

## Challenges of Research Reactors Optimal utilization in Arab Countries

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There are eight research reactors at present in the Arab world, one under construction, another one planned and two shutdown and decommissioned. The level of their operation and utilization differ 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.

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.

AAEA sponsored a coordinated research project 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 project is 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 project 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 AAEA related to the utilization of RRs such as; training courses, on-the-job training, training schools, scientific visits, scientific and experts meeting. Those 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 fully utilized, therefore AAEA regards that its technical cooperation project between Arab countries in the field of RRs utilization is of most interest on 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 availability of facilities they do not have.

Below we summarized the characteristics of the research reactors in Arab countries

Country	Facility Name	Thermal Power (kW)	Type	Status	Criticality	Date
Algeria	ES-SALAM	15,000.00	HEAVY WATER OPER	1992/02/17		
Algeria	NUR	1,000.00	POOL OPER	1989/03/24		
Egypt	ETR-1	2,000.00	TANK WWR OPER	1961/02/08		

Egypt ETRR-2  
 22,000.00 POOL OPER 1997/11/27  
 Iraq IRT-5000  
 5,000.00 POOL, IRT SHUT 1967/01/01  
 Iraq TAMMUZ-2  
 500.00 POOL SHUT 1987/03/01  
 Jordan JRTR  
 5,000.00 TANK IN POOL UC  
 Jordan JSA - Jordan Subcritical Assembly  
 0.00 SUBCRIT OPER  
 Libya IRT-1  
 10,000.00 POOL, IRT OPER 1981/08/28  
 Libya Tajura Critical Stand  
 0.00 CRIT OPER 1981/08/28  
 Morocco MA-R1  
 2,000.00 TRIGA MARK II OPER 2007/05/02  
 Syrian Arab Republic SRR-1  
 30.00 MNSR OPER 1996/03/04  
 Saudi Arabia RR-1  
 POOL 30.0000 PLANNED

Table 1: Status of Research Reactors in Arab Countries, including critical and sub-critical facilities.

## Organization

Arab Atomic Energy Agency

## Country

TUNISIA

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