The Role of the Safety Authority in the Study of Reactor Projects: Experience of Morocco

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Outline

1. National Context (population, energy, electricity, water, medicine...)

2. Moroccan experience (Research reactor, feasibility study for NPP and sea water desalination, National and international aspects of legislative and regulatory framework)

3. AMSSNuR contribution in implementing INIR recommendations
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National Context

Population: 33.5 inhabitants (Growth rate 1%)
Surface: 710,850 km²
GDP: 3,400 US $/Capita

Energy Consumption: 0.57 Tone oil equiv. per capita
Electrical Consumption: 27,000 GWh (in 2015)
Energy dependency: 90%
Imported Electricity: 17% (2015)
Renewable energy: 18% (2015) → 52% (2030)

4500 X Rays medical equipment
350 Medical accelerators
20 Nuclear Medicine Centres
2 Cyclotrons

Research reactor 2 MW power
30 NDT Companies

Water resources: 500 m³ per year per inhabitant
Continuous needs in agriculture, industry and tourism
Environment: Reduction of 52% CO₂ emission by 2030
Moroccan Experience: TRIGA Reactor

Key Dates

1. February 2009: The operating license was given by the Ministry of Energy and Mines (Safety Authority).

Main Applications

1. Neutron Activation Analyses;
2. Radioisotopes production;
3. Education & Training;
4. Research.

Nuclear Safety Aspects

1. Development of a considerable base of knowledge and experience in nuclear activities;
2. Contribution to a comprehensive nuclear law 142-12, which established in 2016 an independent regulatory body ‘AMSSNuR’;
3. AMSSNuR is analysing other legislation that may impact the nuclear project.
Moroccan Experience: Feasibility Study for NPP

Key Dates

1. 1983-1993: Morocco conducted a preliminary feasibility study for NPP;
2. 1993: The government created the Nuclear Energy National Council (CNEN) which is an advisory body chaired by the Prime Minister. Three committees under this council addressing Legal and regulatory, international co-operation and nuclear power promotion were established under the supervision of the Department of Energy.
3. 2009: In the framework of the national energy strategy which considers nuclear power as an alternative option by 2030, the Department of Energy created a committee (CRED) with the main objective of developing a strategy for the possible introduction of nuclear power in Morocco to produce electricity and/or desalinate sea water;
4. 2013: CRED prepared a Self-Evaluation Report (SER) based on IAEA milestones methodology;
5. 2015: with the assistance of the IAEA, Morocco conducted the INIR mission focused on the status of the national infrastructure conditions covering all of the 19 infrastructure issues. The INIR mission was focused on the conditions for phase 1.
Moroccan Experience: Feasibility Study for NPP

Main INIR Recommendations

1. Government Commitment and Involvement:
   - To support the decision making process regarding the nuclear power programme,
   - To develop a master plan with a timeline indicating major activities to be conducted and identifying the organizations responsible for their implementation.

2. Adapting the legislative and regulatory framework for the nuclear power programme:
   - To develop a plan for establishing a national policy and strategy for safety, expressing its long term commitment to safety and setting out the mechanisms for implementing this policy,
   - to ensure appointment of senior leaders in key organizations with appropriate training and experience for the leadership and management of safety.

3. Preparing the key organizations for Phase 2 of the nuclear power programme.
Moroccan Experience: National aspects of Legislative and Regulatory framework

Decree 2-94-666 of 7 December 1994:
Related to the authorization and the inspection of nuclear facilities:
- It foresees five types of authorization:
  1. Construction,
  2. Discharge of liquid and gaseous effluents
  3. Commissioning
  4. Operation
  5. Final shutdown
- It prescribes conditions for obtaining each authorization.
- It foresees responsibilities of license holders.
- It defines the modalities of inspections and penalties.

Decree 2-97-132 of 28 October 1997 (Still in force):
- Related to the use of ionizing radiation in medical and dental practices.
Moroccan Experience: National aspects of Legislative and Regulatory framework

Decree 2-97-30 of 28 October 1997 (Still in force):

- Related to protection against ionizing radiations
- Designates the Ministry of Health (National Centre for Radiation Protection): radiation, transport and waste safety authority responsible for regulatory functions within ionizing radiation sources.

Law 142-12 on nuclear and radiological safety and security and the creation of an independent regulatory body AMSSNuR:

- It defines the process authorization, notification, control and inspection of all activities using ionizing radiation sources and provides enforcement provisions and penalties in case of violations of its provisions.
- It addresses the aspect related to transport of radioactive materials, radioactive waste management, public information, agreement to service providers, setting up of national emergency plan, the national physical protection system and the national system of accounting and control nuclear materials.
Moroccan Experience: International aspects of Legislative and Regulatory framework

1. Morocco: MS of the IAEA since 1957

2. Morocco signed and ratified the majority of international treaties and conventions:

- Nuclear Treaty on Non-Proliferation of Nuclear Weapons (NPT), ratified, November 1970,
- Convention on the Physical Protection of Nuclear materials, ratified August 2002, amendment ratified in 2015,
- Convention on Early Notification of Nuclear Accident, ratified October 1993
- Convention on Assistance in case of Nuclear Accident or Radiological Emergency, ratified, October 1993,
- Convention on Nuclear Safety, signed in December 1994,
- Joint Convention on Safety of Spent Fuel management and Safety of RWM, ratified, July 1999
- Additional Protocol to safeguards Agreement, ratified 2011
AMSSNuR contribution in implementing INIR recommendations

To ensure compliance of the radiological and nuclear safety and security of all the activities and facilities involving ionising radiation sources with the provisions of the Law 142-12 and associated regulations, and Morocco’s international obligations.

AMSSNuR Main Missions

To establish itself as an independent, efficient, credible and transparent regulatory body.
Develop and update the existing regulatory framework

Law n° 142-12 on nuclear and radiation safety and security and the creation of the Agency responsible for ensuring the control

Develop the implementation of the national nuclear security system and the national emergency plan

Strengthen the level of nuclear and radiological safety and security

Establish strategies to set communication, national and international cooperation, Integrated management system
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AMSSNuR Action Plans: Upgrading the regulatory framework

1. Adopt consultative Approach
2. Define priorities
3. Establish a participative action plan
AMSSNuR Action Plans: Upgrading the regulatory framework

Main Nuclear Safety projects

1. Establishment of new regulation of nuclear installations covering the authorization and control regulatory process.

2. Preparation of an inspection programme for the research reactor.

3. Elaboration of research reactor safety guides and inspection procedure.

4. Establishment of new RWM regulations.

5. Elaboration of a national policy and strategy for radioactive waste and spent fuel management.

6. Ratification of the nuclear safety convention.
AMSSNuR Action Plans: Upgrading the regulatory framework

Main Nuclear Safety projects

1. Establishment of new regulation of nuclear installations covering the authorization and control regulatory process.

Concerning the nuclear safety aspects, the AMSSNuR’s action plan is focused on the establishment of new regulation of nuclear installations covering the authorization and control regulatory process. Founded on the IAEA guides, AMSSNuR’s team is progressing on the regulatory benchmark of different regulations (Canada, Belgium, France, and USNRC)

2. Preparation of an inspection programme for the research reactor.

- With the support of the IAEA, AMSSNuR is implementing a regulatory inspection programme for the TRIGA MARK II research reactor.
- AMSSNuR organized, by the beginning of September 2017 an expert mission on establishment of Regulatory Inspection Programme where its staff was trained on the area inspection.
- In collaboration with CNESTEN, the AMSSNuR team curried out a regulatory surveillance visit to this facility and preparatory work for a regulatory inspection.
Radioactive Waste Management: National Status

1. CNESTEN is the national operator of RWM which operates national interim storage facility at Maamora Nuclear Research Centre;

2. More than 500 DSRS (cat 4-5) were dismantled and stored in two appropriate containers. TWO sources of cat 1 are stored in CNESTEN and one cat 1 is stored in private clinic.

3. Repatriation of 6 Disused Sealed Radioactive Sources to France;

4. First spent fuel element will be generated from RR in next coming years;

5. Law 142-12 on nuclear safety and security was adopted in 2014;

Draft policy and strategy of RWM recognizes the following options:

1- **Repatriation option**: the law 142-12 gives priority to repatriation of DSRS to their suppliers

2- **Transfer to national interim storage facility**: in the case of the first option is not possible

3- **Decay and release**: Storage in the local premises in the case of short level period

4- **Disposal option**: Disposal is recognized by the policy ultimate solution but not yet a decision made about it
Radioactive Waste Management: National Status

1. **International commitments:**
   - Joint Convention of SSSFM and SRWM
   - **Nuclear safety convention**

2. **Development of regulation associated with the law 142-12**
   especially:
   - Regulation of predisposal activities of RWM
   - Regulation of disposal activities of RWM
   - Regulation dealing with management system for nuclear facilities

3. **Capacity building**
   - Training of regulator staff in all areas dealing with SRS management
   - Continuous enhancement of operator capabilities dealing with DSRS management.
Devise a transparent communication policy with public institutions, operators, universities, professional associations, civil society, etc..
AMSSNuR Action Plans: International Cooperation

1. Uphold Morocco’s commitments with regards to conventions it has ratified;

2. Include international standards and guidelines in the update of the national regulatory framework.
3. Develop AMSSNuR’s notoriety as an independent, competent, transparent, efficient, and credible regulatory body on a national, regional and international level;

4. Diversify cooperation relationship with international partners.
1. Enforce and maintain staff skills and competences, and instil a professional and regulatory work ethics;

2. Develop good practices of governance and management.
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AMSSNuR Action Plans: RH Development

1. Enforce and maintain staff skills and competences, and instil a professional and regulatory work ethics;

2. Develop good practices of governance and management.
AMSSNuR Action Plans: RH Development

Main AMSSNuR’s Actions

• Senior managers as well as junior inspectors participated in different workshops in international levels related to all the fields covered by the AMSSNuR organized by the IAEA, RCF, FNRBA, ANNuR and TSOs.

• As a Moroccan regulatory body, AMSSNuR organized 13g events including Workshops and IAEA expert missions in 2017 and expect to organize more in 2018.
1. AMSSNuR established clear and comprehensive strategy, programmes and action plans to upgrade and strengthen the national nuclear and radiological regulatory framework especially regarding to NPP projects;

2. However, AMSSNuR will face challenges related to RH development and confirming itself as a national regulatory body independent and credible.
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Thank you for your attention