



STRATEGIC BUSINESS PLAN – ISO/TC 85

Executive summary

The purpose of ISO/TC 85 is to improve nuclear safety, nuclear security and radiological protection for nuclear energy, nuclear technologies, and applications of ionising radiation, to sustain the present globalization of the markets with new international standards, and to help work more efficiently.

The primary objective of ISO/TC 85 is the development of industrial standards addressing the needs of nuclear energy, radiological protection, nuclear installations, processes and technologies and reactor technology, including:

- measurement of radiation and activity of radioactive materials;
- measurement or calculation of safety or performance-related parameters;
- material specifications, including standard dimension interfaces;
- system specifications;
- operation and maintenance;
- waste management;
- decommissioning;
- conformity assessment and quality management system certification;
- knowledge management;
- assessment of the safety culture and the leadership for safety.

The secondary ISO/TC 85 objective is to promote the diffusion, understanding and adoption of those standards.

The scope of ISO/TC 85 is the standardization in the field of peaceful applications of nuclear energy, nuclear technologies and in the field of the protection of individuals and the environment against all sources of ionising radiation. It includes:

- Radiological protection;
- Nuclear installations, processes, and technologies;
- Reactor technology.

Nuclear Power Plants (NPPs) continue to play an important role in the global energy mix and contribute 10 %¹ of the world electricity production.

After 2011, stricter conditions for design and operation of nuclear facilities were defined. This induced facilities to be closed and some countries to withdraw from reactor technology. However, at the global scale, investment increased substantially in new nuclear power plants.

During COP 27 (the 27th Conference of the Parties), countries reaffirmed their commitment to limit global temperature rise to 1,5 °C above pre-industrial levels. In line with the objective set by the Paris Agreement, more and more countries are making pledges to achieve net-zero carbon emissions. To achieve carbon neutrality, a low-carbon energy mix based on renewables (e.g. hydropower, solar, wind, biofuels) and nuclear energy is necessary. In addition to generation of carbon-free and dispatchable electricity, nuclear energy can also play a significant role in decarbonizing other industrial activities through production of hydrogen or provision of heat to industrial processes.

¹The World Energy [Outlook 2022](#) published by the International Energy Agency (IEA)

Since 2021, projections show that nuclear energy is expected to play an increasingly important role in the global energy mix. Advances in reactor designs, particularly micro and small modular reactors (SMR), will be key factors.

In this context, in the field of nuclear generation, the standardization challenges are therefore focused on five main topics:

1. the long-term operation for existing plants, including the need to reinforce safety following the Fukushima event;
2. the construction of new plants (including Small Modular Reactors (SMRs) and microreactors), and the needed safety improvements and improved designs of those plants;
3. the decommissioning of plants that are no longer needed;
4. the management of wastes;
5. the design and construction and operation of research reactors (RRs).

In addition to nuclear energy, nuclear technologies deal with medical activities (diagnosis, boron capture neutron beam therapy and radiotherapy), industrial activities (irradiation services (including accelerated gamma aging for materials/components research), neutron beam radiography, measurements, analysis and non-destructive testing using radioactive sources, as well as production of the sources needed by industrial and medical activities), environment applications, research activities (laboratories and research reactors) and activities and situations related to natural radiation sources (cosmic radiation, naturally occurring radioactive material).

The IAEA² in 2014 published its new basic safety standards (GSR Part 3). The IAEA safety standards reflect an international consensus on what constitutes a high level of safety for protecting people and the environment from harmful effects of ionizing radiation. New requirements have been introduced which need to be implemented with the potential support of international standards, including the participation of ISO/TC 85.

Several organizations are working in order to improve the standards, each in its own field. The need for a global coordination is therefore important and ISO/TC 85 has created a “Nuclear Safety Advisory Group” to link with the other organizations.

ISO/TC 85 standards can cover all aspects of a facility or equipment lifetime (design, qualification, siting, construction, operation, decommissioning) according to the needs expressed by participating members (P members).

ISO/TC 85 encourages an effective and active participation of experts from all P members and from international organizations in liaison with the technical committee or its subcommittees:

- to develop and to sustain international participation for the development and maintenance of ISO standards in the nuclear and radiological protection fields;
- to lead an ISO process for the harmonization of national standards; the strategic objective of this process is the promotion of best industrial practices at an international level through ISO standards;
- to provide support to the IAEA revision of its nuclear safety and nuclear security series, and the development of ISO standards related to the management of extreme events in nuclear facilities and their environment; and
- to drive an ISO initiative to adapt existing ISO standards to the specific needs of the nuclear industry with respect to management systems and conformity assessment and quality management system certification.

² [IAEA](#) : International Atomic Energy Agency

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1 Introduction

1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: [ISO](#) (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of [IEC](#) (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of [ITU](#) (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 164 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the [International Standard](#).

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its [Technical Committees](#) are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2 Business Environment of the ISO/TC

2.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards.

2.1.1 Introduction

The peaceful application of nuclear energy primarily concerns the production of electricity in commercial nuclear power plants.

The other applications of nuclear technology and ionizing radiation, though less well-known, are becoming increasingly prevalent. Radioisotopes, radiation generators, nuclear power process heat and non-stationary power reactors have essential uses across multiple sectors, including : consumer products; food and agriculture; industry; medicine; scientific research; transport; water resources; and the environment.

2.1.2 Nuclear Power for Electrical Generation

Nuclear has a key role to play in solving worldwide energy problems.

Nuclear Power Plants (NPPs) continue to play an important role in the global energy mix and contribute 10 %³ of the world electricity production, thanks to over 400 reactors⁴ in over 32 countries⁵.

After 2011, stricter conditions for design and operation of nuclear facilities were defined. This induced facilities to be closed and some countries to withdraw from reactor technology. However, at the global scale, investment increased substantially in new nuclear power plants.

As a result, in 2021, the projections show that nuclear energy is expected to play an increasingly important role in the global energy mix, for several reasons, including:

- the near-zero carbon dioxide and other pollutant emissions associated with nuclear power generation.
Nuclear generation can help reduce greenhouse gas emissions from fossil fuels. Nuclear power plants produce more than one quarter of all low-carbon electricity. Over the past five decades, nuclear power has cumulatively avoided the emission of about 70 gigatonnes (Gt) of carbon dioxide (CO₂) and continues to avoid more than 1 Gt CO₂ annually⁶;
- the introduction of high shares of renewables, while maintaining grid stability;
- the reliability of nuclear power as an on-demand and secure source of electricity;
- its long-term cost-competitiveness;
- the industrial and human-capital benefits associated with its development and use;
- the ability to produce near zero-carbon heat, in addition to electricity, that could help to decarbonize many hard-to-abate sectors of the economy.

³The World Energy [Outlook 2022](#) published by the International Energy Agency (IEA)

⁴ World Nuclear Association – Nuclear Power in the world today (updated [March 2024](#))

⁵ IAEA – [Nuclear power reactors](#)

⁶ IAEA [report](#) “Nuclear Energy for a Net Zero World”, September 2021.

In this context, future developments include:

- new programmes to increase capacity, increase life time, or to increase the availability rate of the reactors in operation;
- new reactor designs, such as micro and small modular reactors, which can facilitate utilization of nuclear power where needed, and when needed, while also reducing the need for transmission line infrastructure. They can also be produced faster and at less cost than traditional nuclear reactors;
- a strong demand for nuclear power production capacity observed in fast-growing countries, leading to new orders of reactors;
- a sustainable use of nuclear energy. It requires the development of fast neutron reactors and the implementation of a policy of spent fuel recycling. The IFNEC⁷ and GIF⁸ international initiatives include this option.

Nevertheless, nuclear power is also subjected to:

- an increasing demand for uranium;
- a strong uncertainty concerning the future international organization of fuel cycle: enrichment, supply of nuclear fuel, management of the spent fuel;
- overall security (both physical and cyber) of nuclear facilities (NPPs and fuel cycle activities from mining to used fuel treatment through fuel fabrication);
- continued public perception of the danger of nuclear power plants;
- and technical and political issues surrounding waste disposal.

2.1.3 Other nuclear technologies and applications of ionising radiation

Radioisotopes, radiation generators, nuclear power process heat and non-stationary power reactors have essential uses across multiple sectors, including consumer products, food and agriculture, industry, medicine, scientific research, transport, water resources and the environment

Ionising radiation and nuclear facilities are used in five important fields of activity, different from nuclear electrical energy generation:

- the medical field, including diagnosis (positron emission tomography (PET) imaging facilities are in strong development) or medical treatment (radiotherapy);
- industrial applications or activities (radiography, sterilization, irradiation, production of sources, use of accelerators and X-ray generators for industrial, safe and secure management of out-of-service sources, advanced materials, high-performance materials, monitoring of industrial processes);
- environment applications (to assess freshwater resources, biological systems, atmospheric processes, and oceanic ecosystems, and to improve agricultural practices);
- hydrogen production, seawater desalination and heat generation;
- research activities (research reactors, biomedical, research laboratories, X-ray diffraction (XRD) and X-ray fluorescence (XRF), micro computed tomography (micro-CT), accelerators, cyclotrons, etc.).

There are 226⁹ research reactors operating in over 54 countries and 20 under construction in 15 countries. They constitute a complex family, because of their multiple functions:

- the qualification of the fuel and structure materials of nuclear power plant (NPP) and research reactor (RR) in normal or accidental situation;

⁷ [IFNEC](#) : International Framework for Nuclear Energy Cooperation

⁸ [GIF](#) : Generation IV International Forum

⁹ IAEA Research Reactor Database ([RRDB](#))

- the contribution to the training of the engineers and the technicians running the NPP and RR;
- the supply of:
 - o irradiation services: production of radioisotopes for industry, nuclear medicine and for the manufacture of sealed sources, etc.;
 - o neutron beams, which enable material analyses, additional to other sources of radiation such as cyclotrons;
- the development of the future generations of reactors (prototypes of fast neutron or high temperature reactors, ITER¹⁰ project dedicated to the feasibility study of fusion power generation).

The trends of these activities are the following:

- access to increasingly sophisticated technologies (notably for newcomers and new generations of professionals);
- huge evolutions of the medical activities worldwide, both in volume and in kind (new technologies and procedures), in parallel with an increasing concern for the radiation protection of the patients and caregivers. The priorities are to make progress in the radiological safety in radiotherapy, diagnostic and interventional radiology, nuclear medicine, and to optimize doses delivered to patients in these medical applications [as low as reasonably achievable (ALARA) principle];
- a strong international concern for security and safety reasons is on the control of the disused sources and their potential diversion;
- a need to improve the various situations of the world research reactors: dismantling or refurbishing of old research reactors, improving the use of research reactors, maintaining continued production of short-lived radioisotopes for nuclear medicine;
- a new evolution with the internationalization of some research nuclear programmes and activities (GIF, IAEA INPRO¹¹ project, ITER project, international participations to the French RJH¹² project, etc.);
- an increase in non-medical research using stationary and portable (hand-held) X-ray technology (e.g., XRD, XRF, micro-CT) for imaging and elemental identification.

Finally, nuclear power challenges are:

- controlling nuclear safety and security, which imposes an important national infrastructure (legally, regulatory, technical) among which robustness, continuity and sustainability shall be insured, before launching any electronuclear programme, and in such a programme, the responsibility of a country is bound for at least a century;
- controlling of the issues of non-proliferation, and the guarantee of access to the resources (enriched uranium and nuclear fuel), of technology transfers, and of spent fuel management;
- education of and acceptance by public concerned with environmental protection, security, and safety issues: this requires re-thinking the future development of the nuclear energy by considering the principles of transparency and sustainable development;
- harmonization between national regulations and international standards, always including an acceptable level of safety measures;
- radioactivity monitoring of the environment and food production.

¹⁰ [ITER](#) : International Thermonuclear Experimental Reactor

¹¹ [INPRO](#): International Project on Innovative Nuclear and Fuel Cycles

¹² [RJH](#): Réacteur Jules Horowitz

2.1.4 Stakeholders

2.1.4.1 Introduction

The operation of the nuclear facilities (uranium mining and processing, NPPs, RRs, irradiation facilities for the industry, the use of ionising radiation in medicine, non-medical research using radioactive materials and radiation sources) are national activities and involve a very large number of stakeholders on the world's scale.

The need for standardization, preferably international, has increased over the years.

2.1.4.2 Nuclear electricity generation

Manufacturers and suppliers

The infrastructure of the current nuclear power plants is different today compared to the situation when they were designed, constructed, and began to operate. There are significantly fewer manufacturers and suppliers, both nationally, regionally, and internationally, which are specifically focusing on components and equipment for nuclear activities. It is often difficult and costly for manufacturers and suppliers to enter the nuclear market since the global scene is relatively small, safety requirements may vary from country to country and quality requirements are usually stricter than in many other industry sectors in the society. This means that manufacturers and suppliers have a strong interest in standardized designs, products, and solutions. The same applies to nuclear power licensees who try to buy products and services since standardization allows better control of the nuclear supply chain.

Equipment and material supplies

The market was in a fast transition from a national to a global one. It includes a very variable number of stakeholders according to each type of product or equipment. It also applies to research reactors.

Support services dedicated to the nuclear facilities

These services include maintenance, security and safety or environmental monitoring, radiation protection studies, waste or spent fuel conditioning or transit storage services, decommissioning and demolition services. We can also expect a progressive evolution of existing national service companies to move towards the internationalization of some of their services. Some of these services might also interest other nuclear activities and applications of ionising radiation.

2.1.4.3 Other nuclear technologies and applications of ionising radiation

A very small number of companies are in competition on the global market for the supply of high activity sealed sources and for the supply of the high technology equipment for nuclear medicine (imaging, radiotherapy), industrial radiography (non-destructive testing), sterilisation, and calibration.

The use of radiation (sealed sources and X-rays) and radioactive materials (diagnosis and treatment) in medicine will increase because the benefits for patients are enormous. Subsequently the number of stakeholders will increase.

2.1.4.4 The transport activities of radioactive material

The transport is largely developed on an international basis: this includes fuel cycle and sealed sources and medical radioisotopes. Consequently, international standards for transport are of paramount importance.

2.1.5 Regulatory and specific context of the nuclear activities

National regulations

Every country is completely responsible for the nuclear safety, security, and radiological protection of its citizens on its domestic territory.

National regulations can thus introduce specific requirements, which have strong implications in the national codes and standards and may create obstacles to the creation of a global and efficient international market.

However, harmonization factors exist:

- Upstream of the national regulations, international organizations (UNSCEAR¹³, WHO¹⁴, ICRP¹⁵, ICRU¹⁶) issue recommendations and IAEA issues safety standards which, without having a binding character, give a common reference to national regulations. The OECD/NEA¹⁷ does not produce standards, but produces studies and evaluations which provide a review of the state-of-the-art and make common points of view possible;
- In the context of new reactors programmes, safety authorities launched several initiatives to harmonize regulations, codes, and standards as much and as useful as possible: (e.g., MDEP¹⁸ initiative, and the WENRA¹⁹ initiative in the European frame);
- Concerning future reactors, the required new technologies are prepared within the framework of international cooperation (GIF, INPRO project from IAEA, and ITER project on nuclear fusion): that will create an opportunity in favour of the development of international standards.

Public acceptance and transparency, commitment of stakeholders

The development and the use of ISO standards should contribute to public confidence, which is a vital necessity for the future development of nuclear energy and other nuclear activities:

- the transparency of the ISO process offers the public the opportunity to act as a stakeholder or an interested party;
- the ISO process offers the guarantee of an international consensus.

International system of control or safeguards

Complementary to national responsibilities, the production and use of radioactive materials are submitted to an international system of control or safeguards.

This international system is based on the Non-Proliferation Treaty (NPT), which establishes a safeguards system under the responsibility of the IAEA, and relies on regional support such as the EURATOM²⁰ in Europe.

The objective is dual: on the one hand, to check that radioactive materials stay strictly under states' control and, on the other hand, to verify that no state launches an illicit nuclear programme.

¹³ [UNSCEAR](#) : United Nations Scientific Committee on the Effects of Atomic Radiation

¹⁴ [WHO](#) : World Health Organization

¹⁵ [ICRP](#) : International Commission on Radiological Protection

¹⁶ [ICRU](#) : International Commission on Radiation Unit

¹⁷ [OECD/NEA](#) : Nuclear Energy Agency of the Organisation for Economic Co-operation and Development

¹⁸ [MDEP](#) : Multinational Design Evaluation Programme

¹⁹ [WENRA](#) : Western European Nuclear Regulators Association

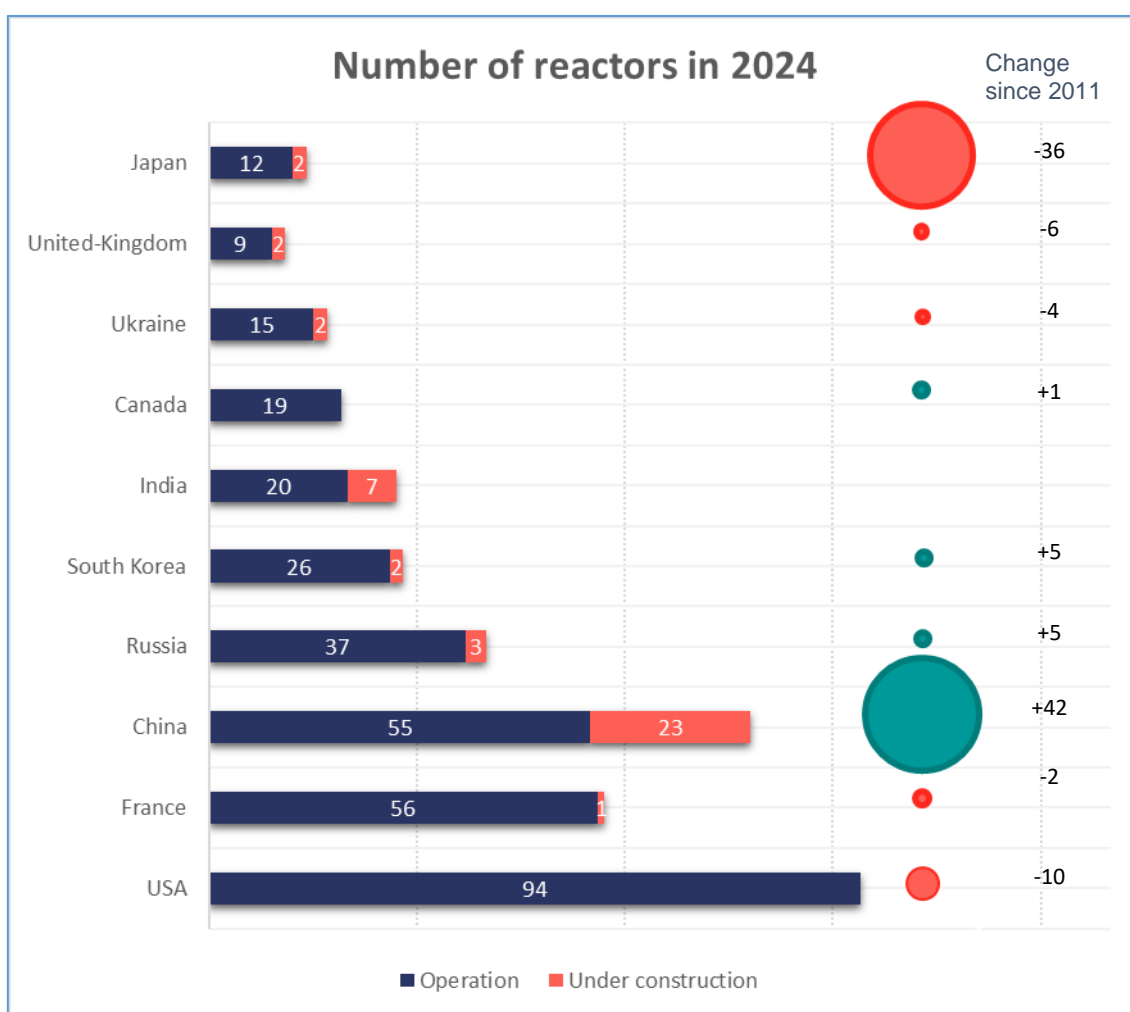
²⁰ [EURATOM](#) : European Atomic Energy Community

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC 85.

2.2.1 Nuclear energy world statistics

Despite some reactors curtailing generation to account for reduced demand or to offer load-following services, the global capacity in 2022 is 393,8 GWe²¹, maintaining the high performance seen over the last 20 years. The total capacity of operable nuclear power plants has remained almost unchanged for the last three years.



In 2022²² nuclear generation increased in Asia. There were minor decreases in South America and in Africa. Generation declined for the third year running in North America as more reactors in the USA were closed. Output declined in East Europe and Russia. Generation also declined in West Europa and can be attributed to in Germany, as reactors closed down.

²¹ IAEA Power Reactor Information System (PRIS)

²² World Nuclear Performance Report 2023

These figures illustrate the foreseen importance of construction, lifetime extension, power increase, decommissioning and demolition programmes.

Number of reactors	2024		
	Under construction	In operation	Shut down
Nuclear Power Reactor (NPR)	57	438	209
Research Reactor (RR)	20	226	74

Sources:

IAEA Power Reactor Information System ([PRIS](#))

IAEA Research Reactor Database ([RRDB](#))

Nearly 70 % of all operable reactors (water-cooled reactors) are pressurized water reactors (PWRs).

Nuclear energy can also be produced by fusion. According to the IAEA's Fusion Device Information System ([FusDIS](#)), as of 2023, there are almost 130 experimental fusion devices and testing facilities operating, under construction or being planned, and a dozen of demonstration plant or pilot plant designs under development.

Research and development activities are also focused on advanced reactors. Small modular reactors (SMRs) are advanced nuclear reactors that have a power capacity of up to 300 MW(e) per unit, and are built largely from prefabricated components assembled on site. More than 70 SMR designs are under development or in construction in 18 countries.

2.2.2 Nuclear activities and applications of ionising radiation

Over 40 million nuclear medicine procedures are performed each year²³. Some 85 % of all diagnostic medical scans worldwide rely on the availability of molybdenum-99 and technetium-99m. Lutetium-177 and iodine-131 are used in therapeutic treatments.

⁹⁹Mo is currently produced in only 6 research reactors (4 in Europe, 1 in South Africa and 1 in Australia) and 1 power reactor in Canada. It is also being produced by synchrotron light source particle accelerators. To ensure that enough radioisotopes are produced, at least 3 reactors must produce simultaneously.²⁴

²³ World Nuclear Association – [Radioisotopes in Medicine](#)

²⁴ Nuclear Medicine Europe - [How the nuclear medicine sector coordinates isotope supply](#)

3 Benefits expected from the work of the ISO/TC

3.1 Contributions of the ISO system

Beyond ISO/TC 85, ISO publishes a collection of standards of general interest that are useful for the nuclear industry activities and applications of ionising radiation. The present document is focused on ISO/TC 85 standards: all information related to other ISO productions is available on the ISO website.

3.2 Current or foreseen ISO/TC 85 specific contribution

The primary objective of ISO/TC 85 is the development of industrial standards addressing the needs of nuclear energy, radiological protection, nuclear installations, processes and technologies and reactor technology including:

- measurement of radiation and activity of radioactive materials;
- measurement or calculation of safety or performance-related parameters;
- material specifications, including standard dimension interfaces;
- system specifications;
- operation and maintenance;
- waste management;
- decommissioning;
- conformity assessment and quality management system certification;
- knowledge management;
- assessment of the safety culture and the leadership for safety.

ISO/TC 85 standards can cover all aspects of any facility or equipment life cycle_(design, qualification, siting, construction, commissioning, operation, decommissioning) according to the needs expressed by P members.

In this context, in the field of nuclear generation, the standardization challenges are therefore focused on five main topics :

1. the long-term operation for existing plants, including the need to reinforce safety following the Fukushima event;
2. the construction of new plants (including Small Modular Reactors (SMRs) and microreactors), and the needed safety improvements and improved designs of those plants;
3. the decommissioning of plants that are no longer needed;
4. the management of wastes;
5. the design and construction and operation of research reactors (RRs).

ISO/TC 85 priorities for the on-going years are the following:

- to develop and to sustain international participation for the development and maintenance of ISO standards in the nuclear and radiological protection fields;
- to lead an ISO process for the harmonization of national standards and the promotion of best industrial practices at an international level through ISO standards;
- to provide support to the IAEA revision of its nuclear safety and nuclear security series, and development of ISO standards related to the management of extreme events in nuclear facilities and their environment;
- to drive an ISO initiative to adapt existing ISO standards to the specific needs of the nuclear industry with respect to conformity assessment, and quality management system certification;
- to coordinate the ISO works in the nuclear and radiological protection fields with the other stakeholders to simplify the context for Standards Users;

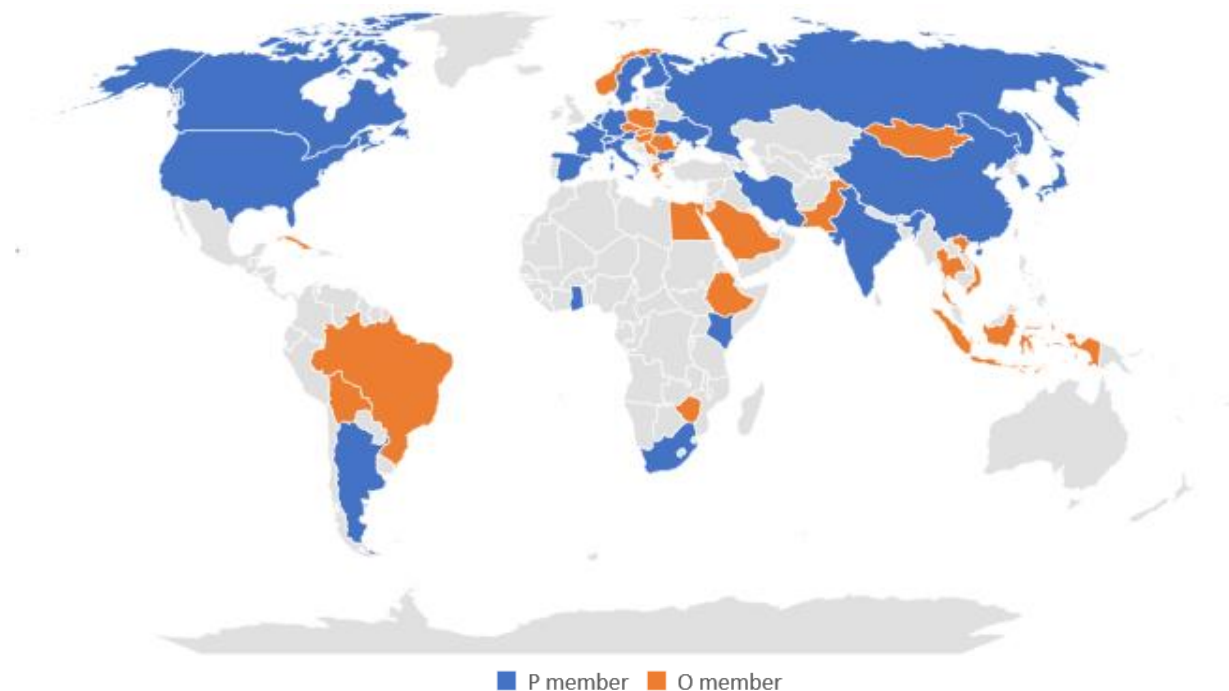
- to promote ISO/TC 85 deliverables during international events, symposia, forums, etc.

ISO/TC 85 will have to make a substantive contribution to the harmonization work of national codes and standards, for which the international community expresses a strong need.

4 Representation and participation in the ISO/TC

4.1 Membership

On 2024-03-15, the membership is the following.



PARTICIPATING MEMBERS (26)

Argentina
Austria
Belgium
Bulgaria
Canada
China
Finland
France
Germany
Ghana
India
Iran
Italy
Japan
Kenya
Korea
Netherlands
Russian Federation
South Africa
Spain
Sweden
Switzerland
Turkey
Ukraine
United Kingdom
United States

IRAM
ASI
NBN
BDS
SCC
SAC
SFS
AFNOR
DIN
GSA
BIS
INSO
UNI
JISC
KEBS
KATS
NEN
GOST R
SABS
UNE
SIS
SNV
TSE
DSTU
BSI
ANSI

OBSERVING MEMBERS (21)

Bolivia
Brazil
Cuba
Czech Republic
Egypt
Ethiopia
Greece
Hungary
Indonesia
Israel
Mongolia
Norway
Pakistan
Poland
Romania
Saudi Arabia
Serbia
Slovakia
Thailand
Viet Nam
Zimbabwe

IBNORCA
ABNT
NC
UNMZ
EOS
IES
NQIS ELOT
MSZT
BSN
SII
MASM
SN
PSQCA
PKN
ASRO
SASO
ISS
UNMS SR
TISI
STAMEQ
SAZ

For updated information, refer to [ISO](https://www.iso.org).

4.2 Analysis of the participation

Over the past few years, the participation in the work of ISO/TC 85 subcommittees and working groups has been active.

ISO/TC 85 encourages effective and active participation of all P members:

- proposition of New Work Item Proposals (NWIP) and Preliminary Work Items (PWI);
- designation of relevant experts;
- vote at each stage of the projects;
- development of co-convenorship in all TC 85 working groups.

ISO/TC 85 encourages:

- non-members to become P or O member;
- participation of experts from relevant organizations in liaison.

5 Objectives of the ISO/TC and strategies for their achievement

5.1 Defined objectives of the ISO/TC

The objectives of ISO/TC 85 are:

- to develop industrial standards addressing the needs of nuclear energy, nuclear technologies, radiological protection, and reactor technology;
- to promote the dissemination, knowledge and usage of those standards.

5.2 Identified strategies to achieve the ISO/TC's defined objectives

To achieve these objectives, ISO/TC 85 has identified the following strategies:

- to improve participation: the systematic use of the ISO Global Directory by P and O members on one hand, annual reporting from each convenor to the SC and TC level on the other hand, will allow ISO/TC 85 to observe the effectiveness of participation, and allow reaction when needed;
- to improve liaisons: ISO/TC 85 wants to listen to the users' needs; to understand these needs and to avoid duplication or contradiction with other works, ISO/TC 85 will continue to develop an active network of formal and informal liaisons with other international organizations like:
 - o institutional organisations: IAEA, UNSCEAR, WHO, ICRP, OECD/NEA, ICRU, EC, etc;
 - o professional organisations: WANO²⁵, WNA²⁶, PNC²⁷, ENISS²⁸, WANO, ISSPA²⁹, WNTI³⁰, HPS³¹, IRPA³², etc;
 - o research organisations: ITER, GIF, etc;
- to improve the promotion of ISO standards: ISO and ISO/TC 85 standards and methods are not sufficiently known. The present business plan, ISO/TC 85 website and other ISO existing documentation will have to be used at all levels of ISO organization (chairs, convenors, liaison officers) to develop and improve information of stakeholders (potential participants to standards development and of potential standards users);
- to improve ISO/TC 85 structure: ISO/TC 85 and its subcommittees must be a living structure; following the needs, working groups or ad hoc groups must be created, restructured, or disbanded. The same is true for subcommittees. The purpose of these evolutions of ISO/TC 85 structure will be to develop a better efficiency of the mobilized expertise, which is a rare resource from the industry and a better response to the industry's needs. These evolutions will offer concrete opportunities for lobbying actions to improve the effective participation of a sufficient number of countries and stakeholders to ISO/TC 85 work. Effective participation of more countries in each new WG will be encouraged, at the expert level and for convenor appointments as well.

²⁵ [WANO](#) : World Association of Nuclear Operators

²⁶ [WNA](#) : World Nuclear Association

²⁷ [PNC](#) : Pacific Nuclear Council

²⁸ [ENISS](#) : European Nuclear Installations Safety Standards

²⁹ [ISSPA](#) : International source suppliers and producers association

³⁰ [WNTI](#) : World Nuclear Transport Institute

³¹ [HPC](#) : Health Physics Society

³² [IRPA](#) : International Radiation Protection Association

The appointment of co-convenors from different countries can be an efficient opportunity for a better international involvement, and will be developed inside ISO/TC 85 on a systematic basis;

- to maintain a document giving a user-friendly access to existing international standards on the ISO/TC 85 web site, including access to IAEA and IEC or ICRU standards, to improve promotion, knowledge, and use of international standards, and to help experts develop standards to avoid overlapping and contradiction.

6 Factors affecting completion and implementation of the ISO/TC work programme

The key factor is participation. ISO/TC 85 develops and sustains international participation for the development and maintenance of ISO standards in the nuclear field.

ISO/TC 85 must consider in its work recent and essential international publications including:

- IAEA Safety Fundamentals (SFs), General Safety Requirements (GSR), Nuclear Security Series,... and associated guides;
- ISO/CASCO toolbox on conformity assessment standards; handbook on "The integrated use of management system standards"; ISO/IEC Guide 99:2011 "International vocabulary of metrology – Basic and general concepts and associated terms (VIM)";
- ICRP Recommendations ;
- OECD/NEA documentation.

Differences in the policies of P members about nuclear energy should not be an obstacle for active participation:

- all countries use nuclear technologies other than nuclear energy, and are welcome in ISO/TC 85 and SC 2 working groups;
- countries which maintain or develop nuclear energy should support SC 5 and SC 6 working groups;
- the SC 5 working groups on waste management and decontamination of nuclear facilities respond to the needs of all countries, wherever they want to phase out, to sustain or to develop nuclear energy.

All P members are strongly encouraged to develop their active participation, and all O members are welcome to consider P membership.

7 Structure, current projects and publications of the ISO/TC

7.1 Information on ISO online

The link below is to the TC's page on ISO's website:

[ISO TC 85 on ISO Online](#)

Click on the tabs and links on this page to find the following information:

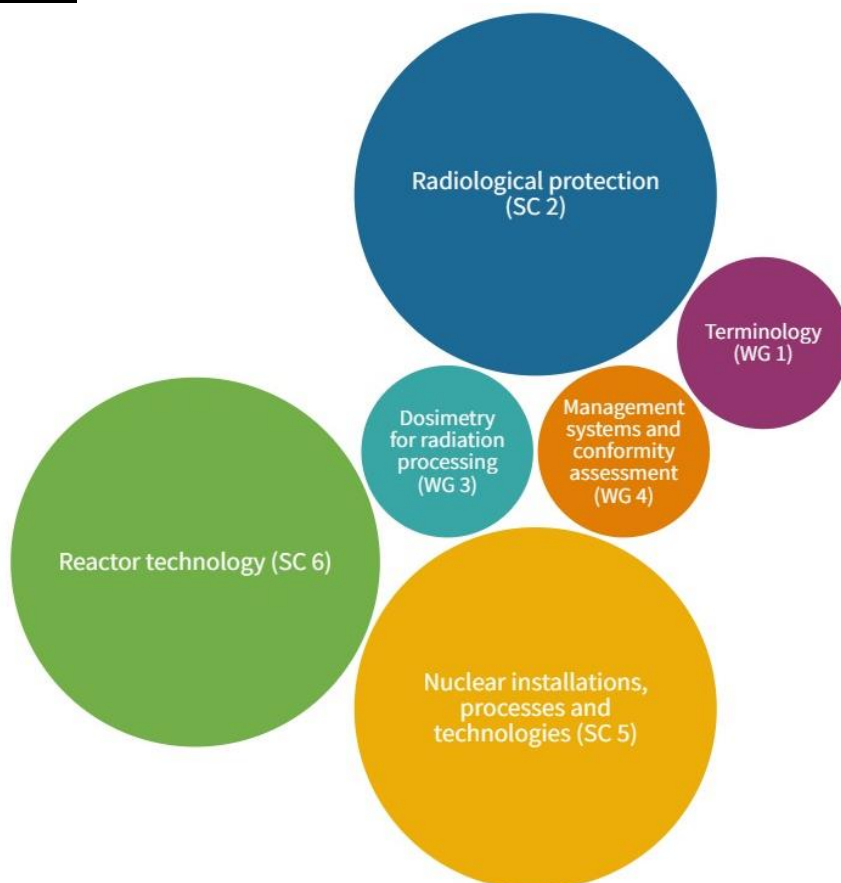
- About (Secretariat, Committee Manager, Chair, Date of creation, Scope, etc.)
- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Tools
- Work programme (published standards and standards under development)

7.2 ISO/TC 85 Nuclear energy, nuclear technologies, and radiological protection

Scope

Standardization in the field of peaceful applications of nuclear energy, nuclear technologies and in the field of the protection of individuals and the environment against all sources of ionising radiation

Structure



7.3 SC 2 Radiological protection

Scope

Standardization in the field of the protection of individuals (workers, patients, members of the public) and the environment against all sources of ionizing radiation in planned, existing or emergency exposure situations linked to nuclear activities, medical activities, industrial activities, research activities and natural radiation sources. It includes notably standardization for the design and use of equipment/systems/sources, metrology of radiation, dosimetry and related protocols, monitoring and measurement methods for the environment, control of goods and materials that may contain radioactive substances.

Structure



Roadmap

The overall objective is to consolidate and develop the SC 2 position in the various sectors of activity using ionizing radiation where standards are needed and could contribute to disseminate good practices of radiation protection.

The roadmap for the next 3 years focuses mainly on the two following actions.

Action 1: Identify the needs in all sectors of activity, regarding emerging issues like

- Management of spent fuel and radioactive waste;
- Dismantling and decommissioning of nuclear facilities;
- Transportation of radioactive sources and waste;
- Application of new technologies and practices, in particular in medicine (nuclear medicine for diagnostic, etc...);
- Control of natural radioactivity in industrial materials (naturally occurring radioactive material (NORM, construction) and radon);

- f. Monitoring radioactive contamination of consumer goods, including human food and animal feed;
- g. Future changes in and practical implications of dosimetric quantities from ICRU/ICRP;
- h. Management of nuclear/radiological events and post-accidental situations and illicit trafficking;
- i. Use of ultra-short pulse lasers in material processing and research.
This action should be conducted, in particular, considering the new regulatory provisions like those in Basic Safety Standards.

Action 2: Attribute the new projects of standards to the competent SC 2 Working Groups, and, if needed, create new ones with the relevant scope.

This action may require finding experts in new fields or collaborating with other organisms (IAEA, EURADOS³³ ...).

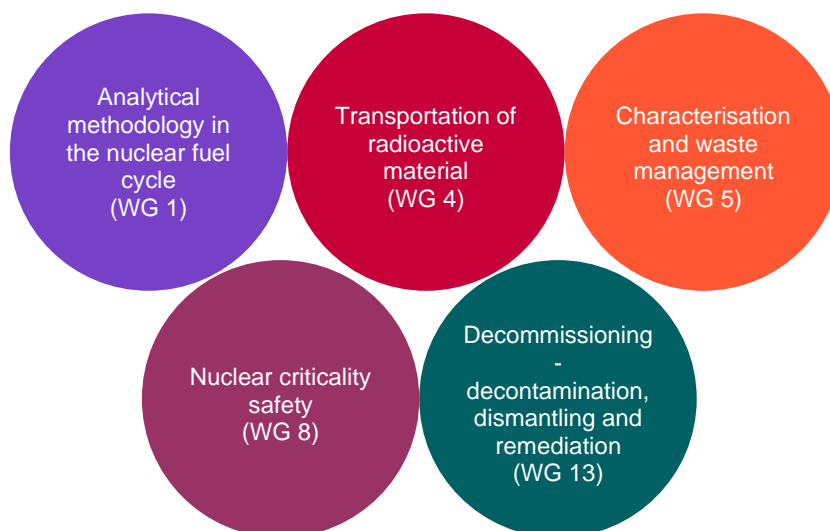
7.4 SC 5 Nuclear installations, processes and technologies

Scope

Standardization and promotion of good practices associated with the planning, construction, operation and decommissioning of installations, processes and technologies involving radioactive materials. Nuclear installations, processes and technologies include: the Fuel Cycle, ex-reactor nuclear criticality safety, analytical methodologies, transport of radioactive materials, materials characterization, radioactive waste management and decommissioning.

Excluded: specific enabling technologies and techniques for non-peaceful applications; sealed sources, radiation processing, nuclear power plants and research reactors (with regard to nuclear criticality safety while fuel is loaded in the reactor core).

Structure



Roadmap

The objective of the roadmap is to present the range of current standards within the scope of SC 5 and its Working Groups, allow interested parties to identify where new standard development may be best situated and identify opportunities to collaborate and drive consensus with other organizations. It is also a useful tool to engage with the wider international community and other member states to help attract experts to support future standards development in SC 5.

³³ [EURADOS](#) : European Radiation Dosimetry Group

The main areas of standard review and development for each WG are outlined below:

WG 1 Analytical Methods

- UF₆, UO₂, UO₂/GdO₃
- Products in inlet and outlet of spent fuel reprocessing facilities
- MOX Pellets and PuO₂
- Other

WG 4 Transportation of Radioactive Material

- Safe Transport of radioactive materials
- Nuclear Energy
- Projects

WG 5 Characterisation and Waste Management

- Characterisation, including characterisation methods
- Waste Management, including requirements, classification and categorisation

WG 8 Nuclear Criticality Safety

- Criticality Accident Management
- Criticality Accident Prevention
- Administrative Practices for Nuclear Criticality Safety

WG 13 Decommissioning

- Decommissioning Strategy
- Sites and Facilities Characterisation
- Waste
- Post Operational Clean Out
- Site and Facilities Remediation
- Decontamination, Dismantling and Decommissioning
- Safety
- Quality

7.5 SC 6 Reactor technology

Scope

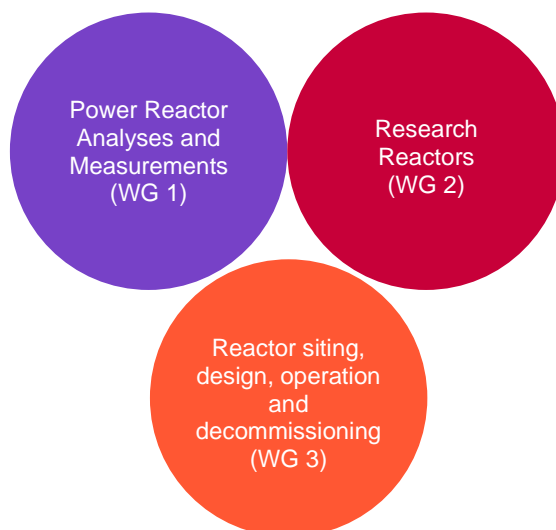
The scope covers standardization in the field of nuclear power plants and research reactors. The scope includes :

- calculation, analysis and measurements in support of physics of nuclear reactor core design and operation;
- siting, design, construction, operation and decommissioning. Siting includes all types of nuclear installations and all topics such as flooding, seismic hazards, etc.

Research reactors include a large variety of facilities: production of neutron beams, irradiation of specimens, production of isotopes (especially production for nuclear medicine) and test reactors or prototypes of new technologies.

Excluded: decommissioning is limited to technical topics that are specific to reactors

Structure



Roadmap

SC 6 discussed its roadmap at a workshop held during its meeting in Berlin, 2019. The following objectives were taken into account:

- evaluate and list the current status of ISO standards within the scope of SC 6;
- identify gaps in the current scope;
- identify related standardization activities in other organizations in order to minimize duplication and non-conformity;
- identify topics for new ISO standards, taking into account the needs of the industry and conformity with standards of other international organizations, such as IAEA, IEC, etc.;
- gain and maintain momentum, visibility and recognition to attract experts from the whole community (industry, regulatory bodies, technical support organizations ...) and from all Member States to produce industrial standards of high quality and added value.

The roadmap contains a list of potential future work items for each working group in SC 6 and was updated in 2023.

P-members are invited to propose other items at any time, the list is not closed:

WG 1: Power Reactor Analyses and Measurements

- nuclear data for radioisotope production for medical and industrial applications
- neutron fission yields
- nuclear Data for reactor design
- uncertainty analysis (methods and tools)

WG 2: Research Reactors

- cold neutron sources
- fusion reactors (ITER)
- general requirements for research reactors (design, operation, decommissioning and waste management)

WG 3: Reactor siting, design, operation and decommissioning

- construction and Design
- external hazards
- inspection methods or specific topics
- SMR
- Gen IV reactors

8 Reference information

[Glossary of terms and abbreviations used in ISO](#)

[General information on the principles of ISO's technical work](#)