



Management of Disused Sealed Radioactive Sources: Moroccan experience

Presented by:

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Introduction

- ❑ The use of Sealed Radioactive Sources (SRS), in Morocco, started very early (1929). radium sources were already being used for medical purpose in oncology service of Ibn Rochd hospital in Casablanca
- ❑ A source is considered disused when it is no longer needed or it becomes unfit for the intended application
- ❑ there are two options
 - Returning the disused source to the supplier
 - Transferring the disused source to the central waste management facility (CNESTEN)



Legislative framework

Regulation	Year	Description
Law 71	12 October 71	This law introduces the principles of licensing and control of activities involving radioactive materials and penalties .
Law 17-83	14 November 86	CNESTEN established and assigned the responsibility of managing radioactive waste including DSRS
Decree 2-94-666	7 December 94	Provides for the control and authorization of nuclear installations. There are four articles that address the management of radioactive waste
Decree 2-97-30	28 October 97	These Decrees regulate the radiation protection aspects
Decree 2-97-132	28 October 97	
Decree 2-99-111	26 February 99	Law authorizing construction of the Nuclear Energy Research Center (CENM):
Dahir n° 1-99-126	19 mai 2000	Decision to publish in the Official Bulletin, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

There is however a proposed law which is expected to bring greater clarity to radioactive waste management requirements



International context

□ IAEA

- Code of Conduct for Safety and Security of Radioactive Sources (Supported).
- Guidance on the Import and Export of Radioactive Sources (Supported, Contact point: CNRP).
- Adherence to Illicit Trafficking Database (ITDB) program.
- Convention on assistance in the case of a Nuclear Accident or Radiological Emergency (Signed in 26 sep. 1986).



National Regulators

- Two regulatory bodies:
 - Ministry of Energy and Mines (Nuclear installations)
 - National Center of Radioprotection (CNRP), Ministry of Health (Radiation safety authority)
 - Authorizations and inspections,
 - Safety and security assessment,
 - Enforcement,
 - Emergency preparedness and response,
 - Education and training,
 - Public awareness.

- CNESTEN



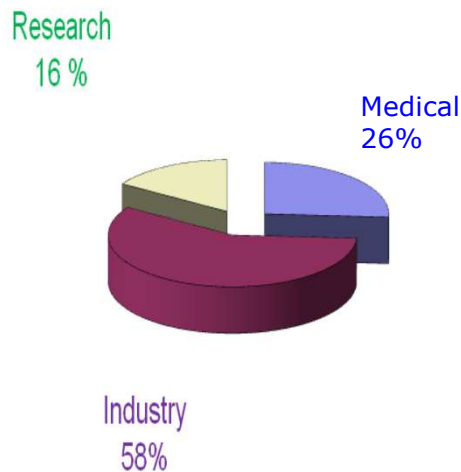
Inventory

- ❑ One of the important aspects of the management of spent sealed sources is the implementation of a national inventory of disused sealed sources as it described in Code of Conduct on the Safety and Security of Radioactive Sources
- ❑ Since the promulgation of the law 71, Morocco introduced a licensing system for users using radioactive sealed sources. The national inventory centralizes the authorizations issued related the sealed sources during its life cycle
- ❑ The national inventory is updated every year and it's available for any government agency. This approach ensures transparency in sharing the information related to radioactive sealed sources
- ❑ Beside the national inventory, each user of radioactive sealed sources is required to have an up to date registry



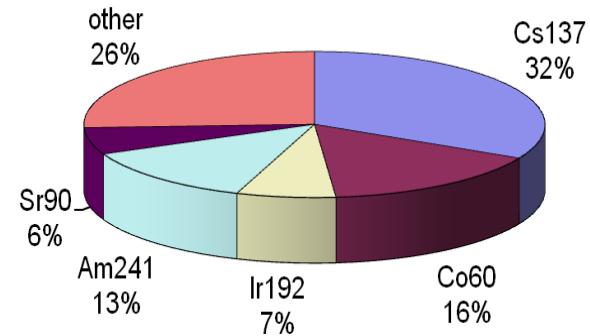
Overview of radioactive sources in Morocco

1500 radioactives sealed sources used in 150 establishments



UTILIZATIONS

RADIONUCLIDES

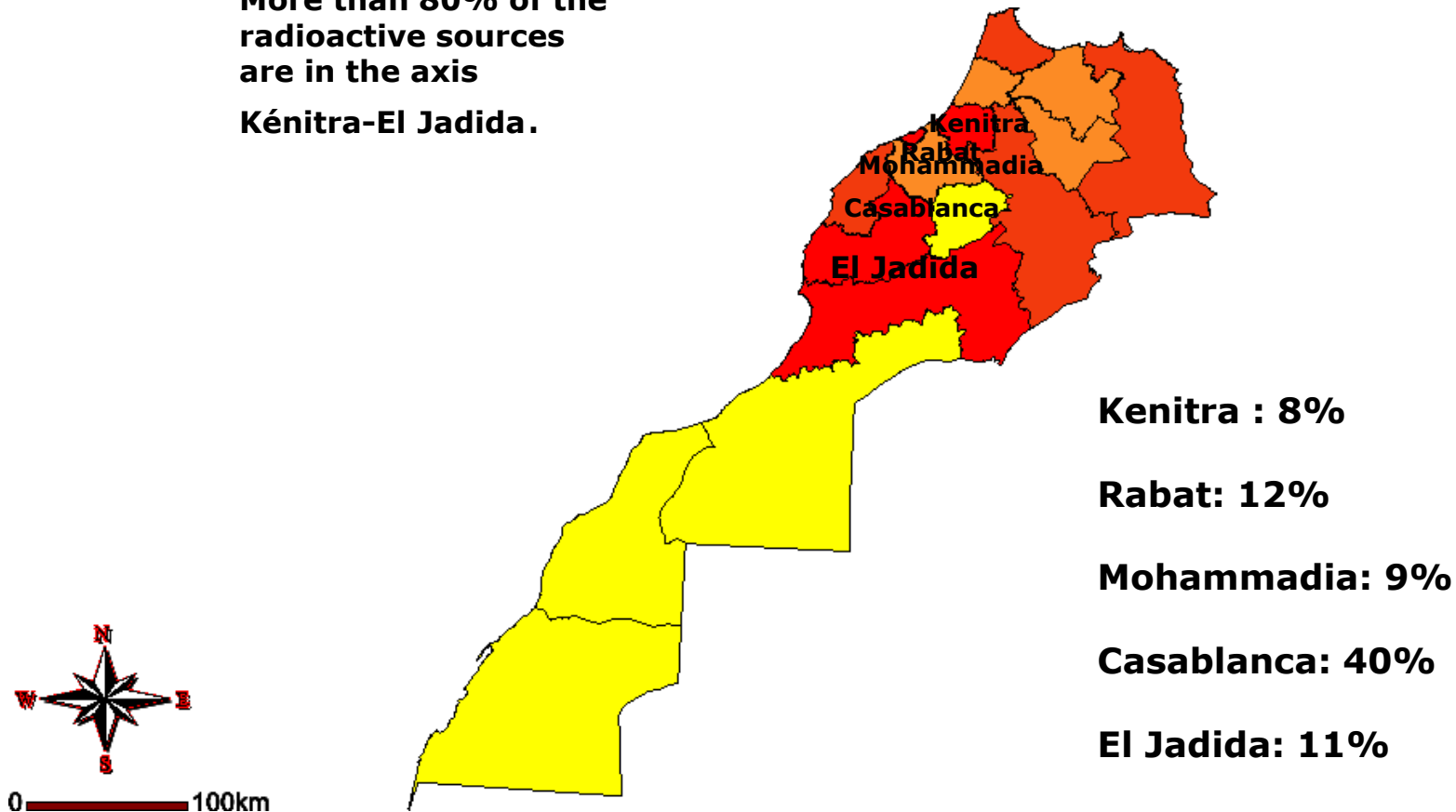




Overview of radioactive sources in Morocco

More than 80% of the radioactive sources are in the axis

Kénitra-El Jadida.





Inventory of spent sealed sources

- ❑ Spent sealed sources (Co60; Cs137; Am241; Rd226; neutron sources) 250 sources
- ❑ SHARS (2 teletherapy heads Co-60; two teletherapy heads Cs-137at CNESTEN, two teletherapy heads Co-60 at two private clinics)
- ❑ Tc generators (120)
- ❑ Smoke detectors (120)
- ❑ Lightning rods (5)

Radiological control on borders

Pilot unit for radiation monitoring and control



- **Agreement between CNRP, National Agency of ports (ANP) and Customs Administration, for installation of radiation portal monitors at additional ports**
- **A draft law on illicit trafficking of dual-use goods (support of USA and EU),**
- **Initiation of a project to establish a Strategic Exports Control, (support of USA).**

Radiological control of scrap metal



- **Preventing accessibility to radioactive sources,**
- **Preventing radiological incidents and accidents,**
- **Regaining the orphan sources**



Management of disused radioactive sources

- The management of Disused Sealed Radioactive Sources remains a challenge for Morocco:
 - To avoid radiological accident due to the loss of radioactive source
 - Morocco has no final disposal option
- When the radioactive sources become disused there are two options:
 - Return the disused sources to supplier
 - Transferring the disused sources to CNESTEN, the operating organization
- Different stages in the management system are:
 - Temporary storage at user's premises
 - Transport to waste management facility
 - Treatment and conditioning
 - Long term storage



Orphan sources

- In case of orphan sources, the regulatory body has established a following mechanism to manage them:
 - The regulatory body takes control of the sources to ensure its safe storage and find the owner if possible. Orphan sources, whose owner can't be identified, are transferred to CNESTEN for its management
 - If the orphan source was found in a facility, the owner of the facility should inform the regulatory body and according to the law he becomes the responsible of the safety of the source until the source is transferred to the CNESTEN

IAEA ITDB



IAEA Illicit Trafficking Database (ITDB)
 IAEA Information System on Illicit Trafficking and other unauthorized activities involving nuclear and radioactive materials

Status:(check one):

- Initial Notification
 Update on Previous Incident

IAEA ID#:

(Enter the IAEA ID# if this is an update. Otherwise, leave blank)
 Send to: IAEA Illicit Trafficking Database Office
 FAX: +43-1-2600-29250
 Email: trafficking@iaea.org

PART I: General information			
Information provided in this section will be disseminated by the IAEA to all Member States participating in the ITDB programme, IAEA Member States not participating in the ITDB programme and selected International Organizations.			
1. Date of incident: 5 November 2006 (e.g. 10 November 98, do not use number to designate month)		2. Country: Morocco (where incident occurred)	
3. Nature of incident: (See Instructions to select the appropriate category.)		4. Location: Casablanca (location within the country; i.e., city, airport, highway, rail station, etc.)	
Materials involved in the incident:			
5. Nuclear Material		6. Radioactive Sources	
<input type="checkbox"/> Natural Uranium	<input type="checkbox"/> LEU (<20% ²³⁵ U)	Nuclide	Sealed/ unsealed
<input type="checkbox"/> Depleted Uranium	<input type="checkbox"/> HEU (≥20% ²³⁵ U)	Co 60	Sealed
<input type="checkbox"/> Thorium 1	<input type="checkbox"/> U-233	Co 60	Sealed
<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Plutonium		
Isotopic content: (% ²³⁵ U, ²³⁵ U, ²³⁹ Pu content)		Activity <input checked="" type="checkbox"/> Bq or <input type="checkbox"/> Ci	
Quantity: <input type="checkbox"/> g/ <input type="checkbox"/> kg		Category (SG-R-19) To be filled by IAEA	
8. Chemical description: (e.g. U ₃ -O ₈ , Oxide, Metal, UF ₆ , KI, tritiated water, etc.)		7. Other materials	
9. Physical description (e.g. pellets, powder, fuel element, dimensions, etc.) and application (see instructions)		Radioactively Contaminated Material (specify):	
		Naturally Occurring Radioactive Material (specify):	
		Other or Unknown (see instructions):	
10. Comments: The loss of the two radioactive sources incorporated in two gauges level devices was discovered during a regulatory control carried out by the National Centre for Radiation Protection, Ministry of Health.			

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The loss of two radioactive sources was discovered during a regulatory control carried out by the CNRP and notified to IAEA

International cooperation

- Morocco has participated in African Regional Cooperative Agreement (AFRA) projects related to radioactive waste management
 - Through this project, Morocco has greatly benefited in terms of expert missions, on job training course, conditioning of radium sources and various equipments that have been received for waste management use
- In the near future, Morocco planned to have the assistance of IAEA:
 - To return the spent high radioactive sources to their supplier
 - To condition disused radioactive sources, mainly gauges and smoke detectors, by removing sources from their shielding

Challenge

- ❑ Promulgation of specific regulation to radioactive waste including sealed radioactive sources
- ❑ The elaboration of an exhaustive national inventory of sealed sources
- ❑ Lack of Final Disposal Options
- ❑ Waste acceptance criteria for long term storage taking into account disposal
- ❑ Conditioning or repatriation of SHARS and neutron sources
- ❑ Financing of the management of disused sealed radioactive sources
- ❑ Legal obligation to send DSRS to centralized waste management installation (CNESTEN)



Conclusion

- ❑ The sealed radioactive sources are used in Morocco for various applications. After their operational life they are stored at the facility and transferred to the CNESTEN
- ❑ The management of disused sealed radioactive sources is an important issue, which is considered by Moroccan authorities to be resolved in accordance with accepted international standards and with national regulations in order to avoid any radiological accident which could have a negative impact on society
- ❑ Morocco has a regulatory system which requires users to obtain a license for the importation, using, transportation and conditioning of sources
- ❑ Until the disposal facility will be available, long term storage is the option adopted in Morocco
- ❑ Morocco appreciates the assistance provided by the IAEA in enhancing and improving our radioactive waste management system



Thanks for your attention