



**Energy and Minerals Regulatory
Commission (EMRC)**



International Peer Review Missions, Jordan's Experience

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March-2015

Current and future Nuclear Projects

1. Jordan Subcritical Assembly.
2. Jordan Research and Training Reactor (JRTR).
3. SESAME Synchrotron Facility.
4. Uranium Exploration and Mining.
5. Jordan Nuclear Power Plant.

Jordan Subcritical Assembly License

- 🏗️ Subcritical Assembly
- 🏗️ Completely assembled on site
- 🏗️ Provides more than 8 principle nuclear experiments for nuclear engineering students
- 🏗️ The owner of the facility is the Jordan University of Science and Technology



Jordan Research and Training Reactor (JRTR) License

1. Training Center



Jordan Research & Training Reactor (JRTR) is a 5 MW multipurpose research reactor located inside the campus of Jordan University of Science & Technology, utilization purposes, includes:

- 1) Education and training.
- 2) Radioisotopes production.
- 3) Neutron beam applications.
- 4) Semiconductor Doping .

located inside the campus of Jordan University of Science & Technology, away from the University building about (4) km.

Licensing of Jordan Research and Training Reactor (JRTR).

- ✚ JAEC Contracted KDC to Build a 5 MW RR in March 20 10.
- ✚ CP was Granted in Aug. 15th 2013.
- ✚ FSAR was officially submitted Dec. 2014. Now EMRC is working on OL
- ✚ Fuel Loading anticipated Oct. 2015.

SESAME – Synchrotron Facility License



SESAME Project



Jordan Nuclear Power Plant License

- ⚠ One of the recommendations of the integrated strategy plan for the energy sector was to consider the nuclear power option for electricity generation and water desalination.
- ⚠ Russian VVER technology was selected for two units, each a 1000 MW.
- ⚠ First to go online 2023.

Jordan Nuclear Power Plant License

- ⚠ EMRC is currently working on its regulatory framework to accommodate NPPs.
- ⚠ EMRC is working now on capacity building programs through the IAEA and other Bilateral options.

Nuclear Security and Radiological Emergencies Preparedness

Two higher committees were established by the order of the cabinet:

1. National Nuclear Security Committee.
2. National Emergency Committee.



Radiation Protection

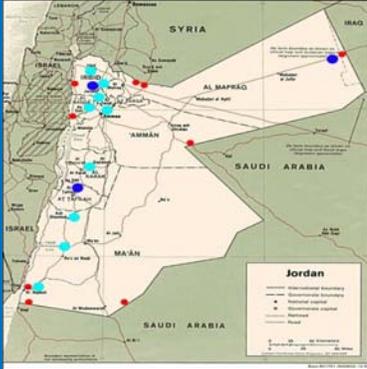


Radiation Protection and Personnel Monitoring

EMRC issued 1565 licenses in 2014 as follows:

| No | Item |
|-----|--|
| 849 | Personal radiation worker license. |
| 326 | Radiation sources or RGE licenses. |
| 390 | Import or transit and export licenses. |

Border Monitoring



Environmental Monitoring Stations

- 🏠 Remotely connected to HQ.
- 🏠 Automatic Gamma, and Gross Alpha/Beta counts.

Laboratories

Analyzing samples collected randomly from shipments at the borders or samples collected for environmental studies.



International Peer Review Missions

IAEA Missions that Visited Jordan

- 🚩 Integrated nuclear Infrastructure Review Mission-Phase 1 INIR, 2009.
- 🚩 Integrated Regulatory Review Service (IRRS), 15-25 June 2014.
- 🚩 Integrated nuclear Infrastructure Review Mission-Phase 2 INIR, August 2014.
- 🚩 Emergency Preparedness and Review Mission (EPREV), 6-16 May 2013.
- 🚩 Integrated Nuclear Security Support Plan INSSP, expected May 2015.

The IRRS Process

The IRRS process consists of the following phases:



Purpose of the IRRS Mission

- Review the existing Jordanian regulatory framework for nuclear and radiation safety.
- Review the safety infrastructure for the nuclear power programme.
- Share experiences and learn from each other through discussions.
- Increase international networking of the regulatory staff

Integrated Regulatory Review Service (IRRS)

15 Experts:

- 12 international experts, senior regulators from Brazil, Bulgaria, Canada, Egypt, France, Ireland, Lebanon, Sweden, Turkey, UAE and the USA.
- 3 IAEA staff members.
- 1 IAEA Administrative Assistant.
- 2 Observers from Japan and Malaysia.

Areas Covered by IRRS Mission

- All facilities regulated by EMRC included
- All core modules of the IRRS: Responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of EMRC; the management system of EMRC; the regulatory activities of EMRC; emergency preparedness and response
- Additional areas : occupational radiation protection, patient protection, transport
- Tailored module for countries embarking on a nuclear power programme

IRRS Methods

- Review of Self-Assessment report and Advanced Reference Materials.
- Discussion with counterparts from EMRC.
- Policy issue discussions.
- Meetings with Ministries, JAEC.
- On-site observations

General Observations

- The radiation and nuclear safety regulatory body is facing challenges.
- JNRC has been merged in EMRC, together with other regulators with quite different objectives.
- Jordan is embarking on a nuclear power programme.
- The new EMRC structure and revision of the relevant law represents a vital opportunity to strengthen Jordan's radiation and nuclear safety regulatory infrastructure

General Observations

- The Government should demonstrate its commitment to safety by:
 - issuing a national policy and strategy for safety.
 - further clarifying the role of the Ministry of Energy.

Challenges Over the Next Years

- Establishing the new organization.
- Commissioning and operation of JRTR.
- Preparation for regulating the nuclear power program.

Strengths of EMRC

- Young, committed and dedicated Staff.
- Jordan is contributing to and making good use of the global nuclear safety regime.
- EMRC is promoting safety culture, including through inventive ways.
- Orphan and disused radioactive sources are transferred for safe storage to a radioactive waste storage facility.
- EMRC has a resident inspector at the construction site of the Jordan Research and Test Reactor.

Areas for Improvement

- The government should ensure that EMRC is provided with adequate human resources with the necessary competence to effectively regulate nuclear and radiation risks in the country.
- EMRC should develop urgently its human resources development planning and establish its internal systematic training programme for current and new staff. As a part of the human resource planning, the Government and EMRC should identify and implement innovative approaches to attract and retain highly qualified staff.

Areas for Improvement

- 🚩 The Government and EMRC should complete the regulatory framework as soon as possible by issuing the regulations and instructions that have been in draft for some time.
- 🚩 In further developing the legal and regulatory framework, the Government and EMRC should also include the requirements for the safety infrastructure of a nuclear power programme.

Areas for Improvement

- 🚩 EMRC should continue to improve its integrated management system, particularly to define, document and implement the core regulatory processes and functions
- 🚩 EMRC should more effectively use a graded approach based upon radiation risks in licensing, review and assessment and inspection, to allow it to focus on higher priority areas

Current Status

- 🚩 The mission report was officially sent to Jordan.
- 🚩 Jordan made the report publicly available.
- 🚩 Jordan developed an action plan for the implementation of the Recommendations and Suggestions.
- 🚩 Jordan is going to invite an IRRS follow-up mission within 2 years.

Thank You
