**Concept Number:** IRA2018006

**Title:** Enhancing Human Capacity for Acceptance Testing to Ensure Fuel Safety and Reliability

**Original Language Title:** Human resource development in nuclear fuel qualification.

**Project Number:** ?????

**Project Type:** National

**Project For:** Iran, Islamic Republic of

**Submitted By:** Member State and/or Observers With Rights

**Priority:** 1

**Project duration (Total number of years):** 3

**Project duration (Start date):** 2020-01-01

**Field of Activity:** 07 - Nuclear fuel cycle

**FOA Distribution:**
FoA Code: 07 = 50%
FoA Code: 10 = 25%
FoA Code: 08 = 25%

**Sustainable Development Goal:**
07 - Ensure access to affordable, reliable, sustainable and modern energy for all

**Link to RB Programme:** 1.2 Nuclear Fuel Cycle and Materials Technologies - 1.2.2 Nuclear Power Reactor Fuel

**Project Description/Abstract: Th**e purpose of this project is to enhance the human resource capacity of TAMAS/NRF Co. as knowledgeable consultant to support Iranian nuclear reactors owners to be smart buyers in the procurement of nuclear reactor fuel. This project will be focusing in enhancing the knowledge and skill of the company’s personnel in the areas of fuel acceptance activities including assessing fuel design, auditing production process and knowledge and skill in qualification processes to ensure the safety, reliability and performance of the procured fuel.

**Problem to be addressed:** TAMAS/NRF Company statute, approved by Iran Parliament included its responsibility to provide safe and reliable nuclear fuel which will be needed in Iran’s nuclear reactors including via procurement and production. In this role, TAMAS/NRF Co. shall act as a technical support in purchasing nuclear fuel from foreign fuel supplier to Bushehr NPP (BNPP). TAMAS/NRF Co. is expectedto be able to audit the safety, quality and good performance of the fuel during purchasing process. However, TAMAS/NRF Co has limited experience to effectively carry out the role of technical support organization for fuel qualification to perform its role effectively. TAMAS/NRF Co. identifies that knowledge and skill of its personnel in the areas of fuel acceptance activities including assessing fuel design, auditing production process and knowledge and skill in qualification processes requires improvement to ensure the safety of the procured fuel during operation with high safety, efficiency and reliability.

**Stakeholder:** • TAMAS/NRF Co.as main counterpart, • Iran’s Nuclear Regulatory Authority (INRA) is the nuclear regulatory body in Iran who will issue license in all nuclear related activities in Iran • Nuclear Power Production and Development (NPPD) Co. as the owner and operator of Bushehr nuclear power plant

**Partnerships:** N.A.

**Overall Objective:** To achieve safe and sustainable operation of Iran’s nuclear reactors.

**Role of nuclear technology and IAEA:** Nowadays, there is a global demand for new sources of clean energy to avoid release of pollutant gases and nuclear technology plays an important role by using safe and high quality nuclear fuel as a suitable substitute of fossil fuels. A reliable nuclear fuel leads to the safe operation of reactors and IAEA, through its Technical Cooperation program could support member state by providing training courses and workshops as well as coordinating for scientific visits and fellowships in host institutes.

**Participating Member State(s):**
Iran, Islamic Republic of

**Physical infrastructure and human resources:** There is adequate number of human resource with different backgrounds and majors such as nuclear, chemical, mechanical, metallurgical and electrical engineering as well as technicians/operators that can support the project implementation available in TAMAS/NRF Co. NRF Co. has also applied the Management System based on IAEA Safety Standards, Safety Requirements No. GS-R-3; 2006.

**Sustainability:** TAMAS/NRF Co. established knowledge management system for ensuring proper knowledge sharing and knowledge transferring among its employees and relevant personnel from the stakeholders. Human resource is considered as main asset of the company and therefore, preserving key personnel and their knowledge is one of the main strategies in company.

**Safety regulatory infrastructure:** Iran Nuclear Regulatory Authority (INRA) is a well-established entity acting as the national nuclear regulatory body in Iran to ensure maintaining and improving the safety of nuclear installations and radiation facilities to protect the workers, the public, the future generations and the environment from harmful effects of radiation.

**Other considerations, e.g. environment, gender:** Management system in TAMAS/NRF Co. which is established based on IAEA Safety standard GS-R-3 (2006), safety and environment protection is the fundamental principle.

**Implementation strategy:** In order to fulfill the anticipated output of the project, CPs from TAMAS/NRF Co. and IAEA should define proper and implementable activities and relative instructors and participants must be involved. TAMAS/NFR Co. with cooperation of IAEA will implement inputs of this project in time, The TAMAS/NRF Co. authorities will monitor and support the project.

**Monitoring and progress reporting:** The progress of the project will be reported annually by submission of project progress and achievement report through E-PPAR platform. In addition, the project will also be under continuous follow-up by the CP and other pertinent project team members. As the main nature of the project is based on HR capacity building, after completion of any training, effectiveness will be evaluated and any identified shortcoming or deficiency will be resolved by implementing the proper corrective action.

**Risk management:** Due to the full support of TAMAS as a holding company, the technical risk on the project is judged to be very low. The risks are largely financial and political. Risk: Lack of funding for this project could impact on well implementing the inputs. Mitigation: The CPs from both sides of IAEA and TAMAS/NRF Co. should monitor and identify in advance the required actions.

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| **CORE FINANCING** |
| **Year** | **Human Resource Components** (Euros) | **Procurement Components** (Euros) | **Total** (Euros) |
| Experts | Meetings/ Workshop | Fellow-ships | Scientific Visits | Training Courses | **Sub-Total** | Equipment | Sub-Contracts | **Sub-Total** |
| 2020 | 0 | 12 600 | 0 | 0 | 22 050 | **34 650** | 0 | 0 | **0** | **34 650** |
| 2021 | 0 | 25 200 | 0 | 3 150 | 22 050 | **50 400** | 0 | 0 | **0** | **50 400** |
| 2022 | 5 250 | 6 300 | 0 | 0 | 7 350 | **18 900** | 0 | 0 | **0** | **18 900** |
| **First Year Approved : 2020** |
| **FOOTNOTE-a/ FINANCING** |
| **Year** | **Human Resource Components (Euros)** | **Procurement Components (Euros)** | **Total (Euros)** |
| Experts | Meetings/ Workshop | Fellow-ships | Scientific Visits | Training Courses | **Sub-Total** | Equipment | Sub-Contracts | **Sub-Total** |
| 2020 | 0 | 3 150 | 0 | 0 | 0 | **3 150** | 0 | 0 | **0** | **3 150** |
| 2021 | 0 | 0 | 0 | 0 | 7 350 | **7 350** | 0 | 0 | **0** | **7 350** |
| 2022 | 5 250 | 0 | 0 | 6 300 | 0 | **11 550** | 0 | 0 | **0** | **11 550** |
| **First Year Approved : 2020** |

 **Logical Framework Matrix (LFM)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Design Element** | **Indicator** | **Baseline and Target** | **Means of Verification** | **Assumptions** |
| **Outcome** |  Enhancement of knowledge for fuel acceptance testing and procedures to ensure safe and reliable operation of Iran’s nuclear reactors | Capability in performing document review of fuel qualification by the end of project Personnel successfully trained with Improved nuclear fuel knowledge and expertise in the field of purchase, licensing and acceptance testing. | Base line: There is a capacity of 40% at the beginning of the project Target: It should be a capacity of more than 80% at the end of the project | Submission of the annual electronic Project Progress Assessment Report (PPAR) is mandatory, through TC-reports https://tcreports.iaea.org/ . | TAMAS/NRF Co. should have appropriate human resources to actively participate in proposed activities. Technical support of IAEA, Financial and technical support of national government and Atomic Energy Organization of Iran |
| **Output** | 1 Project Management Team Operational | Number of trained staff who should work in monitoring,reporting and control the project | Base line: There is 1 person who took part in previous event Target: 4 people from TAMAS/NRF Co. | Periodic progress reports of project and number of events | Technical support of IAEA |
| 2 Trained staff as knowledgeable resource person for nuclear fuel supply/procurement | Ten personnel to be successfully trained and qualified in nuclear fuel supply. | Base line: There is no completed activity. Target: Completion of 80% of planned program in output 2 | Project progress report. Training and qualification certificate. | Trained personnel work in home institute |
| 3 Updated fuel acceptance procedure and management system | Five personnel to be successfully trained and qualified in nuclear fuel acceptance procedures | Base line: There is no completed activity. Target: Completion of 80% of planned program in output 3 | Project progress report. Training and qualification certificate. | trained personnel work in home institute |
| **Activity** | 1.1 Conducting project review/ coordination |  |  |  |  |
| 1.2 Updating project workplan |  |  |  |  |
| 1.3 Preparing and Submitting PPARs |  |  |  |  |
| 1.4 IAEA Field Monitoring |  |  |  |  |
| 2.1 Training in safety criteria of fuel design |  |  |  |  |
| 2.2 Training in fuel design licensing |  |  |  |  |
| 2.3 Training in quality control of fuel fabrication |  |  |  |  |
| 2.4 Training in qualification testing |  |  |  |  |
| 3.1 Drafting fuel acceptance procedure |  |  |  |  |
| 3.2 Training in Quality Assurance System for fuel qualification |  |  |  |  |
| 3.3 Drafting Quality Assurance Manual for fuel qualification |  |  |  |  |
| **Input** | 1.1.1 Project Review Meeting Year 1 | Only 1 person; footnote a |  |  |  |
| 1.1.2 Mid Project Review Meeting | Only 1 person |  |  |  |
| 2.1.1 Training course on fuel safety criteria and limits | Only 2 expert |  |  |  |
| 2.1.2 Training course on general aspects of fuel behaviour in the reactor | Only 2 expert  |  |  |  |
| 2.1.3 Training course on nuclear fuel analysis codes | Only 2 expertFootnote/a |  |  |  |
| 2.2.1 Training course (2 weeks) on nuclear fuel licensing process | Only 2 expert |  |  |  |
| 2.2.2 Scientific Visit on nuclear fuel licensing process to Country A |  |  |  |  |
| 2.2.3 Scientific Visit on nuclear fuel licensing process to Country B | Footnote/a |  |  |  |
| 2.3.1 Workshop on nuclear fuel specification | Only 2 expert |  |  |  |
| 2.3.2 Workshop on general aspects of quality control for fuel fabrication | Only 2 expert |  |  |  |
| 2.3.3 Participation in TM on Technical Challenges and Advances in Fuel Fabrication in Water Reactors | Reduced budget based on current practice – automated calculation is too high |  |  |  |
| 2.3.4 Participation in International Conference in Characterization and Quality Control of Nuclear Fuels | Reduced budget based on current practice – automated calculation is too high |  |  |  |
| 2.4.1 Participation in international conference on WWER fuel performance, modelling and experimental support | Reduced budget based on current practice – automated calculation is too high |  |  |  |
| 2.4.2 Participation in International Conference on HOTLAB 2020 | Reduced budget based on current practice – automated calculation is too high |  |  |  |
| 2.4.3 Participation in International Conference on HOTLAB 2021 | Reduced budget based on current practice – automated calculation is too high |  |  |  |
| 2.4.4 Participation in International Conference on HOTLAB 2022 | Reduced budget based on current practice – automated calculation is too high |  |  |  |
| 3.1.1 Scientific visit on Fuel Acceptance Criteria to Country A | Footnote/a |  |  |  |
| 3.1.2 Expert mission to review the procedure on Fuel Acceptance Criteria |  |  |  |  |
| 3.2.1 Workshop on establishing QAP for fuel qualification including competency of personnel | Only 2 expert |  |  |  |
| 3.3.1 Expert mission to review the draft QA Programme for fuel qualification | Footnote/a |  |  |  |