

ES-SALAM RESEARCH REACTOR

By

REZOUG Kh

Nuclear Research Center of Birine

Commisariat A L'Energie Atomique, ALGERIA

Rezoug.khelifa@hotmail.com



Contents

- 1 Introduction
- 2 Experimental devices
- 3 Safety
- 4 Protection against radiation
- 5 Guarantees
- 6 Situation
- 7 Conclusion



Introduction:

- Es Salam is the second Research Reactor installed in Algeria after the NUR Reactor of Algiers
- Es Salam is a multi-purpose heavy water Research Reactor , with thermal power of 15 megawatts.
- The reactor was started up in July 1992.



Experimental devices:

- Es Salam is designed to be used mainly for the production of radioelement, the doping of silicon , the analysis by neutron activation, neutron beam photography, the test of materials and for formation
- It also provides beams of neutrons for the needs of the fundamental and applied research.



The Reactor Es Salam

- tank type
- moderated and water-cooled with heavy water and graphite like reflectors.
- Use low enriched uranium.
- flow of 2×10^{14} n/cm² s.
- the clad is in zircaloy



The Reactor has:

- 45 experimental vertical channels of various diameters,
 - 23 in heavy water,
 - 20 in graphite and
 - 2 in the shielding water tanks.



The Reactor has:

- Two pneumatic connections which connect the analysis laboratory by neutron activation to the reactor.
- Es Salam is equipped with seven horizontal channels, 3 are already used for:
 - AAN,
 - Diffraction,
 - Neutronradiography



Safety

- Protection system
- The emergency system cooling
- Electric feeding system of help
- Auxiliary stopping device
- System of ventilation of help
- Secondary system of cooling of help



SYSTEM OF PROTECTION AGAINST RADIATION

- CONTROL OF PERSONAL DOSE
- FIXED CONTROLE
- CONTROL OF THE SURFACE CONTAMINATION
- CONTROL USING OF PORTABLE DEVICES
- CONTROL OF THE CONCENTRATION OUT OF GAS AND RADIOACTIVE DUST IN THE AIR.



SYSTEM OF PROTECTION AGAINST RADIATION

- CONTROL OF EFFLUENTS DEGAGES BY THE CHIMNEY
- TRITIUM CONTROL



System of control of process

- Monitoring and system of measurement of the sheath rupture in heavy water.
- Monitoring and system of measurement of the sheath rupture in helium.
- Monitoring and system of measurement of escapes D2O in the exchangers.
- Monitoring and system of measurement of the rupture of the capsules.
- System of amount for radioactive gases
- Systems of measurements of strong gamma 60Kev ~ 7Mev

Guarantees:

- Signature of a safeguards agreement between the AIEA and the COMENA : infcirc 401 in February 1992 within the framework of the infcirc 66
- Signature of the treaty of non-proliferation in 1995
- Signature of an agreement safeguards generalized within the framework of the treaty of non-proliferation March 1996 ratified in December 1996 : infcirc 531
- Intention of the signature of the additional protocol in September 2004



