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MEASURES TO STRENGTHEN INTERNATIONAL CO-OPERATION IN NUCLEAR, RADIATION AND WASTE SAFETY

INTERNATIONAL INTERCOMPARISONS OF RADIATION DOSE MEASUREMENTS FOR RADIATION PROTECTION PURPOSES

BACKGROUND

1. In October 1999, in resolution GC(43)/RES/13, the General Conference - inter alia - stated that "reliable and accurate measurements are an essential prerequisite for demonstrating compliance with international and national dose limitation requirements" and encouraged all governments "to join in the current co-operative efforts directed towards the organization of international intercomparison exercises relating to radiation dose measurements for the control of occupational and other exposures, the aim being the harmonized application of dosimetric quantities and techniques".

2. The background to the adoption of resolution GC(43)/RES/13 is the fact that in the Preamble to the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (the Basic Safety Standards), under "Quantities and Units", it is stated that "Although most of the requirements of the Standards are qualitative, the Standards also establish quantitative limits, and guidance levels …" and recommendations are made regarding the quantities and units to be used for radiation protection purposes.

WORK DONE BY THE SECRETARIAT

3. Pursuant to the Agency's statutory function of providing for the application of the standards of safety established by the Agency, and taking into account the requirements of the Basic Safety Standards and the need to harmonize the use of dosimetric quantities and techniques used in Member States, the Secretariat has been organizing international and regional intercomparison exercises, with the participation of a number of Member States. The principal aims of the exercises are:

(a) to facilitate the estimation of similarities or dissimilarities of the measurements of radiation protection quantities performed in the participating Member States;

(b) to foster exchanges among Member States of information and experience relating to the measurement of radiation protection quantities and to methods for estimating derived quantities;

(c) to provide access to resources, which might otherwise not be available to some Member States, for the calibration of radiation protection monitoring devices.

4. An international intercomparison of measurements of the quantity "personal dose equivalent, Hp (10)" which involved monitoring services in 34 Member States[1] was completed in February 2000.

5. An international intercomparison of measurements of the quantity "activity" of gamma-emitting radionuclides in human urine samples, with the participation of monitoring services in 39 Members States[2], is currently under way. It is expected that the intercomparison will be completed in September 2000, by the time the General Conference's forthcoming regular session opens. When it has been completed, the Secretariat intends to start an international intercomparison of methods used to derive from the measured activity estimates of intake.

6. An international intercomparison of measurements of the quantity "activity" of radionuclides in simulated human organs is due to start in September 2000 and expected to last until November 2002. So far, 25 Members States have nominated laboratories to participate. When the intercomparison has been completed, the Secretariat intends to start an international intercomparison of methods used to derive estimates of intake by human organs from measured activities in simulated human organs.

7. The Secretariat is co-operating in the 12th International Intercomparison of Environmental Dosimeters, which is being conducted by the US Environmental Measurements Laboratory, the Brookhaven National Laboratory and the US National Institute of Standards and Technology and is expected to be completed in December 2000.

8. Within the framework of the Regional Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL), two intercomparison exercises - one covering the quantity "ambient dose equivalent", determined through measurements with survey equipment used in radiation protection, and the other covering the quantity "activity" of radionuclides in food and environmental samples - are planned for the second half of 2000.

9. Within the framework of the Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA), the third

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[1] The 34 Member States were: Argentina, Australia, Austria, Brazil, Bulgaria, Colombia, Cuba, Czech Republic, Estonia, Finland, Germany, Greece, Iceland, India, Israel, Latvia, Lebanon, Lithuania, Madagascar, Mexico, Morocco, Netherlands, Norway, Pakistan, Paraguay, Peru, Romania, Singapore, Slovakia, Spain, Syrian Arab Republic, Tunisia, Turkey and United Kingdom.

[2] The 39 Member States are: Argentina, Austria, Brazil, Bulgaria, Cuba, Canada, Costa Rica, Estonia, Egypt, Finland, Germany, Hungary, Italy, Islamic Republic of Iran, Indonesia, Jordan, Lithuania, Malaysia, Netherlands, Norway, Paraguay, Pakistan, Poland, Philippines, Romania, Singapore, Slovakia, Syrian Arab Republic, Switzerland, Sri Lanka, Russian Federation, Tanzania, Thailand, Tunisia, Turkey, Ukraine, United Kingdom, United Arab Emirates and Viet Nam.

phase of an intercomparison of measurements of the quantity "personal dose equivalent, Hp (10)" is planned for the period 2000-2002.

10. The Secretariat is discussing with national and other international organizations the question of the co-sponsorship of future intercomparisons of measurements of quantities for radiation protection purposes and the possibility of including the following topics:

(a) measurements of the quantity "personal dose equivalent, Hp (10)" in mixed (neutron-gamma) fields;

(b) measurements of the quantity "personal dose equivalent, Hp (0.07)" for extremities;

(c) determination of the quantity "activity" of alpha-emitting radionuclides in human urine samples;

(d) determination of the quantity "activity" of alpha-emitting radionuclides in human faeces;

(e) determination of the quantity "activity" of alpha-emitting radionuclides in human breath;

(f) methods for estimating the intake of radionuclides into the body (see paragraphs 5 and 6 above); and

(g) methods of dose assessment in cases of overexposure.

MAIN FINDINGS OF THE COMPLETED INTERNATIONAL INTERCOMPARISON

11. The main findings of the intercomparison of measurements of the quantity "personnel dose equivalent, Hp (10)" referred to in paragraph 4 above were as follows: nearly 80% of the participating services satisfied the evaluation criteria; the services using thermoluminescence dosimeters generally obtained better results than those using film dosimeters; and the services in seven Member States receiving Agency assistance under the technical co-operation Model Projects on upgrading radiation protection infrastructure obtained results which were considered excellent given the status of those Member States' infrastructures when the Model Projects started. It was concluded that the Agency should continue acting as a focal point for organizing intercomparison exercises for radiation protection purposes and fostering exchanges of information between Member States. The participants stressed the importance of education and training in radiation protection, especially in the radiation protection monitoring of occupationally exposed persons.