not to be exceeded, rather than as an indicator for further investigation, as intended.
10. Generally, it was felt that the differences between limits, guidance levels and other standards or indicators need to be better explained and understood. Approaches adopted for presenting numbers (e.g. rounded values) also has to be explained. For an emergency exposure situation these guidelines do not apply but the IAEA safety standards presented above, to which WHO is a cosponsor, are applicable.

**1986 Chernobyl NPP accident experience**

11. Mr Balonov (Russian Federation) gave a presentation on the experience of dealing with contaminated food and drinking water following the Chernobyl accident – both within the country and for food exports. This presentation included an overview of the evolution of contamination levels and dose criteria adopted over the years since the accident, as well as three methodologies for calculating permissible levels for food (“Temporary Permissible Levels”, TPL). The practical issue of applying permissible radionuclide concentration levels to food and water throughout a whole country or only to a specific region within an affected country (for example where a relatively small area is contaminated in a large country) was raised as a topic for further discussion.

**2011 Fukushima Dai-ichi NPP accident**

12. Japan’s experience of dealing with the contaminated food was presented by Mr Yamaguchi (Japan). This included data from monitoring of foods and application of reference level. The methodology for deriving the permitted levels in food was based on the same methodology used by Codex Alimentarius but assuming 50% of the food was contaminated at the guideline level. Approximately one year after the accident it was possible to reduce the permitted levels in food further. The estimated doses arising from consumption of food in Japan (based on data from a survey of the food market basket) were presented and it was clear that these were just a fraction of the 1 mSv/year reference dose chosen. If an individual consumes more wild food their doses would be higher but still below the reference level.

**China’s experience**

13. The monitoring network for food and drinking water was described with approaches of radionuclide specific measurement (for food) and gross alpha and beta activity screening survey for drinking water in China were described by Ms Yanquin Ji. Reference levels were described including application of investigation levels. In the discussion, the importance of having baseline data for radionuclide levels (such as gross alpha/beta values for drinking water or caesium-137 in food) was noted. All of the data from the post-Fukushima monitoring for food and drinking water was provided to the public.
National reports

14. A number of countries noted that they have either adopted or use the Codex Alimentarius values and WHO drinking water guidelines as the national standards (or in the absence of national standards) for existing exposure situations. Post-Chernobyl and post-Fukushima monitoring was addressed by a number of countries.

15. The maximum permitted levels adopted by the European Union (EU) countries are in accordance with European Commission (EC) regulations for food and WHO guidelines for drinking water (with a new EC directive on drinking water having being adopted in 2013 and in the process of implementation). In some countries the decision making for food control and restrictions lie with local authorities, with national authorities providing the general framework for this process.

16. The optimization of reference levels in existing exposure situations was mentioned (Czech Republic). The need to account for potentially high natural radioactivity was mentioned as important — particularly for drinking water assessments (Brazil). Age dependant groups are considered to identify the most exposed group and permitted levels are generally based on these (or separate levels are established to protect these groups). The use of food basket or all day/mixed diet assessments for evaluation of doses to people was discussed.

17. Consumption of wild foods (e.g., wild mushrooms, boar meat) was mentioned as a persistent source of internal exposure post-Chernobyl though the actual doses were not high for the majority of wild boar meat consumers due to low consumption rates (Czech Republic and Bulgaria). The importance of giving information to population groups that may consume large quantities of these foods which are not always controlled as they do not go to market was emphasized.

18. The establishment of different zones based on contamination levels was described by France which correspond to protection of the population including the pre-determined food monitoring and control strategies.

19. Lack of or inadequacy of technical capacities, shortage of resources or absence of national regulations for food and drinking water control were mentioned by a number of countries. A number of countries noted the need to have proper laboratory/field analysis infrastructure and monitoring capacity in place for food and drinking water monitoring as a key requirement.

20. Several countries mentioned that they are in the process of drafting new legislation or national guidance on reference levels in food and drinking water in existing emergency situations and that this work could be supported by the TECDOC. The legislation needs to allow flexibility for implementing guidance.

21. Regarding food importer certification requirements it was mentioned by Lithuania, and others, that importing countries/companies often require certification of some radionuclides that would no longer be expected to be detected in foodstuff due to the long period of time since the accident (including relatively short-lived radionuclides like Ru-103, I-131 asked for import from Chernobyl affected areas).

22. Russia described a methodology for using a dose based approach with weighted dietary intake in order to look at relative risk for different age groups.

23. Sweden reported the issue of post-Chernobyl contamination of reindeer meat, wild berries and mushrooms. Whereas 1 mSv/year reference level was established, it was decided that individual effective doses of up to 10 mSv per year could be acceptable provided that those individuals are informed about the additional risks (and this additional dose criteria not apply to children and pregnant women). An initial limit for Cs-137 in all food was set at 300 Bq/kg, with a higher limit for Cs-137 in foods seldom consumed by the general public being
introduced one year after the accident. Thus, the limit for reindeer meat, game meat, fish from inland lakes, wild berries, mushroom and nuts was increased to 1 500 Bq/kg. Together with this, dietary advice was provided (see presentation for details) on how often it was appropriate to eat foods with different levels of Cs-137 content (according to steps of 300/1500/10,000 Bq/kg) (used like action levels). Monitoring data are made available on-line. The levels were chosen so that, based on typical consumption patterns, food products in commercial shops would give a dose of no more than 1 mSv/year. Measurement capabilities were made available in those local municipalities where there is high consumption of the foods with higher Cs-137 levels.

24. The UK provided information on post-Chernobyl contamination of sheep meat. A reference level of 1000 Bq/kg for Cs-137 in sheep meat was established and controls were applied for certain parts of the country where the higher availability of Cs-137 in the soil led to sheep exceeding this level. In vivo sheep measurements were used (with correspondent inter-calibration of instrument against laboratory measurements of meat samples) with sheep assessed to be below 1000 Bq/kg being free to be moved across the country and with no restrictions on entering the food chain. For sheep assessed to be above 1000 Bq/kg, there was a prohibition on going to slaughter for a minimum of three months – identified by a colour paint mark and the animals were transferred to clean feed for this time. The restrictions were gradually removed over the years where full-flock surveys demonstrated that all sheep were below 1000 Bq/kg (from approx. 10,000 farms in 1987 to less than a thousand farms in 1990). By 2011, there were 338 farms still subject to restrictions. Following a dose assessment which looked at the doses to an adult frequent buyer, who purchases meat every two weeks direct from the farm or farm shop who sources all their meat from the monitored farm and who consumes at the 95th percentile consumption rate (20 kg per year) at the 97.5th percentile of the radiocaesium distribution in their sheep meat intake. For this group of representative person, and even more extreme consumption habits, it was shown that their annual doses were below 1 mSv/year (less than 0.21 mSv/y). Based on this, the assessment that the controls are not providing a meaningful reduction in dose and that there was no evidence that alternative protective actions would achieve a further reduction in dose, the controls were lifted in 2012. This was done following a programme of stakeholder engagement and public consultation.
Discussion of Figure 1 from draft TECDOC

25. Terminology was discussed and it was agreed that Figure 1 was to be clarified and a list of definitions/terminology, as used in the TECDOC, should be prepared and included in the final document. The scope of the document will be clearly defined in the Introduction.

26. The term “affected country” was not clear regarding who decides that a country is “affected” and on what basis.

Discussion on the term “post-emergency phase existing exposure situation.

27. There was a discussion on the terminology and what exposure situation the meeting and thus the TECDOC is referring to. This can be mentioned in the context of clarification of the scope of the document rather than defining a document-specific “existing exposure situation” as this is a defined term in the IAEA Safety Standards.

Discussion on appropriateness of 1 – 20 mSv reference level:

28. The attribution of 1 mSv/year (given in the BSS for each of commodities such as food and drinking water) was discussed with an indication of clarification need. Different interpretations were noted on how this, and the 1-20 mSv/year reference level for existing exposure situations, apply. The WHO drinking water level of 0.1 mSv/year with further assessments up to 1 mSv/year was also noted. The necessity for flexibility of the guidelines was noted though some of the participants felt that having a range is difficult to explain to the public, with one participant of the meeting indicating a preference for having a single reference level for food and water and default concentrations in food.

Discussion on natural radioactivity and its inclusion in the TECDOC scope:

29. The focus of the TECDOC is the post-accident artificial radioactivity though noting that this should be explained in the introduction and that some consideration needs to be given to the doses from naturally originated radioactive materials (NORM) when looking at radioactivity in drinking water as the WHO guidelines do not distinguish between naturally-occurring radionuclides and man-made radionuclides introduced by human activities.

Discussion on application of single standard for food in international trade and food in different regions of the same country:

30. Non-technical issues (e.g. broader considerations, economics, political and communication aspects) involved in the justification of different reference radionuclide concentrations in different countries were noted but it was agreed that the TECDOC should formulate recommendations based on radiation protection aspects only (though noting other factors may influence the final reference levels for radionuclides adopted as the basis for controls). While it may be appropriate to adopt different permissible levels or reference radionuclide concentrations in a country or across a regional trading area (e.g. EU) due to different degree of contamination in the food (or different food distribution and/or consumption patterns), this may or may not be practical to implement due to differences in internal controls of food movement between administrative regions. It was noted that this approach may be difficult to communicate to the public.
31. It was noted that criteria should be set for food as prepared (i.e. reconstituted if the food rehydrated and eaten, or dehydrated if the food is eaten in its dried state) for consumption (FAO noted that other sectors use this practical approach), noting that food preparation will likely alter the activity concentration in the food. It was noted that laboratories that test food destined for sale need to apply a correction factor to account for reconstitution or other preparation techniques before compliance is determined. Restrictions that apply to food supply must be based on scientific and technical considerations and this is why the Codex Standard that provides guideline levels is so important, but many countries have adopted radionuclide concentrations in food which are different to the Codex Guideline levels. It was concluded that explaining different activity concentrations obtained for the same dose criteria is a significant issue for national authorities.
Discussion of drinking water aspects

32. It was noted that in the WHO guidance, the guideline levels for drinking water are linked to specific actions e.g. what to do if GL is exceeded. The inclusion of naturally originated radioactive materials (NORM) into the WHO drinking water GLs was mentioned as well as perceived inconsistency of 0.1 mSv/year (WHO drinking water GL) vs. 1 mSv/year (BSS). Following discussion and review of the current version of the WHO guidance (4th edition), it was generally not clear that the WHO guidance does allow for doses higher than the 0.1 mSv/year although it is said in the guidance that the GLs are conservative and not mandatory limits, and there is paragraph explicitly referring to the application of the 1 mSv/year reference dose in the new international BSS. It was noted that further dissemination of this information, for example, through the WHO’s planned addendum and this TECDOC, would be helpful.

Discussion on conservatism of standards

33. The variability within national/regional diets was noted, and that by seeking to protect the most vulnerable consumers the general population receive doses much lower than the reference dose. It was mentioned that the level of conservatism will depend on the scale of the accident and food replacement abilities. The potential problems of over-conservatism when establishing national reference levels were noted (such as unnecessary costs to the State, food producers and consumers). It was noted that the actual doses (due to ingestion) in Fukushima were found to be much less than 1 mSv/year (typically <0.003 mS/year). It was noted that the TECDOC will include examples of calculations for national regulatory authorities.

How much work on existing exposure RP should be done at preparedness time?

34. It was suggested that the preparation of explanatory and guidance documents can be developed in advance. In addition, list of food items consumed/imported, baseline measurement values, expected radionuclide composition for different scenario, and formalization of national arrangements and roles/responsibilities of different organizations can all be considered. It was noted that these should generally be considered as part of the overall emergency preparedness and not just in the context of preparing for a post-accident existing exposure situation.

Discussion on uncertainties

35. A range of approaches to the consideration of measurement uncertainty both to determining compliance with permissible levels and in communication with the public/decision makers were discussed. These ranged from looking at the measured value only (not including the uncertainties), having a slight elevation of measurement results above reference level (when uncertainties are considered) to trigger further investigation to including summation of the value and uncertainty to determine compliance. It was noted that ISO 11929 (from EU directive on drinking water) is to be applied in the EU. Safety Guide RSG 1.8 (section 8) was mentioned as the good basis for dealing with uncertainties in monitoring and it was noted that the CAC has guidelines on consideration of uncertainties that includes advice for regulatory

compliance assessments. It was agreed that it would be helpful to consider how uncertainties will be handled at the planning phase of the screening programme.

**Discussion on Frequently asked Questions (FAQ)**

36. Issues of liquid food vs. drinking water were noted regarding the difference in the 0.1 mSv/year and 1 mSv/year dose criteria for drinking water/liquid food. The issue of reconstituted food (e.g. tea) was briefly discussed. Some additional FAQs were suggested for inclusion in the TECDOC – these included the issue of natural vs. artificial radioactivity in drinking water and on measurement uncertainties.

**Methodology discussion**

37. Three methodologies for deriving the radionuclide concentrations from the dose criteria were suggested. After discussion of the various methods and the advantages/disadvantages of using different models, it was agreed that the TECDOC should propose the simple methodology (based on the modified equation/methodology of the Codex Alimentarius – considering all food as a whole) as a first step.

38. Once sufficient data/resources are available one of the other methodologies could be used to refine control of particular food types or target protection of particular population groups. It was proposed that the TECDOC include overviews (and case studies) of all three methodologies. In this regard, experience of Russia, Japan, Sweden and the UK were identified as useful case-studies for inclusion in the TECDOC – as well as the methodology previously used by the EC.

39. It was noted that regional (clusters of countries) dietary information is available from WHO (GEMS/Food consumption database). Other points noted were the aspect of health risk communication regarding highly contaminated foods (e.g. wild meat) to the public, possibility for evaluation of percentiles of real dose distribution (“case-specific approach”).

40. There was a discussion on the need to include factors for metabolism rates for different radionuclides in the equations used. It was noted that factors such as this are covered by the ingestion dose coefficient (dose per unit intake factors) but that this should be clarified in the TECDOC.

41. The conclusion on the model application was as following: Use of the simple model for entire foodstuff as a first stage – accumulation of monitoring data – identification of specific population groups and food items – application of specific model/approach to these population groups and food items. It was noted that MSs may not need to use all of these stages.

**Discussion on stepwise approach for establishing dose criteria in existing post-emergency exposure situations in affected countries**

42. The consensus of participants was reached on the importance of this approach with explanation of the logic behind the gradual decrease of reference dose values. An example of such an approach was noted from the presentation of the Russian experience where there was a stepwise decrease in the dose criteria related to the decrease of activity concentrations in foodstuff as well as to the change of international guidance on radiation health risks (decrease of dose limits for the public from 5 mSv/year to 1 mSv/year in ICRP guidance). A major factor for the initial reference dose chosen was also the issue of security of food supply. The different approach used in the EU was noted.
Discussion on the application of Codex Alimentarius values

43. Such approach was mentioned as easy to explain to the public. At the same time, it was mentioned that assumed contaminated food percentage may differ from that used by Codex for affected countries. It was concluded that for import/export of food the recommended levels should be kept no lower than Codex Alimentarius values unless there is good evidence to show otherwise, for example that the fraction of food imported from the affected countries is different than the 10% assumption.

Other application of Codex Alimentarius approach

44. It was noted that the Codex Alimentarius approach to calculating guideline levels for radionuclide concentrations in food destined for international trade might also be helpful for calculating radionuclide reference levels in other scenarios.

45. The Codex Standard states that the mean internal dose of the public, $E$ (mSv), due to annual consumption of imported foods containing radionuclides can be estimated using the following formula:

$$
E = GL(A) \times M(A) \times e_{ing}(A) \times IPF
$$

where:

GL(A) is the Guideline Level (Bq/kg)

M(A) is the age-dependent mass of food consumed per year (kg)

$e_{ing}(A)$ is the age-dependent ingestion dose coefficient (mSv/Bq)

IPF is the import/production factor (dimensionless).

46. In the Codex standard the import/production factor (IPF) is defined as the ratio of the amount of foodstuffs imported per year from areas contaminated with radionuclides to the total amount produced and imported annually in the region or country under consideration. According to FAO statistical data the mean fraction of major foodstuff quantities imported by all countries worldwide is 0.1 and the Codex standard uses an IPF of 0.1 when estimating the dose due to annual consumption of imported foods that contain radionuclides at levels equal to the Codex Guideline Levels. The Codex standard also recognizes that this assumption may not always apply. Using this mathematical approach and replacing the IPF with a “food contamination factor”, a ratio that represents the fraction of contaminated food available to consumers (a ratio of the amount of foodstuffs per year from areas contaminated with radionuclides to the total amount in the food supply chain annually in the region or nationally) could be used at a national level to calculate radionuclide reference levels (Bq/kg) based on appropriate dose criteria. The formula then becomes:

$$
E_c = NRL(A) \times M(A) \times e_{ing}(A) \times CF
$$

where:

$E_c$ (mSv) is the appropriate internal dose criteria for the public,

NRL(A) is the National Reference Level (Bq/kg)

M(A) is the age-dependent mass of food consumed per year (kg)

$e_{ing}(A)$ is the age-dependent ingestion dose coefficient (mSv/Bq)
CF is the contamination factor (dimensionless).

It follows that national reference levels could be calculated by rearranging the formula:

\[
NRL(A) = \frac{E_c}{M(A) \times e_{\text{ing}}(A) \times CF}
\]

47. Japan reportedly used a value of 0.5 for the contamination factor together with national consumption rate data and dose criteria of 1 mSv/year when using this modified Codex Alimentarius calculation approach to derive national reference levels for radionuclide concentrations in domestic food. The meeting participants considered that this is a good approach. However, it was also mentioned that because of the implicit assumptions used in these types of calculations it is appropriate to round the values of the resulting National Reference Levels to an appropriate whole number (1-2 significant figures was mentioned as sufficiently conservative).

48. The TECDOC should emphasise that 1 mSv/year is the appropriate dose criteria because 1 mSv/year is specified in the IAEA Basic Safety Standard. The discussion on the duration of application of these criteria and derived concentration has followed to the conclusion that they could be in place for as long as significant residual levels of radionuclides remain present in the environment but that changing the reference levels too frequently (due to the natural decline in the Contamination Factor for example) could lead to confusion and in practice National Reference Levels might be in place even though actual assessments of internal dose to the public indicate mean internal dose to the public is far less than 1 mSv/year. It was also mentioned that the radionuclide(s) of concern, the specific type of food or foods affected, as well as the size of the area contaminated, and the population most affected should also be considered when calculating National Reference Levels and implementing controls to restrict food or water distribution.

**Section by section Discussion of draft TECDOC**

The draft TECDOC was discussed and comments collated by the meeting secretary.

These included:

49. Section 1: Table of definitions should be incorporated in the TECDOC (probably as Annex with reference in the text in Section 1). The range of natural radioactivity in food (40 – 600 Bq/kg) should not be quoted; dose should be presented instead.

50. Section 2: The term of “affected country” requires clarification. The TECDOC should be applicable for all countries of the world. The aspect of specific food items requiring the informed consent of the consumer was mentioned.

51. Section 3: The link to numerical values of dose per unit intake (ingestion) should be given (e.g. correspondent BSS tables). The inclusion of example calculations for National Reference Levels for radionuclides other than caesium would also be useful (e.g. Am-241, Sr-90 and Cerium were proposed). Similar dose assessments performed using different mathematical models would provide additional useful information for the reader.

52. Frequently asked questions textbox: Terminology of water (drinking water/potable water/beverages) should be included in the Definitions. The question on uncertainties should make a reference to IAEA document on monitoring (e.g. MDA etc.).

53. Annex II: Hyperlinks for each international standard would be useful.
54. Annex III: Case studies from Czech Republic, Sweden and the UK on national experiences with specific food items were suggested.

**Discussion on the Framework**

55. The proposed framework was discussed and the concepts were agreed by the meeting. A number of suggestions on the wording were noted for incorporation in the TECDOC. These included:

- Equation 2 (derived from a modified Codex Alimentarius approach) is considered useful and further, it was considered that using a Contamination Factor of 0.1 would seem to be a reasonable starting point. Therefore a Contamination Factor of 0.1 would generate National Reference Levels that are equal to those already calculated and provided by Codex as Guideline Levels for several different radionuclides of concern in food following a radiological or nuclear emergency\(^2\). Therefore adopting National Guideline Levels that are numerically equal to the Codex Guideline Radionuclide concentrations might be useful for countries as default values in case of the lack of national data or resources. Baseline values (e.g. global Cs, natural radioactivity) should be taken into account for comparison of GLs with the activity concentrations in food and drinking water.

**Additional comments**

56. The inclusion of existing exposure situation considerations as a part of the emergency plans was mentioned as well as the integration of TECDOC proposals into the existing systems of quality control of food and drinking water. Advance development of communication strategy was noted as an important issue. This could include development of plain language explanations, along the lines of those included in GSG-2. The paramount importance of the protection strategy justification was noted for all time periods since the accident including the existing post-emergency exposure situation. Even if the emergency situation is not formally declared the need for prompt actions (even public communication alone) or perceived risks are vital.

**Further steps**

57. The results of the Technical Meeting discussions and advice will be taken into account during the further drafting of the TECDOC, the final draft of which will be discussed at the RASSC meeting in November 2014.

ANNEX

Technical Meeting on the Harmonization of Reference Levels for Foodstuffs and Drinking Water Contaminated Following a Nuclear Accident

IAEA Headquarters, Vienna, Austria

8-12 September 2014, M Building, Room M-3

AGENDA

10:00 – Monday – Thursday, 8-11 September 2014

1. Opening of the Technical Meeting
   P.S. Hahn (IAEA)
2. Chairman’s opening remarks
   C. McMahon (Ireland)
3. Adoption of the agenda
4. Administrative arrangements
5. Expectations of the Technical Meeting
   I. Gusev (IAEA)
6. IAEA standards for emergency exposure situations
   S. Nestoroska-Madjunarova (IAEA)
7. Current International Standards for existing exposure situations
   I. Gusev (IAEA)
8. WHO guidelines for drinking water
   J. Fawell (United Kingdom)
9. Experience of past nuclear accidents
   a) 1986 Chernobyl NPP accident
      M. Balonov (Russian Federation)
   b) 2011 Fukushima Daichi NPP accident
      I. Yamaguchi (Japan)
   c) China
      Y. Ji (China)
   d) Brief national reports
      MS participants (see reverse)
10. Results of MS on-line questionnaire survey
    I. Gusev (IAEA)
11. Discussion of draft TECDOC
    a) Framework for controlling the radionuclides in foodstuffs and drinking water in existing (post-emergency) exposure situations
    b) Methodology for deriving operational criteria
    c) Discussion and comments on the draft TECDOC
12. Any other issues

09.00 – Friday, 12 September 2014

Summary of discussion (summary report to be prepared on the last day of the meeting)

Further steps

Closing of the meeting

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3 This meeting will consider the reference levels in the existing exposure situation following a nuclear or radiological emergency. This refers to people’s exposure due to residual radioactive material in food and drinking water arising from a nuclear or radiation emergency, after an emergency exposure situation has been declared to be ended.

4 Daily sessions start at 10:00 (08 September) and 09:00 (9-12 September) and end at 17:00 (8–11 September) and 12:30 (12 September); Coffee breaks (30 min) at 11:00 and 15:30; lunch breaks at 12:30 – 14:00.

5 MS participants will provide brief description (max 10 min presentation) of national approaches to controlling the radionuclides in foodstuffs and drinking water in existing (post-emergency) exposure situations. Exact date and time of the presentation will be communicated on the morning of the first day.

6 Item 11 is related to correspondent draft TECDOC sections and should address key points shown in the draft TECDOC text.
Agenda Item 9d) – Brief national reports:

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<td>Albania</td>
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<td>Argentina</td>
<td>A.Canobía (presented by I.Fernández Gómez)</td>
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