CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture Organization of the United Nations

World Health Organization

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON CONTAMINANTS IN FOODS

Eighth Session
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MATTERS OF INTEREST ARISING FROM OTHER INTERNATIONATIONAL ORGANIZATIONS

ACTIVITIES OF THE JOINT FAO/IAEA DIVISION OF NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE RELEVANT TO CODEX WORK[1]

1. The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (the Joint Division) is this year celebrating its half century of exemplary/functional collaboration within the United Nations system during which it has promoted the mandates of both the International Atomic Energy Agency (IAEA) — through peaceful uses of atomic energy to accelerate and expand the contributions of nuclear technologies to promote global health and prosperity — and the Food and Agriculture Organization of the United Nations (FAO) in its efforts to eliminate world hunger and reduce poverty through sustainable agricultural and rural development, improved nutrition and food security.

2. The mission of the Joint Division is to strengthen capacities for the use of nuclear techniques for sustainable food security and to disseminate these techniques through international activities in research, training and outreach in the FAO and IAEA Member States/Countries. The Joint Division comprises five Sections working in the following areas: food and environmental protection; soil and water management; plant breeding and genetics; animal production and health; and insect pest control. Each Section and its respective laboratories champion the peaceful application of specific nuclear technologies, which help address human and socio-economic development needs and challenges.

3. In this regard, the Joint Division continues to strengthen collaboration with sister Divisions at FAO Headquarters to improve food and feed safety, protect consumer health, and facilitate international agricultural trade by providing assistance, coordinating and supporting research, providing technical and advisory services, providing laboratory support and training, and collecting, analysing and disseminating information. At the Food and Environmental Protection Section, specific activities related to Codex/Codex Committee on Contaminants in Foods (CCCF) work include food irradiation, food authenticity, the analysis and control of various chemical food contaminants, and the response to and management of nuclear and radiological emergencies affecting food and agricultural production. The activities are implemented through technical cooperation and coordinated research projects as well as with the help of both Regular Budget Fund and extrabudgetary support from Member States.

4. The Joint Division will host an **International Symposium on Food Safety and Quality: Applications of Nuclear and Related Techniques** at the IAEA Headquarters in Vienna, Austria, from 10 to 13 November 2014. The symposium will address various topics in food and agriculture — not only food irradiation, but also analytical technologies for food authentication, traceability and chemical contaminant control. The event will constitute a forum for interdisciplinary networking and the Joint Division extends its warm invitation to scientists, laboratory analysts, policymakers, regulators, food producers and others concerned with food safety and quality as well as with the integrity of the food supply chain to participate in the symposium. More information on the symposium is available online[2].

PREPAREDNESS AND RESPONSE TO NUCLEAR AND RADIOLOGICAL EMERGENCIES AFFECTING FOOD AND AGRICULTURE

5. The FAO works in partnership with the IAEA through the Joint Division in preparing for and responding to nuclear or radiological emergencies affecting food and agriculture. These activities are carried out within the context of the FAO's obligations under the Convention on Early Notification of a Nuclear Accident and under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, as well as under the FAO co-sponsored Joint Radiation Emergency Management Plan of the International Organizations (EPR-JPLAN 2013). The JPLAN provides management tools for coordinating international organization arrangements in preparing for, and responding to, nuclear and radiological emergencies. These practical arrangements are also reflected in the Cooperative Arrangements between FAO and IAEA in Response to Nuclear or Radiological Emergencies. Recent activities in this regard include contributing to the IAEA's comprehensive review of the accident at the Fukushima Daiichi nuclear power plant, and also being involved with emergency preparedness activities. For example, the Joint Division worked closely with the IAEA, other international organizations and Member States through the IAEA's Incident and Emergency Centre when participating in the ConvEx-3 exercise, an international emergency exercise hosted by Morocco in November 2013. The exercise was designed to test the full operation of information exchange mechanisms during nuclear or radiological incidences and emergencies.

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1 Document prepared by and under responsibility of the Joint FAO/IAEA Division on Nuclear Techniques in Food and Agriculture, IAEA Headquarters, Vienna, Austria (please see http://www-naweb.iaea.org/nafa/index.html for additional details).

2 http://www-pub.iaea.org/iaeameetings/46092/Food-Safety-and-Quality

Criteria for Food and Drinking (Potable) Water Contaminated as a Result of a Nuclear or Radiological Emergency

6. The FAO and other international organizations are co-sponsors of the IAEA Safety Guide *Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GSG-2). The guide concerns restrictions on the consumption of radionuclide contaminated food, milk and water within an accident State or State(s) affected by a release of radioactive material, in terms of calculated absorbed dose and activity concentrations provided as operational intervention levels (OILs). In the same regard, the FAO recently contributed to discussions of, and provided feedback on, the draft text of the new IAEA Safety Requirements publication *Preparedness and Response for a Nuclear or Radiological Emergency* (DS457), which will establish requirements for an adequate level of preparedness for, and response to, a nuclear or radiological emergency with the aim of mitigating its consequences. The text will replace the current IAEA Safety Requirements publication entitled *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GS-R-2) taking into account experiences gained since 2002, when the original safety standard was issued.

7. In the aftermath of the Fukushima Daiichi accident in March 2011, considerable attention was focused on the radionuclide contamination of food produced in Japan and sold on national and international markets. There are several international standards dealing with radionuclides in food and drinking (potable) water which are applicable in an emergency as well as under 'normal' conditions. However, the activity concentrations indicated in these standards differ due to various considerations related to protecting consumers in different circumstances. In connection with the CCCF / Codex Alimentarius Commission (CAC) discussions/recommendations[3] on guideline levels for radionuclides in food contaminated as a result of a nuclear or radiological emergency[4] and following the 32nd meeting of the IAEA Radiation Safety Standards Committee (RASSC)[5], a Working Group was established by the IAEA Secretariat together with relevant international organizations[6] to consider activity concentrations relating to food and water in the different international standards and to support implementation of the IAEA Action Plan on Nuclear Safety. The Working Group met twice in 2013 and prepared a discussion paper as the basis for a prospective IAEA Technical Document (TECDOC). This paper provides an explanation of the existing international standards, including numerical values and the circumstances in which they are intended to be applied. The discussion paper was presented to the 35th RASSC meeting at the IAEA Headquarters in November 2013 for consideration and feedback. The paper concluded that there are no major gaps in the international standards on radionuclides in food and water. However, a number of areas were identified where steps could be taken by international organizations and Member States to improve the understanding and implementation of existing standards. The paper also noted that there were still some technical issues to be resolved, including the stage of food production to which the Codex Alimentarius guideline levels apply, the reason why food and drinking water are considered jointly in emergency exposure situations but separately in existing exposure situations, and the different approaches to controlling drinking water in, inter alia, the WHO Guidelines for Drinking-water Quality and the International Basic Safety Standards.

8. The discussion paper further indicated that there seems to be some uncertainty about the period of time the guideline levels in the *Codex General Standard for Contaminants and Toxins in Food and Feed* should be applied in food trade following a nuclear or radiological emergency. The Working Group considered that additional guidance was necessary on this issue and that the identification of internationally validated methods of analysis for radionuclides in food and sampling plans/methods could also enhance the application of the guideline levels. It was noted that the Codex guideline levels were derived for foods contaminated following a nuclear or radiological emergency and traded internationally, and based on an intervention level of 1 mSv per year (assuming 10% of imported foods are contaminated), consumer protection is already assured by using the Codex guideline levels for food imports/exports. The Working Group also indicated that there is a need to consider appropriate management of the transition from an emergency exposure situation immediately post-accident to an existing exposure situation much later after the accident.

9. The 35th RASSC meeting considered the discussion paper and noted that, while there were no major gaps in existing international standards, better harmonization of standards would be desirable given the disparities among Member States and some international organizations. The meeting commented on the complexity of the issue since any standard(s) should address the situation in an accident State, neighbouring affected States and other States in a consistent manner. The standards also have to apply over an extended period. It was also noted that when considering/setting standards, it is important to appreciate that most of the world is in an existing exposure situation most of the time, whereas emergency exposure situations normally apply to a limited area and period.

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3 Report of the Seventh Session of the Codex Committee on Contaminants in Foods, Moscow, Russian Federation, 8–12 April 2013, REP13/CF, Paragraphs 22, 46, 49, 50, 52, 53.

4 Guideline levels for radionuclides provided in the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995).

5 The Radiation Safety Standards Committee (RASSC) is a standing body of senior experts in radiation safety, established by the Deputy Director General, Head of the Department of Nuclear Safety and Security. RASSC advises the IAEA on its radiation safety programme to support the development, review and revision of IAEA safety standards relating to radiation safety as well as the programme for their application. Its objectives are to provide feedback and recommendations to the IAEA on the radiation safety programme and areas for improvement, and to achieve consensus, quality, coherence and consistency in the development of IAEA safety standards.

6 The Working Group includes representatives from the Joint Division and the Secretariat of the Codex Alimentarius Commission.

10. This RASSC meeting further recognized that some countries lack the experience to develop 'default' values (maximum permitted radionuclide concentrations in Bq/kg) for the control of foodstuffs in existing exposure situations, and advised that a priority should be to provide a methodology to assist Member States to derive appropriate radionuclide concentrations at the national level. At discussions during the meeting, it was noted that Codex Alimentarius values were not necessarily sufficiently protective with regard to an annual dose of 1 mSv, which may be unnecessarily high in many situations. Since some countries have lower permitted levels for locally consumed food/products than for those traded internationally, some Member States addressed the need for a distinction between international trade and national issues and thus urged for caution in applying the Codex guideline levels. The 35th RASSC meeting asked the IAEA Secretariat to develop a TECDOC to report on radionuclide concentrations relating to food and water in different international standards intended to be used for the control of foodstuffs and drinking water contaminated as a result of a nuclear or radiological emergency. The TECDOC will inform and assist Member States and international organizations accordingly and should include a framework to assist in developing maximum activity concentrations for use at the national level. The FAO and collaborating organizations such as the European Commission, the International Commission on Radiological Protection, the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development, and the WHO, will contribute to this TECDOC. The 35th RASSC meeting also discussed and approved a three year (2011–2013) RASSC report presented by the IAEA Secretariat with input from the Joint Division/FAO.

11. The Joint Division also represented the FAO at an extraordinary meeting of the Inter-Agency Committee on Radiation Safety held on 18 November 2013 in Vienna, Austria. The meeting discussed activities related to radionuclide contamination in food, water, feedstuffs and other commodities, and reviewed/improved a questionnaire for collecting information on such contamination. Data collected from co-sponsoring organizations using the questionnaire will help identify and address any gaps in international guidelines and standards.

12. The Committee is welcome to consider the information from the inter-agency working group as outlined in paragraphs 7-11, and in particular, paragraph 8, in order to decide if complementary work is appropriate and feasible.

FOOD TRACEABILITY, AUTHENTICITY AND THE DETECTION OF FOOD CONTAMINANTS/ADULTERANTS

13. The Joint Division provides support to FAO and IAEA Member States/Countries for the implementation of holistic food safety and control systems. This includes the development of isotopic and related analytical techniques to verify the origin of food and hence audit information-based traceability systems, and to verify the authenticity of foodstuffs or detect adulteration to combat fraud, enhance food safety and enable international trade in food commodities. These activities are implemented through various coordinated research projects (CRPs) such as the Joint Division's new five-year CRP relevant to the CCCF's work which is entitled "Response to Nuclear Emergencies Affecting Food and Agriculture". This project aims at developing/assessing innovative systems for data collection and management as well as geovisualization platforms that can be used in routine monitoring and emergency response to nuclear and radiological incidents affecting food and agriculture. Nine institutions from developed and developing countries are involved in this CRP. Another CRP will be initiated to support the control of various contaminants in aquaculture products. The Joint Division also coordinates international collaborative research projects on the implementation of nuclear techniques to improve food traceability and accessible technologies for the verification of the origin of dairy products involving up to 30 developing and developed countries around the world.

14. The Joint Division also continues, through a number of national and regional technical cooperation projects, to support capacity building in Member States for more effective contaminant control and traceability programmes to improve public health through a safe food supply, and enhanced trade in foodstuffs. An example is a regional project for South-East Asia involving 13 countries and building technological capacity for food traceability and food safety control systems through the use of nuclear analytical techniques. In Latin America and the Caribbean, a recently concluded regional project (2012–2013) on harmonizing official control laboratories to analyse chemical contaminants in food and feedstuffs under a network of 15 countries has been instrumental in helping the participating countries to improve their control of various contaminants (including mycotoxins and heavy metals) through a number of training programmes and by facilitating attendance of their experts at international meetings. A related project in Africa is helping with establishing a food safety network through the application of nuclear and related technologies and thus far involves 13 African countries. This project addresses, among many other needs, the monitoring/control of contaminants such as mycotoxins, heavy metals and selected persistent organic pollutants.

15. A sustainable regional food safety laboratory network, the Latin American and Caribbean Analytical Network (RALACA, http://red-ralaca.net), has been established in the Latin America and Caribbean region with assistance from the Joint Division. RALACA is a non-profit network created to enhance regional capabilities to target food safety and environmental sustainability through the control of contaminants. The initial membership includes laboratories in 16 countries, and this will be expanded in the future. Members of the network are applying proven technical solutions and efficient information and communication technologies to allow countries without any existing capacity to quickly begin training using regional capacities.

16. These laboratory networks will be expanded regionally and across regions to benefit broader Member States' initiatives such as the new Partnership for Aflatoxin Control in Africa (PACA) involving many African countries and regional/international development partners. The Joint Division has expressed interest in PACA and recently contributed 30 copies of the manual *Sampling Procedures to Detect Mycotoxins in Agricultural Commodities* in support of effective laboratory surveillance and food sampling. Forty additional copies were also distributed to participants during two meetings organized/coordinated by the Joint Division, namely an interregional workshop on laboratory quality control/assurance, including a component on the total diet study (TDS) approach to risk assessment (Botswana, 28 October–1 November 2013), which was attended by representatives of 21 countries, and the Latin American regional technical cooperation project meeting in Panama (2–6 December 2013) aimed at enhancing the harmonization of official control laboratories to analyse chemical contaminants in food and feedstuffs. Also with regard to partnerships and appreciating that animal feed safety is an integral part of the intricate food safety continuum, the Joint Division has expressed interest in joining a multi-stakeholder partnership programme for capacity development for feed safety recently conceived by FAO sister Divisions in Rome together with other global stakeholders. The partnership broadly aims at developing the capacities of relevant stakeholders to ensure safe feed production/supply and should be relevant to CCCF work.

17. In the same regard, the Joint Division provides technical advice and support to FAO sister Divisions in two projects focusing on the control of mycotoxins in food. One project has looked at developing online tools to enable the calculation of the performance of sampling plans for mycotoxins in foods, while the other (2012–2014), in collaboration with the WHO, gathered and collated statistically reliable data on levels of mycotoxins in sorghum in sub-Saharan Africa (mainly Burkina Faso, Ethiopia, Mali and Sudan). The latter project aimed at assisting countries to generate data relevant to the work of both the CCCF and the Joint FAO/WHO Expert Committee on Food Additives, especially with regard to setting relevant maximum levels. A report on this project will be presented by the FAO at the Eighth Session of the CCCF.

18. The Joint Division has also provided technical management and laboratory support for IAEA national technical cooperation projects in Nigeria (contributing to laboratory accreditation), Indonesia (strengthening monitoring/control of various mycotoxins, including aflatoxins, in foods and animal feeds) and in Mongolia (monitoring heavy metals in foods/feeds). Additional technical cooperation projects have also commenced (2014–2015/2016) in countries such as Benin, Namibia, Paraguay and Uganda with diverse objectives, including monitoring a host of contaminants in table-ready foods and conducting baseline studies on potential radionuclides in foods/water/environment. With regard to prospective work on table-ready foods, Benin's recent interest in a TDS approach to risk assessment (also supported by the WHO and to be coordinated by the Central Laboratory for Food Safety), will build on previous Joint Division support in a project on regulatory control and monitoring of mycotoxins in Benin spearheaded by the Department for the Promotion of Quality and Handling of Agricultural Products (DPQC) in Cotonou. Laboratory capacity at the DPQC was strengthened and information booklets containing guidelines for controlling mycotoxins in agricultural products were developed. The booklets have been widely disseminated among stakeholders in Benin and used to train/sensitize farmers on good agricultural/storage practices.

19. During the 2014–2015 cycle of the IAEA technical cooperation programme, the Joint Division will also support Latin American Member States through the regional project "Developing Indicators to Determine the Effect of Pesticides, Heavy Metals and Emerging Contaminants on Continental Aquatic Ecosystems Important to Agriculture and Agroindustry" and the Central African Republic through a national project "Enhancing Laboratory Capacity to Control Chemical and Bacteriological Hazards in Foodstuffs of Animal Origin". Another technical cooperation project is also in the pipeline to help Tajikistan in strengthening the capacity of its National Centre for Veterinary Diagnosis to monitor radionuclides in fodder and water for domestic animals.

20. In relation to the FAO/IAEA Agriculture and Biotechnology Laboratory complex, a new capital investment project to support the renovation and modernization of the laboratories of the IAEA's Department of Nuclear Sciences and Applications at Seibersdorf near Vienna, Austria, has been initiated. The ReNuAL ('Renovation of the IAEA Nuclear Applications Laboratories') project represents an important initiative. It is a little over 51 years since the laboratories were established in Seibersdorf and the ReNuAL project represents the first comprehensive renovation and thorough upgrading of equipment at these facilities. It will enable the Joint Division to continue to carry out its activities at the laboratories with appropriate space and equipment as required to fully provide for the future in meeting the needs of our Member States. It is envisaged that Member States will increasingly be challenged to expand food production and availability to meet the demands of a growing global population. Part of the demand will be met by a rise in the trade of agricultural products amongst countries, and food safety, quality and authenticity will be of the utmost concern. The goals of the ReNuAL project are: to redesign and expand the current infrastructure to improve the efficiency and effectiveness of laboratory operations and services in order to better meet the current and future requirements of Member States; to ensure that the laboratories in Seibersdorf continue to be a vibrant research and training institution in the future; and to continue attracting highly qualified scientists and other staff committed to advancing applied nuclear sciences to serve the needs and interests of Member States. In particular, the laboratories will continue to seek to serve as a hub for growing networks of Member State laboratories in the respective thematic areas as a means to enhance their sustainability; address emerging issues (for example, the impact of population growth and adaptation to climate change); foster the development of new nuclear applications, products and services; and increase capacity-building activities by providing hands-on training.