**Project Achievement Report**

**Project Number:** IRA2012

**Project Title:** Increasing Nuclear Power Production and Development (NPPD)'s Capability in Planning and Implementing Activities Related to Design and Construction of Two New Pressurized Light Water NPP Units in Bushehr with Emphasis on Safety

**Project Objective**: To further strengthen NPPD’s capabilities for the effective project management during the design and construction phases of its two new pressurized light water reactors with emphasis on safety.

**First year of approval:** 2014

**Project Counterpart:** Mr. Amir Afshin Rahnama

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**Abstract:** The Iranian authorities places high priority on peaceful use of nuclear energy including the contribution of nuclear power generation capacity to the electric energy generation mix of the country. The Council of Nuclear Energy of Iran has decided that the Iranian nuclear power generation capacity should reach 8,000 -10,000 MW by the year 2030. Based on the 2005 law that has been ratified by the Iranian Parliament, the share of nuclear energy in the total electricity generation capacity of the country has been set to 20,000 MW for the coming three decades. In view of the above and considering the lessons learned from the designing, constructing, the start-up and the on-going commissioning of BNNP-1, there is an obvious need to optimize the current organisational structure and to improve the required skills and effectiveness in principal project management of the two new light water Nuclear Power Plants (NPP) at Bushehr site with emphasis on safety. This project was built on the efforts that have been exerted and the support that has been provided under TC project IRA/4/038, which aims at strengthening the owner's capabilities for the successful implementation of two NPP units with Pressurized light Water Reactors (PWR) in Bushehr for the safe and reliable increase in the country’s electricity generation capacity.

The project’s major areas for which IAEA input (in terms of advice and technical assistance) was deemed necessary for its successful completion were: independent review of seismic safety and utilizing latest international practices in seismic design, and analyses and testing; assessment of NPP project implementation; workforce planning and human resource development for different stages of NPP project implementation; nuclear, radiation safety and nuclear security with promotion of ownership and safety culture; and management of interfaces among participants in the project as important factor for success.

**Output Achievements:**

This project encompassed six outputs. 1) Project Management Team Operational, 2) Improved owner’s safety and engineering capacity for planning and construction of two light water reactor NPP units, 3) An increased number of trained staff and implemented improved project management to promote and support strong ownership, 4) Improved overall Human Resource Management (HRM) for the two new NPP units, 5) Increased capabilities in adherence to safety and quality requirements by local organizations participating in manufacturing and construction of two new NPPs and 6) Increased public information and awareness.

3 project coordination meetings, 3 workshops, 5 expert missions, two group fellowships for 40 Iranian participants in total, and 3 scientific visits were implemented to achieve the targeted outputs of this project which were consisted of six outputs.

***Output 01 - Project Management Team Operational***

Effective implementation of project management workshops and trainings helped to review and update the implementation plan of projects increased. These activities have increased ownership of these projects and capabilities of the NPPD’s and relevant Technical Support Organisation (TSO) for project management are also enhanced.

***Output 02 - Improved owner’s safety and engineering capacity for planning and construction of two light water reactor NPP units***

The knowledge and skills of staff in the areas of seismic safety assessment and radioactive waste management was increased including preparing technical documents. This output contributed in establishing confidence in local staff to execute necessary safety-related tasks and licensing processes of these projects.

***Output 03 - An increased number of trained staff and implemented improved project management to promote and support strong ownership***

The project under this output enhanced the capacity of NPPD competencies for project management systems and promoted ownership by adhering safety principles related to the nuclear safety. The project significantly increased Iranian engineers’ knowledge and competence for preparation of updated nuclear power programme in terms of all aspects related to pre-construction, construction management and PWR technology.

In addition, senior managers of the NPPD and relevant Technical Support Organisation (TSO) acquired and strengthened expertise of the BNPP-2&3 projects on effective project management for construction, infrastructure including supply chain management.

***Output 04 - Improved overall Human Resource Management (HRM) for the two new NPP units***

CP Systems on Knowledge and risk management during pre-construction and construction phase of PWR with focus on safety have been improved. Strengthened Counterpart process on corporate knowledge management for BNPP - 2&3 with focus on safety and also, Management and maintaining design basis information through life cycle of BNPP-2&3. So due to delay in some pre-activities by the contractor in turn- key contract for providing the required inputs, the activity on assist in review of selected/developed training materials for future operators for two new NPP units shifted to new project and achievement would be expected in 2020.

40 NPPD staff in 2 separate Group(s) Fellowship participating in training on construction and commissioning management with focus on safety requirements which helped in gaining experience and required knowledge on construction and commissioning management with focus on safety requirements and the core of knowledgeable NPPD staff established under Project Management structure.

**Output 05 - Increased capabilities in adherence to safety and quality requirements by local organizations participating in manufacturing and construction of two new NPPs**

IAEA expert mission on “Stakeholder Involvement and Public Communication” provided helped in achieving capabilities involving local organisations and industries by keeping safety and quality requirements. The NPPD team participated was trained to involve local industry in the construction of NPPs, preparing a plan for their effective involvement and national localization strategy to increase involvement in construction of the two new NPPs.

NPP owner/operator team acquired knowledge and experience in carrying out their responsibilities and interfaces with Engineering, Procurement and Construction (EPC) contractor during construction which contributed to the NPPDs team’s effective liaison with local industries.

**Output 06 - Increased public information and awareness**

IAEA conducted a training workshop on public information and awareness programmes focusing on safety aspects from 28 sept to 01 Oct 2014. During this training, international experts provided understanding in drafting strategic documents for owner to establish and implement a public information and awareness program. This activity assisted NPPD team in preparing these documents and contributed for establishing public information awareness centre.

**Outcome Achievement**

***Outcome***: To establish effective project management processes during the design and construction of the two new pressurized water reactor (PWR) nuclear power plant (NPP) units in Bushehr with emphasis on safety.

***Indicator***: A comprehensive set of project management processes during design and construction phases of the two new PWR NPP units in Bushehr

**Achievements:**

This project significantly contributed into the capacity and capability building of NPPD in achieving its objective by means of trainings, expert missions, workshops, fellowships/scientific visits, and procurements. By the end of this project, the NPPD has developed competence in project management processes, strengthened the ability in seismic safety and increased engineering capacity for planning and construction of NPP units.

Effective project management processes during the design and construction of the two new pressurized water (PWR) NPP units in Bushehr with emphasis on safety and improved owner’s safety and engineering capacity for planning and construction of two light water reactor NPP units were established.

This project improved project management knowledge of 50 participants in processes and best practices to promote and support strong ownership. NPPD’s Stakeholders Involvement Plan were finalised, and the Public Information and Awareness Centre was planned. Knowledge of experts at NPPDs was enhanced by acquiring experiences shared by IAEA experts during various trainings, workshops, and missions. NPPDs staff is now familiar with latest methods of project management and safety which is achieved through various SV, FS, EM and WS. Knowledge management mechanism with focus on increasing NPPs` Personnel capabilities and abilities is established. NPPD experts are now familiar with stakeholder engagement methods. The knowledge of NPPD experts is updated based on safety and waste management requirements in storage methods.

**LESSONS AND RECOMMENDATIONS**

**Sustainability**: Nuclear energy provides a sustainable option for generating electricity. The design and construction of the two new PWR nuclear power units is supported by the existing nuclear power infrastructure and the valuable experience gained during the period of safe and reliable construction, start-up, and on-going commissioning of the first NPP unit in Bushehr. The NPPD staff is trained on safety and engineering aspects for planning and construction of NPPs which is helpful in managing not only these two NPPs but also this staff will be able to prepare the teams in project management for future projects. This project has involved local industry in NPPs construction by adhering the safety standards. The preparation of stakeholder involvement plans raised safety issues for consideration of owner/operator for safe implementation of project management activities which were addressed during the implementation of IRA2/012 activities. The theoretical and practical knowledge on project management including risk management, safety assessments, radioactive wate management not only enhances the sustainability of these two NPPs but also contributes to future construction and management of NPPs by disseminating knowledge through national trainings and workshops.

**Lessons learned regarding project management:** Continuous and coherent engagement of all project stakeholders is highly recommended to ensure clear expectations and timely preparation of the IAEA support. Frequent communication between the Project teams can assist in understanding the challenges and help in mutual agreement on the way forward to meet the targeted outcome and desired results.

**Which practice proved to be beneficial for the project**? The expert mission, fellowships, and scientific visits during the project duration proved beneficial for the project as it provides expert guidance, feedback, recommendations, and remedial measures that ensures the effective and accurate execution of the project activities to achieve the designed objectives

**Which practices proved not to be beneficial?** Implementation of project activities in Iran could be improved by allocating abundant lead time, when possible, to secure visa for international experts and national participants.

**What was learned about partnership(s) with other stakeholders, if any?**

The stakeholders provided great support to develop stakeholder involvement plans which will enhance local participation. The improved technical and physical infrastructure as well as human resource development about project management by adhering safety standards has benefited the stakeholders.

**Recommendations**

1. An extended support from IAEA is required to continue in enhancing level of operational safety and reliably for NPPs. Further support of IAEA is desired in the of nuclear power production and enhancing capability in planning, implanting activities related to design, construction, and commissioning of NPPs.
2. Lesson learnt and good practices of project implementation will be applied in the follow-up projects.