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Radiological protection — Monitoring and internal dosimetry for specific materials —

Part 2: Ingestion of uranium compounds

Radioprotection — Contrôle et dosimétrie interne des éléments spécifiques —

Partie 2: Ingestion de composés d'uranium

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 2, *Radiological protection*.

A list of all the parts in the ISO 16638 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

In the course of employment, individuals may work with radioactive materials that, under certain circumstances, could be taken into the body. Protecting workers against the risks of incorporated radionuclides needs monitoring for potential intakes and/or quantifying actual intakes and exposures. Internal radiation exposure caused by the contamination of radioactive substances results in doses, which cannot be measured directly. Decisions should be made regarding which methods, techniques, frequencies, etc., to select in order to measure and assess these doses. The criteria for determining the design of a monitoring programme, i.e. its requirements, methods and schedule, usually depends on legislation, the purpose of the overall radiation protection programme, the probabilities of potential radionuclide intakes and the characteristics of the materials handled.

For these reasons, four International Standards addressing monitoring programmes (ISO 20553), laboratory requirements (ISO 28218), dose assessments (ISO 27048) and special cases of inhalation of uranium compounds (ISO 16638-1) have been developed and can be applied in a straightforward manner to many radionuclides for accreditation purposes.

This document has been developed to address the specific issue of monitoring and internal dosimetry for ingestion of uranium compounds. It contributes to harmonizing the practices in the monitoring of occupationally exposed persons while remaining complementary to ISO 16638-1. Occupational intakes solely by ingestion are rare however they may need to be considered in some circumstances, for example; external contamination of the mouth or lips; in cases of poor working practices such as food being eaten in contamination areas. Intakes by ingestion can also occur alongside inhalation depending on the circumstances of the event. Monitoring and dose assessment for intakes by inhalation (ISO 16638-1) are covered in a separate document and would take precedence over the requirements for assessing intakes by ingestion. However, the monitoring requirements are very similar. Uranium is both radiologically and chemically toxic. Hence, the scientific bases of current occupational exposure standards are reviewed in addition to radiation exposure limits.

This document describes the need for a monitoring and internal dosimetry programme for the different compounds of uranium in case of a risk of ingestion and offers guidance on its design. The design of the workplace, the work practices and hygiene practices followed and the protective equipment worn, may all be essential in controlling exposure to this risk. The development of this document has taken into account recommendations from international expert bodies and persons with international experience of the practical application of its recommendations in radiological protection programmes. Its application facilitates the exchanges of information between authorities, supervisory institutions and employers.

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Radiological protection — Monitoring and internal dosimetry for specific materials —

Part 2: Ingestion of uranium compounds

1 Scope

This document specifies the minimum requirements for the design of professional programmes to monitor workers exposed to a risk of ingestion to uranium compounds. This document establishes principles for the development of compatible goals and requirements for monitoring programmes and dose assessment for workers occupationally exposed to internal contamination. It establishes procedures and assumptions for risk analysis, monitoring programmes and the standardized interpretation of monitoring data in order to achieve acceptable levels of reliability for uranium and its compounds. It sets limits for the applicability of the procedures in respect to dose levels above which more sophisticated methods need to be applied.

This document addresses those circumstances when exposure could be constrained by either radiological or chemical toxicity concerns.

This document addresses, for ingestion of uranium and its compounds, the following items:

a) purposes of monitoring and monitoring programmes;

b) description of the different categories of monitoring programmes;

c) suitable methods for monitoring and criteria for their selection;

d) information that is collected for the design of a monitoring programme;

e) procedures for dose assessment based on reference levels for special monitoring programmes;

f) criteria for determining the significance of monitoring results;

g) uncertainties arising from dose assessment and interpretation of bioassays data;

h) reporting/documentation;

i) quality assurance;

j) record keeping requirements.

It is not applicable to the following items:

a) detailed descriptions of measuring methods and techniques for uranium;

b) modelling for the improvement of internal dosimetry;

c) potential influence of counter-measures (e.g. administration of chelating agents);

d) investigation of the causes or implications of an exposure;

e) dosimetry for inhalation exposures and for contaminated wounds.

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