

*IN THE NAME OF GOD
THE COMPASSIONATE
THE MERCIFUL*



*ENHANCING ORGANIZATIONAL EFFECTIVENESS IN **TEHRAN** RESEARCH REACTOR (TRR)*

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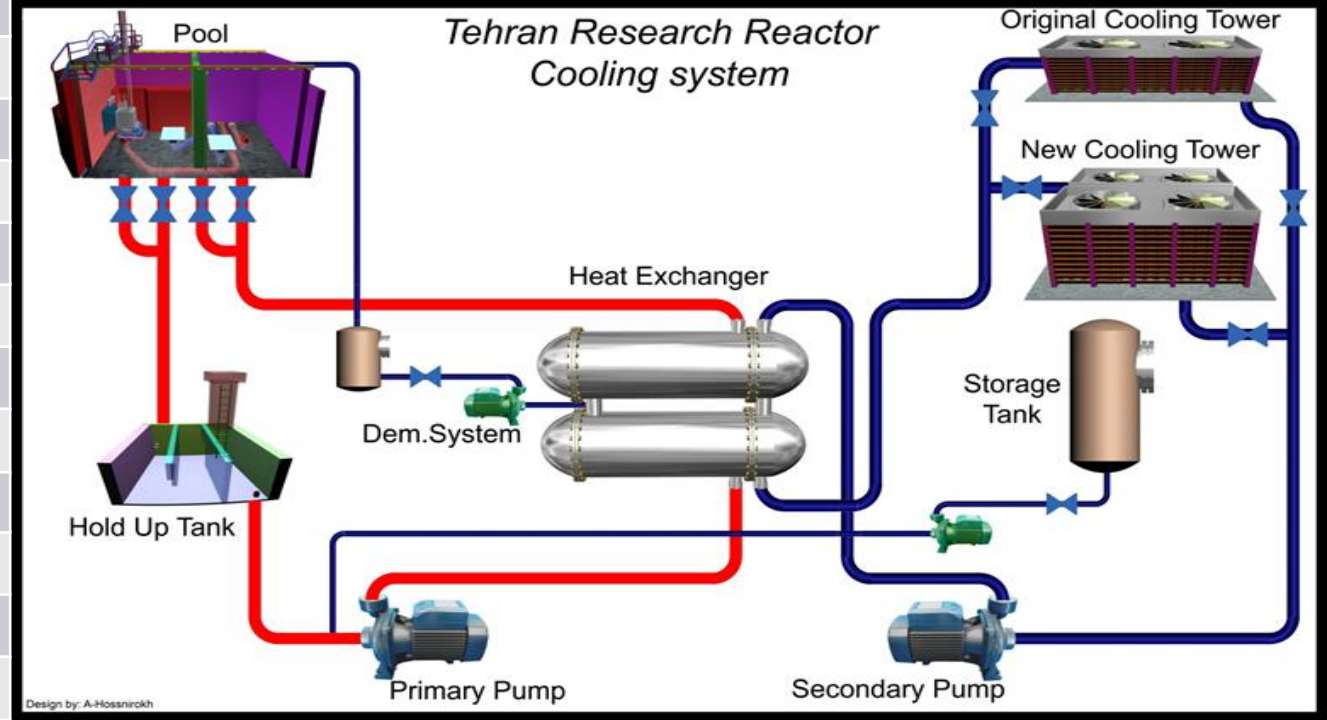
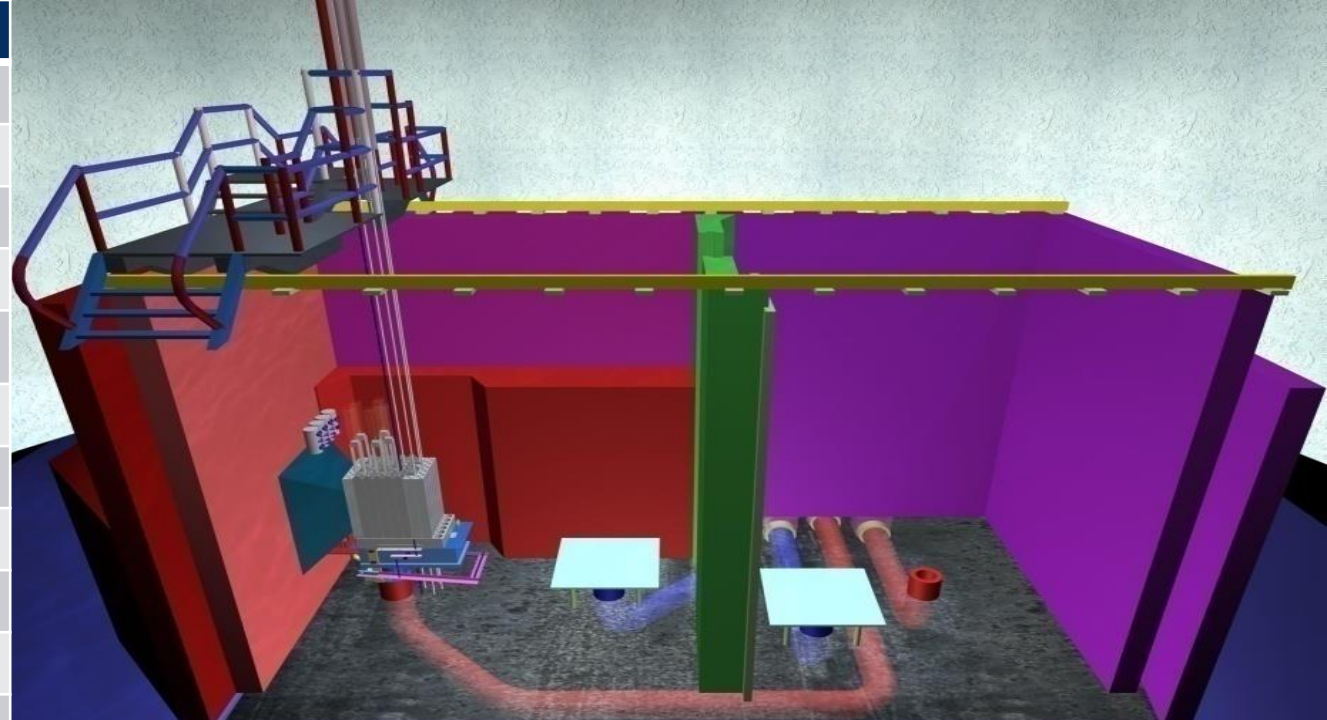
TEHRAN RESEARCH REACTOR (T.R.R)

Tehran Research Reactor achieved its first criticality in Nov 1967. The nominal thermal power of the TRR is 5MW.

TRR is a **pool** type research **reactor**, using **LEU** fuel. The reactor core is configured in a 54-holes grid plate which is **situated** in a 9.6 meter deep pool.

- **TRR 1965 (1344)**
- **Nominal Power 5MW**
- **Type : MTR**
 - open pool**
 - light water**
 - High enriched**
- **First criticality Nov 1967**
- **7 irradiation Channels in Reactor Core**
- **An Active Beam Tube B Type**
- **5 Ph.D. Students**

Reactor core parameters	Values	
Neutronics		
Fuel	MTR-U ₃ O ₈ Al	
Enrichment	20%	
Moderator	Light water	
Reflector	Graphite-Light water	
Clad	Al-6061	
Thermal hydraulics		
Thermal power	5 MW	
Coolant inlet temperature	37.8 °C	
Operating pressure	1.7 bar	
Mass flow rate	500 m³/hr	
Fuel plates		
Meat thickness	0.07 cm	
Cladding thickness	0.04 cm	
Water channel thickness	0.27 cm	
Meat width	6 cm	
Meat length	61.5 cm	
Fuel assemblies	SFE	CFE
Total dimensions	8.01×7.7×161.5cm	8.01×7.71×89.7cm
Number of fuel plates in	19	14
Control Rods		
Absorber Material	Ag-In-Cd	



INTRODUCTION

TRR operating organization has important: roles in national R&D programs.

objectives are providing services for all customers efficient (e.g. with accurate and sufficient, in due time and with satisfaction quality) in reliable, safe and secure manner.

Responsibilities for providing some certain medical radioisotopes for about one million patients all around the country, training the university students ,... .



INTRODUCTION

For enhancing effectiveness of the Tehran Research Reactor (TRR) as a nuclear facility in order to satisfactorily meet research and production needs, must be effort in some different areas in parallel and simultaneously including technical, administrative, organizational and human resource issues.



INTRODUCTION

These efforts include:

- ▶ **At the first step** prepare a plan to identify the errors, overlaps, gaps, failures, misunderstanding of the process implementation and fix the situation of facility in all interested subjects and areas based on a comprehensive Inspection & Test Plan (ITP) and Review & Assessment Plan (RAP) for:
 - ✓ current situation / problems analysis,
 - ✓ determine the required criteria and standards,
 - ✓ determine goals,
 - ✓ root case analyses of the problems and failures,
 - ✓ propose the solution and how implementation of their corrective action (action plan).



INTRODUCTION

These efforts include:

- ▶ **In the next step** implementing the plans and record the results,
- ▶ **And then** audit, re-evaluate, determine the conformance and non-conformance items,
- ▶ **Finally** obtain the results from plan implementation.
- ▶ Currently work is implemented and after that we shall evaluate the results, but up to now briefly we understood that selected way helped us to improve our organization



WHY NEED TO REVIEW AND UPDATE THE ORGANIZATIONAL CHART

the main objects of the TRR establishment as a nuclear centre was research in the fields of agriculture, industry, medicine and education of students.

Today the main concerns are:

- ▶ Research, development and production of industrial radioisotopes, radiopharmaceuticals and increased requirements on the type and amount of radiopharmaceuticals (approximately for 1 million patients),
- ▶ Increasing quantities of transients related to experiments,
- ▶ Test of material in the TRR,
- ▶ Training of university students,
- ▶ Carrying out various projects for universities and MSc. and Ph.D. students



WHY NEED TO REVIEW AND UPDATE THE ORGANIZATIONAL CHART

- ▶ Maintaining, refurbishment and upgrading the TRR installations and equipment in accordance with updates standards and technologies and the lessons learned from 40 years of operation,
- ▶ Aging the reactor facilities and the need to implement some programs as Aging Management Program (AMP),
- ▶ Training the TRR nuclear experts,
- ▶ Training human resources in the design and manufacture of reactors,
- ▶ Sanctions which was organized against our country and the creation of very unusual restrictions,
- ▶ Increasing the scientific and technological capacity and promoting technological systems and equipment,



WHY NEED TO REVIEW AND UPDATE THE ORGANIZATIONAL CHART

Assessment the activities and Efficiency of the organizational structure was done in two steps.

1. **At the First** by reactor management with self- assessment method,
2. **and then** performed by an independent assessor.

the evaluation whit applied:

1. **R**eview and **A**ssessment **P**lan (**RAP**),
2. **I**nspection and **T**est **P**rogram (**ITP**) and
3. **S**elf-**A**ssessment **P**lan (**SAP**).



BASES USED FOR ASSESSMENT

Review and assessment had been done based on:

- a) **IAEA Recommendations** and related documents,
- b) **TRR operating** experiences,
- c) **Results** and recommendations of peer reviews reports,
- d) Results of interaction with **Regulatory Body(RB)**,
- e) Opinions of our **customers and other stakeholders** as reference arguments,
- f) **Facts, evidences and indicators**, which necessitate reorganization or modifications.



SOME RESULTS OF THE EVALUATION

RCA1 - Defined activities, working programs duties and authority were out of the expert capabilities, not proper distribution of human resources in working groups.

C.A11 – Necessitate of revision of working groups and modifying the reactor organizational structure,

C.A12 – Necessitate of revision the duties, responsibilities and authorities of management, staff and working groups.



SOME RESULTS OF THE EVALUATION

RCA2 - Too much focusing on experience not knowledge and lack of effective implementation of updated standards, requirements and IAEA technical documents and recommendations, lack of using the experiences of other research reactors as lessons learned, lack or improper knowledge management at the TRR facilities,

C.A21 – Necessitate providing the necessary continuous training from the beginning of employment and at different stages of work,

C.A22 – Necessitate to recruitment experts for needed positions instead of retired (or near to retiring personnel or due to new duties,

C.A23 – Necessitate of periodic on the job training and exchange of experiences with other experts from other countries (the transfer of best practices, exploitation and practical place).



SOME RESULTS OF THE EVALUATION

RCA3 –depreciation of equipment, facilities, buildings, and in some cases lack of equipment (due to sanctions), is evident.

C.A31 –Necessitate to create a working group to review, evaluate and identifying the depreciated operating equipment and to determine reliability of equipment, lack of required equipment, monitoring the real situation of the instruments and equipment spare parts and support services by the manufacturer or seller,

C.A32 –Necessitate training the personnel responsible to take advantage of the maximum capacity of the instruments and equipment.



ACTIONS AFTER ASSESSMENT

After declaring and adaptation of the results we prepared and implemented the **Comprehensive action plan** in response to results of the study and by using **Graded Approach**. Also we establish a mechanism for assessment of performed activities and then accomplishing correction actions if should be any deficiencies in performed actions and expected ones. Based on results of work of this mechanism we understand that the following enhancements are also necessary:

Enhancing internal audits and interaction between Auditors and responsible persons of the TRR departments

Enhancing Training program of TRR for improving skills and attitude of all workers.



ACTIONS AFTER ASSESSMENT

Enhancing interactions with main stakeholders and customers

Improving the mechanism for evaluating contractors and other organizations which involve in performing nuclear and safety related activities for TRR

Establishing mechanisms for monitoring and periodic reporting the quality of works based on quantified proper indicator especially Safety Performance Indicators(SPI).



MODIFICATIONS DUE TO RESULTS OF ASSESSMENT

Main modifications of the TRR organizational structure include:

- Improving the safety committee,
- Improving the training Committee,
- Establishing Technical Committee,
- Establishing emergency group,
- Review and Improving the composition of working groups and the number of their members,
- Review and Improving the structure and research group specialist,
- Review and Improving the working processes.



MODIFICATIONS DUE TO RESULTS OF ASSESSMENT

After the review, approval, adoption and implementation of reforms in organizational structure, it became necessary to review and revise documents and other components related to the structure and working processes. Some of the components and the programs that were created or modified are:

- ▶ Definition of Facility Strategic Plan (FSP) and redefining the vision, mission and Goals,
- ▶ Preparing the Aging Management Program,
- ▶ Establishing the Integrated Management Systems (IMS),
- ▶ Changed and modified the management system by considering international experiences



MODIFICATIONS DUE TO RESULTS OF ASSESSMENT

- ▶ Modification of process stream and flow diagrams of work inter TRR departments for 3 major fields of activities: Isotope production, Research and Education and Training. Therefore modification of related procedures,
- ▶ Review the plans and procedures,
- ▶ Review the personnel training program and recruitment, according to extensive and variety of processes and activities,
- ▶ Review the facility and logistical support,
- ▶ Review the management, personnel and specialist responsibilities, authorities and tasks,
- ▶ Review the experiments safety program,
- ▶ Radiation protection and personnel safety review program,
- ▶ Review and reforming the working processes and other documents.



EFFECTIVENESS INDICATOR

The following items can be used as Indicators of the effectiveness of changes:

- a) Performance and quality of the Radioisotope Production (medical and industrial),
- b) Quantity of R & D activities on the production of new radioisotopes,
- c) Quality and quantity of trained students and workers,
- d) Provided Irradiation services to universities and institutions



CONCLUSION

As our experience showed the nuclear facility is a dynamic object and capability and ability of its organizational situation and its properness to achieve goals and targets shall be assessed periodically using operating experiences, opinions of all stakeholders, worldwide experiences and recommendations of IAEA, other international valuable related documents. Managing system of the facility shall have necessary instruments for doing so and for monitoring and auditing and then have sufficient authority and resources to implementing the necessary modifications.





*THANK FOR
YOUR KIND ATTENTION*

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