

# THE RESEARCH REACTORS IN ARAB COUNTRIES: THE AAEA ROLE IN EFFECTIVE UTILIZATION

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## Abstract

There are eight research reactors operating at present in the Arab world. The level of their operation and utilization differs from one country to another depending on the individual situation in a particular country. Some other Arab countries are constructing or planning to build new research reactors. These RRs are mostly used in: analysis of the structure of matter, radiation damage studies to develop better materials for nuclear and industrial applications, neutron activation analysis for accurate determination of elemental concentrations in material, production of isotopes that are used in biology, medicine, agriculture, industry, hydrology and research and training of scientists, engineers and technicians needed to support the nuclear power industry. This paper describes the role of the AAEA in the promotion of peaceful utilization of atomic energy in Arab states.

## 1. INTRODUCTION

The Arab Atomic Energy Agency (AAEA) is a regional specialized organization working within the framework of the League of Arab States to coordinate the scientific efforts of the Arab Countries in the field of peaceful uses of atomic energy. It contributes also to the transfer of the peaceful nuclear knowledge and technologies.

One of the most important tasks of AAEA is to coordinate between Arab states to share their laboratory facilities and develop the human resources which have the capabilities of assimilating the nuclear knowledge and its application. The use of nuclear research reactors depends heavily on the availability of qualified scientists, engineers and technicians. Many Arab countries still have insufficient training capabilities in nuclear fields, and are experiencing problems with high staff turnover and shortage of specialized professionals in these areas.

## 2. PROJECTS OF THE AAEA

AAEA sponsored a coordinated research projects [1] put down by Arab experts according to the needs of sustainable development in Arab states and implemented within the human and technological resources available in the country and sharing of laboratory and technological capabilities with other AAEA member states.

The projects are accompanied by continuous cooperation between researchers and by human resources development and expert missions for the participating researchers and technicians in order to improve their skills and performances. The ultimate objective of the coordinated research projects is to define and develop the preliminary steps and methods necessary to help in establishing a sound research and utilization program of available RRs in the Arab region.

Many activities have been undertaken by the AAEA related to the utilization of RRs such as training courses, on-the-job training, training schools, scientific visits, and scientific and experts meeting. These activities cover a wide range of subjects related to RRs. Following are some of the training subjects undertaken regularly by AAEA:

- Research reactors: Design, operation and applications;
- Neutron activation analysis using RRs;
- Reactor safety and security systems;
- Radiation protection, regulations and legislations;
- Emergency plans, waste management, monitoring and early warning;
- Modelling of nuclear accidents and their effects on the environment and public health;
- Workshops and fora about the applications of RRs.

The research reactor is a very versatile tool, that when used effectively, can contribute to a country's technological and scientific development. As most of the research reactor facilities are not being utilized fully, therefore AAEA regards that its technical cooperation projects between Arab countries in the field of RRs utilization are of the interest of long-term sustainability of RRs utilization programmes. Therefore, countries which do not have a RR can benefit a great deal from these AAEA activities and enjoy the facilities they do not possess.

Below we summarized the characteristics of the research reactors in Arab countries; more details can be found in the IAEA research reactors data base[2]

TABLE 1: STATUS OF RESEARCH REACTORS IN ARAB COUNTRIES, INCLUDING CRITICAL AND SUB-CRITICAL FACILITIES, [2]

Country	Facility name	Thermal power (kW)	Type	Status	Criticality date
Algeria	ES-SALAM	15,000.00	Heavy water	Operating	1992/02/17
Algeria	NUR	1,000.00	Pool	Operating	1989/03/24
Egypt	ETRR-1	2,000.00	Tank WWR	Operating	1961/02/08
Egypt	ETRR-2	22,000.00	Pool	Operating	1997/11/27
Iraq	IRT-5000	5,000.00	Pool, IRT	Shut down	1967/01/01
Iraq	TAMMUZ-2	500.00	Pool	Shut down	1987/03/01
Jordan	JRTR	5,000.00	Tank in pool	Planned	
Jordan	JSA - Jordan Subcritical Assembly	0.00	Subcritical assembly	Under construction	
Libya	IRT-1	10,000.00	Pool, IRT	Operating	1981/08/28
Libya	Tajura Critical Stand	0.00	Critical assembly	Operating	1981/08/28
Morocco	MA-R1	2,000.00	TRIGA Mark II	Operating	2007/05/02
Syrian Arab Republic	SRR-1	30.00	MNSR	Operating	1996/03/04

## REFERENCES

- [1] ARAB ATOMIC ENERGY AGENCY, Arab Strategy for Peaceful Use of Atomic Energy up to 2020, AAEA, Tunis (2008) (in Arabic).
- [2] INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Research Reactor Database, <http://nucleus.iaea.org/RRDB/>.