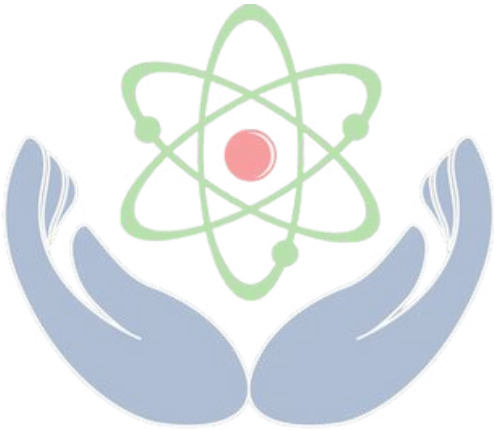
Kingdom of Morocco
Head of Government

Moroccan Agency for Nuclear and
Radiological Safety and Security

Enhancing Nuclear and Radiological Safety and Security Capacity Building in AFRICA



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HIS MAJESTY THE KING MOHAMMED VI

I have always firmly believed that Africa can turn the challenges it is facing into genuine prospects for development and stability. African population growth, African institutions, migration and youth issues are opportunities we should leverage together.

Morocco wants to contribute to the emergence of a New Africa: a strong, daring Africa that defends its interests; an Africa that is influential on the world stage.

To shape this new Africa, it is important to shed all illusions and reject any fantasies. The New Africa I am yearning for should, on the contrary, be based on a solid, pragmatic vision which is likely to help forge a conquering Africa that is committed to solidarity.

An extract from His Majesty's speech at the 29th Summit of Heads of State and Government of the African Union (AU), Addis Ababa, 2017

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> Our mission is to Protect the People and the Environment against the risks associated with the use of ionizing radiation.

M. SAÏD MOULINE
DIRECTOR GENERAL OF AMSSNuR

> Our policy is to facilitate while being strict.

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OUR MISSION

Established in 2014 under Law No. 142-12, the Moroccan Agency for Nuclear and Radiological Safety and Security, "AMSSNuR" is a strategic Public Establishment responsible for the regulation and control of activities and facilities involving ionizing radiation sources.

Our mission is to ensure that the nuclear and radiological safety and security of activities and facilities involving ionizing radiation sources comply with the provisions of the Law No. 142-12 and its related regulations, as well as with the Kingdom's international commitments.

OUR VISION

Our vision is to be a national regulatory body which is :

- Strong, based on its human resources, its experience, and the continuous development of its technical, organizational and human skills.
- Exemplary, according to the rigor with which its mission is fulfilled, and its ambition to be a regional and continental Leader for Safety.
- Independent, ensuring the execution of its mission in full compliance with compliance with the Law No. 142-12 and related regulations .

OUR VALUES

Our fundamental values are:

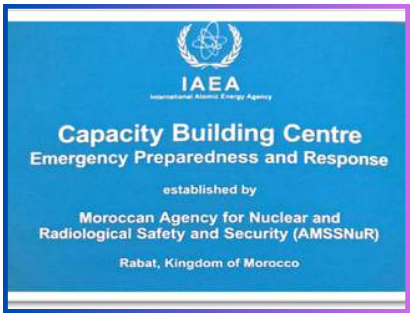
- Rigor: in carrying out our mission by striving for excellence .
- Integrity: in relations with internal and external stakeholders.
- Relevance: of our technical assessments and inspections.
- Transparency: in our communication, while respecting confidentiality.
- Independence: of our position and our decision-making process.

I. Regional and International Cooperation

1. IAEA recognitions

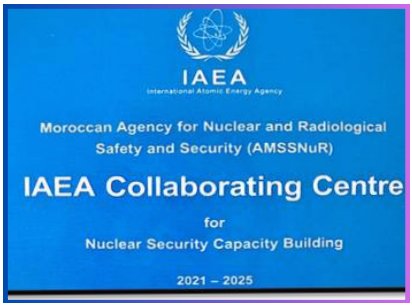
- **Capacity Building Centre in Morocco for Emergency Preparedness and Response**

The IAEA designated Morocco's Agency of Nuclear and Radiological Safety and Security (AMSSNuR) as the first African IAEA Capacity Building Centre (CBC) for Emergency Preparedness and Response (EPR), bringing the global total to seven centers. The Moroccan CBC facilitates EPR training workshops and events, offering African nations access to IAEA safety standards and publications.



- **IAEA Collaborating Centre in the Field of Nuclear Security in Africa**

As the first IAEA Collaborating Centre in the field of nuclear security in Africa, the Moroccan Agency for Nuclear and Radiological Safety and Security (AMSSNuR) provides an important platform to support the IAEA's efforts to enhance nuclear security in the region, by working to strengthen regulatory frameworks and the security of radioactive sources, as well as support capacity building in these areas.



I. Regional and International Cooperation

1. IAEA recognitions

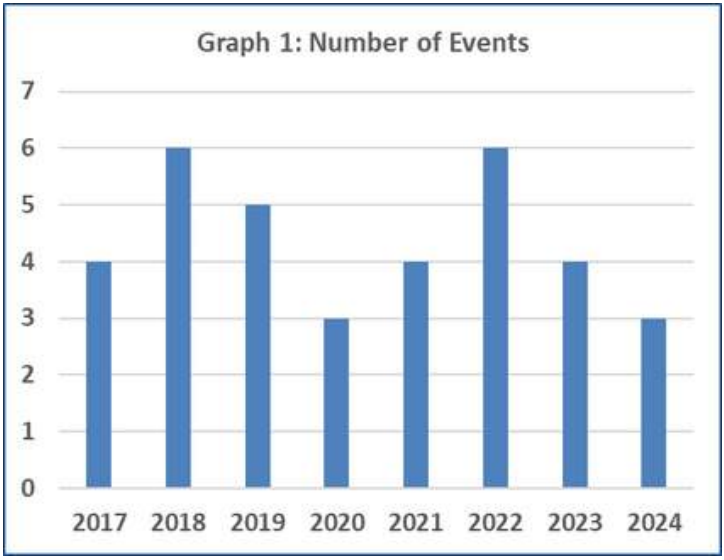
- **African School for Radiation Safety Regulators**

A practical cooperation agreement has been signed between the IAEA and AMSSNuR to promote radiation safety expertise on the African continent by providing AMSSNuR with an African School for Radiation Safety Regulators.. The mission of this school is to establish and/or reinforce the existing regulatory infrastructure by organizing training courses each year, covering topics such as drafting regulations, licensing and inspecting licensed activities and facilities using ionizing radiation sources, as well as train the trainer courses for Radiation Protection Officers (RPOs), and organizing mentoring sessions for African trainees under the auspices of the IAEA.

I. Regional and International Cooperation

2. Contributing to regional and international cooperation and Networks

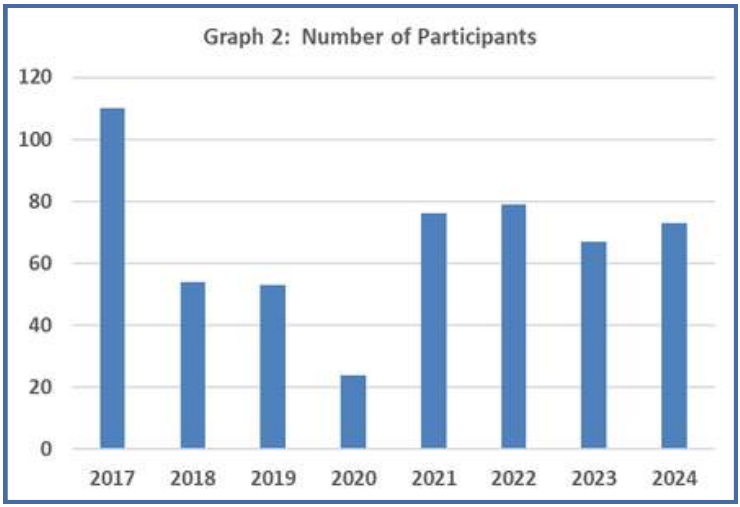
From 2017 to 2024, in collaboration with IAEA and its international partners, AMSSNuR hosted more than 35 regional events aiming to enhance safety of research reactor, international instruments (joint convention, CPPNM, nuclear safety, ..), radiation protection, security of radioactive sources, safeguards and emergency preparedness and response capacity building (see graph 1).



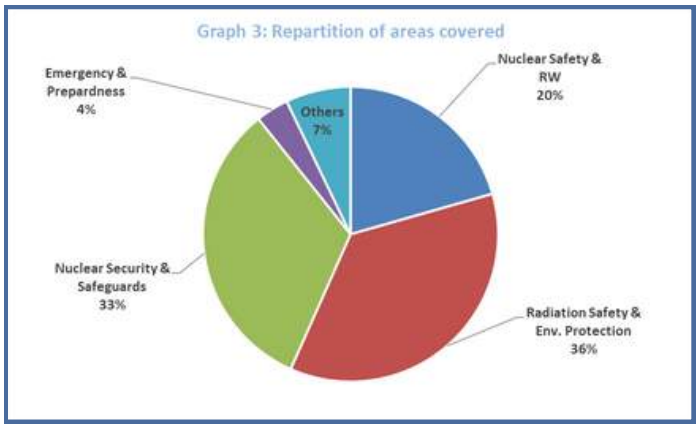
More than 550 representatives of sister regulatory bodies representing IAEA member states in Africa and Arabic countries have received basic and practical training and shared knowledge in nuclear and radiation safety and security (see graph 2).

I. Regional and International Cooperation

2. Contributing to regional and international cooperation and Networks



The events hosted by AMSSNuR covered its core functions mainly radiation safety, nuclear safety, safety of radioactive waste, nuclear security and safeguards, emergency preparedness and response as well as capacity building elements for nuclear and radiation safety and security (see graph 3).



I. Regional and International Cooperation

3. Technical Cooperation Programme 2017-2024

19 Expert missions for 12 African countries

This series of expert missions addresses key areas to support radiation safety, regulatory development, and emergency preparedness across multiple African countries. Efforts include helping national regulatory authorities establishing authorization review and assessment as well as inspection systems, reviewing regulatory frameworks. Additionally, missions focus on implementing integrated management systems (IMS), enhancing capacity for responding to criminal acts involving nuclear materials, and conducting tabletop and national exercises for nuclear security. Several missions also provide guidance on completing profiles for radiation safety information systems, regulatory infrastructure for nuclear safety and security, and training in the use and maintenance of nuclear detection equipment.

I. Regional and International Cooperation

3. Technical Cooperation Programme 2017-2024

35 fellowships and scientific visits

This training program covers various aspects of regulatory control, radiological and nuclear safety, as well as emergency preparedness, tailored to meet diverse trainee needs across different durations. Key areas include extensive training on radiatiological safety regulatory control for 16 participants over 350 days and emergency preparedness and response for eight trainees totaling 140 days. Shorter sessions address regulatory control in nuclear safety, and integrated management systems, each designed to strengthen regulatory competencies. The program also includes one-month training on nuclear and radiation safety and security.

I. Regional and International Cooperation

4. The Third International Regulator's Conference on Nuclear Security

Given the relevance of nuclear and radiological security globally and especially for the African continent, the Moroccan Agency for Nuclear and Radiological Safety and Security (AMSSNuR) convened, under the High Patronage of His Majesty King Mohamed VI, for the first time ever in Africa, the Third edition of this International Conference in Marrakech, Morocco, from 1 to 4 October 2019. This effort further strengthening and sustaining national, regional, and international cooperation, and enhancing capacity building for nuclear security around the world in general and, in Africa, in particular.

350 Participants

35 African Member State

II. Regulatory oversight activities on nuclear safety of Cat I facilities and activities

ACHIEVEMENTS

1. Nuclear Safety Regulatory Framework:

- Draft national nuclear and radiation safety policy.
- Draft decree on "Safety and Authorization of Category I Facilities and Activities".
- Draft ordinances on Periodic Safety Review (PSR), modalities and categorization of Modifications, notification of abnormal events, content of annual report on nuclear safety activities.

2. Development of Capacity Building in Nuclear Safety:

- Recruitment of Staff and Training Programmes.
- Implementation of Inspection programme for TRIGA MARK II research reactor.
- Assessment and review of the annual reports on safety of the research reactor.
- Assessment of safety case related to new experience on Prompt Gamma Neutron Activation Analysis (PGNAA).
- Development and update of inspection procedures and guidance as part of AMSSNuR's integrated management system.

3. International Cooperation:

Contribution to the Nuclear Harmonization and Standardization Initiative (NHSI) of Small and Modular Reactors SMR and IAEA programmes on safety of research reactors and nuclear power plants.

4. Peer reviews:

Conduct of IRRS mission covering safety of TRIGA MARK II research reactor

PERSPECTIVES

1. Enhance Capacity Building in Nuclear Safety:

- Regulatory control of the research reactor based on the inspection of SSCs important for safety.
- Periodic Safety Review.
- Development of training and competences in nuclear safety comprising (fire protection, safety criticality, explosive…).
- Implementation of 8th & 9th peer review recommendations of nuclear safety convention.
- Preparation of 10th review meeting and update of nuclear safety convention, 2026.

2. Promote and foster the safety culture both at AMSSNuR and at national level.

3. Share lessons learned and experiences within

- **The IAEA Global Nuclear Safety and Security Network (GNSSN)**
- **The Forum of Nuclear Regulatory Bodies in Africa (FNRBA)**
- **Arab Network for Nuclear Regulators (ANNuR)**
- **Regulatory Cooperation Forum (RCF)**

III. Regulatory oversight activities on safety of radioactive waste and spent fuel management

1. Nuclear Safety Regulatory Framework:

- Draft national policy and strategy of radioactive waste and spent fuel management.
- Draft decree on safety of radioactive waste management, disused radioactive sources and spent fuel.
- Draft ordinance on modalities of radioactive waste characterization.

2. Development of Capacity Building in Safety of Radioactive Waste:

- Authorization process (40 authorizations per year).
- Implementation of regulatory inspection program of category II facilities and activities generating radioactive waste (40 inspection per year).
- Adoption of Update review, assessment and inspection procedures and guidance as part of AMSSNuR's integrated management system.

3. International Cooperation:

Participation to the 7th peer review of Joint convention, 2022, Participation in the 8th & 9th peer review meetings of nuclear safety convention, 2023 and contribution to IAEA programmes on safety of spent fuel, radioactive waste and DSRS management.

4. Peer reviews:

Conduct of IRRS mission covering safety of radioactive waste and DSRS management.

PERSPECTIVES

1. Enhance Capacity Building in Safety of radioactive waste and DSRS management:

- Implementation of IRRS recommendations, 2024-2025.
- Implementation of national policy and strategy of radioactive waste and spent fuel management.
- Implementation of the regulatory control program of category II facilities generating radioactive waste.
- Implementation of the 7th peer review recommendations of Joint convention.

2. Share lessons learned and experiences within FNRBA, ANNuR, RCF and GNSSN

IV. Nuclear Security and Safeguards

ACHIEVEMENTS

1. Nuclear Security and Safeguards Regulatory Framework:

- Development of Nuclear Security Regulations covering the security of radioactive sources and physical protection of nuclear materials and associated facilities and activities.
- Development a comprehensive national strategy for nuclear detection.
- Establishment of a national plan to search for radioactive sources out of regulatory control.
- Development of a decree establishing a national committee in charge of threat assessment and coordination of nuclear security related matters.
- Regulation on the implementation of the state system of accounting for and control of nuclear material and for the application of Additional Protocol.

2. Development of Capacity Building in Nuclear Security and Safeguards:

- Recruitment of Staff and implementation of a national training program for AMSSNuR and national stakeholders.
- Enhancement of Regulatory Control Regime by strengthening regulatory oversight through authorizations procedures, inspections activities, and compliance measures.
- Providing guidance pertaining to the Security of Category I and Category II high-activity radioactive sources.
- Establishment and maintenance of a national register of radioactive sources.
- Improvement of the quality control of nuclear material accounting reports (use of IAEA software).
- Integration of digital and secure transmission methods of safeguards information to the IAEA.

3. International Cooperation:

- Recognition and Designation by the IAEA as a Regional Collaboration Center for Nuclear Security.
- Designation of AMSSNuR as AFCONE Regional Collaborating Centre for Safeguards.
- Promoting and fostering a strong security culture both at AMSSNuR and national level.

PERSPECTIVES

1. Enhance Capacity Building in Nuclear Security and Safeguards:

- Improving national, regional, and global capability to prevent, detect and respond to nuclear events:
- Deploy the national nuclear detection architecture.
- Approve the regulations relating to nuclear security.
- Enhance and implement a robust nuclear security culture.
- Raise awareness and involve stakeholders and decision makers in nuclear security.
- Meet kingdom of Morocco's obligation with regards of nuclear safeguards and additional protocol.
- Strengthen the regulatory control regime to maintain a high level of compliance in safety and security.
- Continuous improvement of the Moroccan State System of Accounting for and Control of nuclear material.
- Safeguards Outreach Activities for Policy/Decision Makers involved in PA declarations. Implementation of Pelindaba Treaty provisions.

2. Implement adequate procedures for the collection, evaluation, validation, and periodic submission of such information as well as procedures for the facilitation of IAEA inspections.

3. Share lessons learned and experiences within FNRBA, ANNuR, RCF and GNSSN.

V. Legal and Regulatory Framework for Nuclear and Radiation Safety and Security

ACHIEVEMENTS

The upgrading of the national regulatory framework, in accordance with the provisions of law No. 142-12 and the Commitments of the Kingdom of Morocco in the field of nuclear radiological safety and security constitutes the first strategic objective defined in both Strategic Plans of the AMSSNuR for 2017-2021 and 2022-2026.

To this end, AMSSNuR established in 2017 a strategy with an action plan involving all national stakeholders aiming at upgrading the regulatory framework within the required legal timeline (5 years). Subsequently, by the end of 2021, AMSSNuR had submitted to the Head of Government all regulatory drafted texts identified initially. These drafts covered different fields such as :

- Authorization and declarations of activities, installations and associated ionizing radiation sources falling within Category II.
- Protection of workers, public and environment against ionizing radiation.
- Recognition of technical service providers.
- Use of ionizing radiation for medical purposes .
- Security of radioactive sources .
- Implementation of Nuclear Safeguards Agreements.
- Emergency Preparedness and Response;
- Safety of radioactive waste management and spent fuel.
- Authorization of category I facilities and activities.
- Authorization for the extraction and processing of radioactive minerals.

PERSPECTIVES

Until early 2024, and do to the commitment of Moroccan Government and all the stakeholders, four regulatory texts have been published in the Official Bulletin and the rest is yet to come.

In order to enable AMSSNuR to carry out efficiently the missions conferred to her by the law N° 142-12, the Agency will:

- Pursue the coordination with all the stakeholders to accelerate the process approving and publishing the draft regulatory texts that are in assessing stage.
- Review draft texts in order to integrate the recommendations of the audit services held in Morocco.

VI. Radiation Safety

ACHIEVEMENTS

1. Enhanced Radiation Safety Regulatory Framework:

- Developing and updating of regulatory texts ensuring high-level protection for workers, patients, the public, and the environment as well as establishing a robust process, based on a graded approach, of authorization, review-assessment, and of recognition of technical service providers.
- Defining criteria for recognizing technical service providers in radiation protection, guaranteeing the quality, effectiveness and efficiency of such services;
- Tailoring requirements licenses conditions to meet radiation safety needs through a graded approach.
- Fostering a robust "safety and radiation protection culture" shared by AMSSNuR staff and stakeholders.

2. Reorganization of the radiation protection system:

- Decree n°2-23-151 on the radiation protection introduced expert in radiation protection (RPE) and radiation protection officer (RPO) roles as main actors in the field of radiation protection.
- The recent approval of decree no. 2-23-1192 on the recognition of technical service providers in radiation protection “TSORP” will further strengthen this organization by designating recognized TSORP that can both handle initial technical assessments and assume the role of the RPE in an outsourced way.

3. Improving radiation protection of patients:

- Developing regulation on radiation protection of patient outlining guidelines for applying justification and optimization principles in medical practices using ionizing radiation.
- Initiated projects for quality management and enhanced medical practices, with major projects on: (a) providing regulatory assistance to healthcare professional organizations for developing training programs on radiation protection of patient; (b) initiating the implementation of "ESR iGuide" clinical imaging guides; (c) enhancing the role of medical physicists; (d) establishing reference framework for quality assurance.

4. International Activities:

- Recognition and Designation by the IAEA as a Regional Collaboration Center for establishing and strengthening regulatory infrastructure for radiation safety in Africa.
- Appointment of AMSSNuR as member of the Commission on Safety Standards (CSS), of the Radiation Safety Standards Committee (RASSC), and of Transport Safety Committee (TRANSC).
- Contribution as supporting state for implementing The Regulatory Infrastructure Development Program (RIDP).

5. Peer reviews:

- Actively participates in IAEA review missions and advisory services.
- Hosts missions in Morocco and contributes to missions abroad (Integrated Regulatory Services (IRRS), advisory missions (AM), advisory missions on the regulatory infrastructure for radiological safety and nuclear security (RISS) and expert missions (EM).

PERSPECTIVES

- Continuously further enhance radiation safety and protection regulation and implementation to better integrate radiation safety and protection within modern concepts of and approaches to risk governance.
- Strengthening the organization of the radiation protection system.
- Strengthening regulatory functions efficiency.
- Promoting robust safety and radiation protection culture.
- Active pursuit of collaborative efforts in areas such as radiation protection of patients and environmental protection.
- Further sharing AMSSNuR's experience and lessons learned at the regional and international levels.

VII. Environnemental Radiation Monitoring

ACHIEVEMENTS

1. National Strategy Development:
AMSSNuR, in collaboration with national stakeholders, formulated a comprehensive national strategy for environemental radiation monitoring.

2. Strategic Focus:
The strategy, reviewed by IAEA experts, emphasizes three key actions: establishing online environmental radioactivity monitoring, implementing an off-line a national radiological environmental monitoring program, and specific programs for radiological environmental monitoring in the event of nuclear or radiological emergencies.

3. National network monitoring environmental radioactivity:
In 2020, AMSSNuR, in partnership with the Meteorology General Directorate, initiated the setup of a national radiological environmental monitoring network. The first batch of measurement probes was installed in Rabat, Casablanca, El Jadida, Fez, and Tangier.
A gamma spectrometry probe has been added to this first batch, enabling detection of ambient dose rates and identification of radioelements causing environmental has been installed at the AMSSNuR headquarters in Rabat.

4. Expansion:
Acquisition of a second batch of probes in 2021/2022 extends monitoring coverage to Agadir, Laayoune, Oujda, and Nador, achieving 50% national coverage.

5. International Collaboration:
- Collaboration with the European Commission's IRE-Lab department aims to install additional probes and enhance monitoring capabilities over a three-year period.
- Integration with IAEA's IRMIS system marks Morocco as the 51st IAEA member state and the first African country to implement the system.

PERSPECTIVES

- Complete Network Implementation: Ensure full deployment of the environmental radioactivity telemetry network.
- Regulatory Compliance: Implement regulations for technical organizations and environmental radioactivity measurement laboratories.
- System Integration: Connect all monitoring stations to the IRMIS and EURDEP systems for seamless data sharing.
- Enhanced Cooperation: Strengthen partnerships with national and international stakeholders.

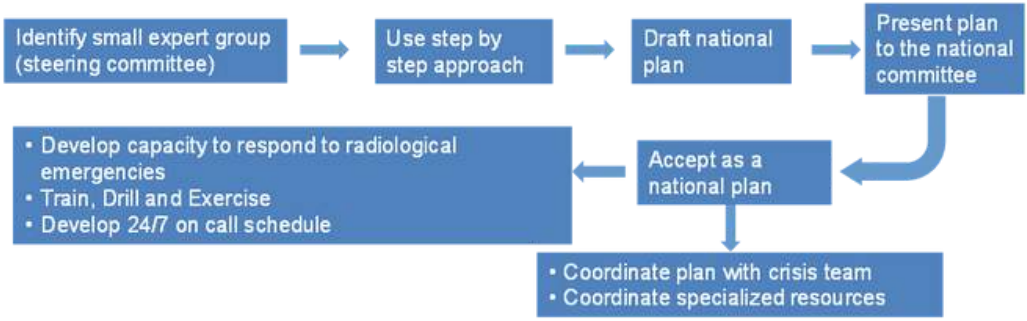
VIII. Preparedness and Response for a Nuclear or Radiological Emergency

ACHIEVEMENTS

1. Regulations & National Plan for Emergency Preparedness and Response (EPR)

- Development of draft regulatory texts covering regulations on EPR in close cooperation with and participation of all relevant national actors involved in EPR in accordance with the requirements of IAEA GSR Part 7, and a National Emergency Plan (NEP) based on a step-by-step approach.

- Step-by-step approach consisting of the development of the national framework on EPR; Operation concept; Hazard assessment; protection strategies during an EPR; etc.



- Establishment of regulatory Reference Levels for the public and emergency workers during emergency exposure situations (Decree No.2-23-151 enacted on 23 November 2023).
- Enhancing measures taken by the licensee to manage accidents and reduce consequences, ensuring on-site staff protection, and rapidly and accurately informing AMSSNuR in case of a nuclear or radiological emergency.

2. IAEA Emergency Preparedness Review (EPREV)

Review of the Emergency Preparedness and Response (EPR) framework for nuclear and radiological emergencies in the Kingdom of Morocco, conducted by the IAEA from 22 October to 2 November 2022, hosted by the Moroccan Agency for Nuclear and Radiological Safety and Security (AMSSNuR).

Main Objective:

- To provide an assessment of Morocco's EPR arrangements and capabilities against IAEA safety standards and to provide a basis for further enhancements.

Main strengths identified by the IAEA EPREV team include:

- A strong commitment to preparedness for nuclear and radiological emergencies among all stakeholders.
- Hosting and participating in training, outreach and capacity building to strengthen national and international EPR.
- The maintenance of a high level of capability throughout the country for field radiological emergency operations.

- Updating the draft regulatory texts on EPR to meet the recommendations of EPREV and IRRS missions of the IAEA.
- Updating the risk map based on the hazard assessment of facilities and activities involving radiation sources in accordance with the publication the IAEA No. GSR Part 7.
- Enhancing the implementation of the provisions of the Conventions on the Early Notification and the Assistance related to Notification, Reporting and Assistance in case of a nuclear or radiological emergency trough Morocco's participation in IAEA Conventional Exercises (IAEA-ConvEx).

PERSPECTIVES

- Development of the Emergency Centre of AMSSNuR through cooperation with the EU, the IAEA and the Department of Energy of the United States.
- Continued sustained efforts to finalize the draft regulatory texts on EPR, including the content of emergency plans at the national, local and on-site levels.

- Updating the hazard assessment for a nuclear or radiological emergency and the risk map for facilities and activities in case of a nuclear or radiological emergency.
- Carrying out a self-assessment on EPR using the Emergency Preparedness and Response Information Management System (EPRIMS) of the IAEA
- Continued sustained development of justified and optimized protection measures for nuclear or radiological emergencies.
- Organizing emergency exercises to test on-site emergency plan provisions.

It is expected that through the implementation of AMSSNuR's action plan 2023 – 2026 on Emergency Preparedness and Response, in cooperation with the relevant departments, the following outcomes will be achieved at both national and regional levels:

- Continuous improvement of emergency preparedness and response arrangements;
- Strengthening of national capacities on EPR;
- Harmonization of EPR arrangements; and
- Ensuring the sustainability of adequate EPR arrangements.

IX. Integrated Management System

ACHIEVEMENTS

After having fulfilled its commitments under the strategic plan for the period 2017-2020 by developing the manual of IMS, policies and mapping the processes, the IMS Unit has started a new phase in accordance with the Strategic plan 2022-2026 which recommends the following actions.

- Complete the implementation of pilot processes and continue the implementation of other processes, draft reports that are subsequently approved by general management.
- Identify areas for improvement.
- Start the Internal process audit.
- Management review of core and management processes.
- Initiate the core processes certification ISO 9001.
- Participate in the sessions of the IRRS mission.
- Digitize all the documentation of IMS on a digital platform.

1. IRRS Mission

The IRRS mission recognize AMSSNuR's timely establishment of a comprehensive integrated management system as a good performance.

The dematerialization strategy advocated by AMSSNuR has also been put into practice with the development in 2023 of the digital platform for IMS documentation.
This action also meets the IAEA's requirement for documents to be made easily available to users.

PERSPECTIVES

- Developing new processes and procedures to meet new needs.
- Creating new versions of processes, based on areas of improvement.
- Extending internal audit to other processes.
- Finalize process management reviews to complete all stages of the implementation process.
- Obtaining certification ISO 9001 of AMSSNuR's Activities
- Share the experience of the AMSSNuR's management system with similar organizations in Africa.

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