

**Field: RADIATION PROTECTION**

**Topic: REGULATION OF RADIATION PROTECTION IN MINING,  
INCLUDING MINING OF FISSILE MATERIAL**

<b>Course type:</b>	TRAINING	<b>Objective</b>
<b>Date:</b>	03-07 June 2024	The course offers participants both theoretical knowledge and hands-on practice regarding regulatory functions, such as licensing and authorization, inspection, and processes and procedures for planned exposure situations in relation to naturally occurring radioactive materials (NORMs) and technologically enhanced NORMs (TENORMs), with a special focus on the mining of fissile and fertile materials.
<b>Duration:</b>	One week	
<b>Location:</b>	Windhoek, Namibia	
<b>Working language of the course:</b>	English	

**Outline of course content**

The course focuses on the regulation of planned exposure situations in relation to naturally occurring radioactive materials (NORMs) and technologically enhanced NORMs (TENORMs), with particular emphasis on mining of fissile and fertile materials, i.e., natural U and Th ores.

The course is structured around the following topics:

- Introduction to radiation protection principles, introduction to the international legal and regulatory frameworks and interpretation of regulations on radiation protection.
- Definition of NORM and TENORM based on dose consequences and intentional use of these materials. Definitions and special features of naturally occurring fissile and fertile materials.
- Introduction of governmental and regulatory functions and processes in relation to nuclear facilities (nuclear power plants, research reactors, mining and ore processing plants, waste management facilities, etc.). Application of the principles of radiation protection in licensing and regulatory control and application of the graded approach for the regulatory supervision of activities and facilities. Special reference to the licensing and operations of fissile material mining.
- Introduction to mining explorations making use of radiation sources and fissile materials.
- Introduction to conventional uranium mining and in-situ leaching (ISL). Explanation of chemical processes in uranium mining, including radioanalysis of samples related to mining purposes.
- Introduction to environmental and personal monitoring, measurements, modelling and dose estimation. Discussion of environmental issues, including by-products, tailings and wastes of nuclear fuel production; methods and qualification of environmental remediation activities, and the remediation and waste management.
- Discussion of radiological issues of non-fissile TENORM mining industries, and the exposure to the public from deposits of mineral residues.
- Overview of lessons learned in relation to legacy wastes from uranium mining, and to the radiation protection aspects of incident and accident management in mining.

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### **Technical schedule and delivery methods**

The course will last a working week (i.e. 5 workdays).

- **Classroom lectures** will take about 4 days with lectures of 90 minutes each, with time allocated for discussions and appropriate breaks.
- **Tabletop exercise** will be included related to licensing of establishment and operation of mining plants. For the exercise participants will form groups to evaluate variant aspects of the licensing procedure.

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### **Target audience**

This course is intended to experts and professionals of Nuclear Regulatory Authorities (NRAs) and Technical Support Organisations (TSOs), with responsibilities and experience related to radiation protection in mining and environmental radiation monitoring.

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**Target number of participants:** 10 – 20

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### **Prerequisites and requirements for participants**

Participants should have an adequate level of knowledge in English (at least an 'Independent user' level defined by the [CEFR](#)) and basic radiation protection knowledge. A university degree obtained in engineering, physics, geology or chemistry faculties with nuclear specialization OR at least 2 years of professional experience in functions relevant to the content of the course is also a prerequisite.

Relevancy of the course topic in the work and institutionally justified interest in participating will be considered as well as the need and opportunity for filling competence gaps. Regional connections to the course location are prioritized and efforts are made to ensure gender equality, so these aspects may also be taken into account as selection criteria.

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### **Terms of participation**

The project is implemented under the European Union (EU) external assistance programme called the European Instrument for International Nuclear Safety Cooperation (INSC) and aims to support the National Nuclear Regulatory Authorities (NRAs), their Technical Support Organisations (TSOs) in non-EU countries in strengthening their capabilities with regard to their regulatory tasks and responsibilities in the field of nuclear safety and radiation protection.

Employees of the NRAs or their TSOs in the Beneficiary Countries are eligible for financially supported participation in the T&T courses. Beneficiary Countries of the project are published on the project website <https://training.ek-cer.hu/>.

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### **Costs**

Travel costs and subsistence allowances (including the international and national travel tickets, per diems, shuttle services, insurance and visa application costs) for participants will be covered by the project.

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### **Application**

Application via the project website <https://training.ek-cer.hu/>, according to the process and deadlines indicated there.

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### **Examination**

Technical and linguistic tests will be written as part of the application and selection process to assess the underlying knowledge and preparedness of applicants. Knowledge and development of selected participants will be assessed through technical tests throughout the course.

Participants attending the full course will be issued with attendance certificates. Successful participants will receive certificates confirming their knowledge achieved and skills acquired.

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