Description

Background
In October 2007 the Arab Republic of Egypt decided to develop a nuclear power programme for electricity generation including construction of several NPP units. It also decided to take the necessary steps for drafting a comprehensive nuclear and radiation law and to ensure the independence of the Egyptian Nuclear and Radiological Regulatory Authority (ENRRA). Consequently a new nuclear law was approved and issued on 30 March 2010 and its executive regulation was published on 17 October 2011. The new independent nuclear regulatory authority was officially established on 5 March 2012. The ENRRA is located in Cairo and it is entrusted with regulatory and control functions for safety, security and safeguards related to the nuclear and radiation areas. The first Egyptian NPP is expected to be constructed at the El-Dabaa site located on the Mediterranean Sea coast (west of Alexandria, in an area of low seismic activity). The first phase of the construction project would include the erection of several PWR units with unit capacity between 900 and 1650 MW. The construction is managed by the Nuclear Power Plants Authority (NPPA). In November 2015 Egypt and the Russian Federation signed an Inter-Governmental Agreement (IGA) and the associated financial agreement in order to establish legal and financial conditions to build four VVER-1200 units at the El-Dabaa site with Rosatom as main supplier. In 2015 a cooperation agreement was signed between the Russian nuclear regulator (Rostechnadzor) and ENRRA, as well. Previously, a first INSC project EG3.01/08 (EG/RA/01) was conducted from 2009 to 2012 in order to support the Egyptian nuclear regulator, at that time the National Centre for Nuclear Safety and Radiation Control NCNSRC (part of the Egypt Atomic Energy Authority EAEA).

The present INSC project EG3.01/10 (EG/RA/02) was a follow-up project launched to assist the new independent nuclear regulatory authority ENRRA in its capacity building effort by transferring experience and knowledge accumulated in the EU countries with established nuclear regulations, regulatory framework and nuclear safety standards.

Objectives
The basic objective of the project was to facilitate the development and strengthening of the managerial and technical capabilities of the Egyptian Nuclear and Radiological Regulatory Authority (ENRRA). Specific project objectives were as follows:

· Provision of support to establish/develop an Action Plan in the field of capacity building for the enhancement of the ENRRA;
· Supporting the establishment of an independent nuclear regulatory authority in Egypt, based on existing infrastructure;
The above goals were to be achieved by performing the following project activities:

- Project inception and coordination;
- Updating the Strategy Plan and the Action Plan; elaboration of technical inputs for further collaboration with the EU;
- Provision of training and support in safety assessment and licensing activities;
- Strengthening professional skills of the ENRRA staff;
- Training of ENRRA inspectors to perform various inspections at NPPs and other nuclear facilities;
- Strengthening ENRRA capabilities in the area of physical security.

The assistance work was carried out by a consortium led by RISKAUDIT having the following members: BEL V (Belgium), GRS (Germany), HAEA (Hungary), IRSN (France), and STUK (Finland). The project was launched on 25 June 2014. The original 24 months duration of the project was extended by one year in April 2016, so its actual end date was 24 June 2017.

**Results**

The project consisted of five technical tasks as follows:

- **Task 1: Update of the Strategy Plan and the Action Plan and elaboration of technical inputs for further collaboration**
  Task 1 provided support to ENRRA in the elaboration of updated versions of its existing Strategy Plan and Action Plan. Within this task the Contractor updated the Strategy Plan with clear descriptions of Egyptian needs, objectives and priorities in the regulatory field. Support was also given to update the Action Plan of ENRRA. The Action Plan outlines the development and expansion of ENRRA for the next five years, especially in view of the recent developments in the Egyptian nuclear industry.
  Task 1 was successfully completed; all necessary documents were provided (except the updated ENRRA Action Plan) and the draft of Task 1 report was prepared.

- **Task 2: Training and support in safety assessment and licensing**
  Task 2 improved the technical competence and capacity of ENRRA in safety assessment and licensing by providing training and support. Training and support covered various fields such as nuclear safety supervision, review of safety assessments, licensing activities and discussions with the operator. Support in regulatory review was performed through on-the-job trainings and hand-in-hand work with EU experts. In the hand-in-hand approach, ENRRA built its own capacity for reviewing safety documents. Safety culture was addressed and underlined in each topical workshop. Trainings were delivered in Subtask 2.1 and they covered three main topics: (1) review of a Safety Analysis Report (SAR); (2) evaluation of an Environmental Impact Assessment Report (EIAR) and (3) licensing. Subtask 2.2 focused on supporting regulatory review activities through hand-in-hand work with EU experts. The support activities covered the following topics: (1) review of a SAR; (2) evaluation of an EIAR; (3) licensing and (4) public information.
  Task 2 was successfully completed: all planned trainings were delivered and the capacity of ENRRA staff was enhanced in conducting safety evaluations and in preparing safety evaluation reports. All planned documents were provided (except the strategy for public communication) and the final version of the Task 2 report was prepared. Within Task 2 ENRRA also established the first draft of the Generic Approach of the Egyptian Safety Assessment Review Guide. ENRRA also issued the first version of the Egyptian General
Design Requirements and developed additional regulations, rules and procedures for NPP licensing.

- Task 3: Strengthening professional skills of the Project Partner staff
  Task 3 provided training and knowledge transfer in various fields of competence useful to ensure proper safety assessment and supervision of issues related to the design and construction of NPPs and other nuclear facilities. Training was carried out either through training sessions in Egypt or through on-the-job trainings at EU regulators with the participation of selected Egyptian experts. Five fields of nuclear safety were training subjects: (1) design safety concepts; (2) safety analysis; (3) analysis of mechanical and civil structures; (4) containment and confinement systems; (5) control systems.
  Task 3 was successfully completed; all expected deliverables were provided and the draft version of the Task 3 report was prepared. The trainings provided in Task 3 contributed to the capacity development of ENRRA staff and an effective transfer of best European practices related to NPP safety assessments took place. During the workshops the ENRRA staff acquired deep understanding of conducting proper safety assessments and supervision of issues concerning the design and construction of NPPs and other nuclear facilities.

- Task 4: Training of ENRRA inspectors for NPPs and other nuclear facilities
  The task assisted in defining the general approach and methodology of inspections to be applied for the supervision of structures, systems and components (SSCs). Training was also provided to the inspectors in charge of inspections during the construction and operation.
  The following fields were the training subjects:
  - Inspection of civil works during construction and related quality control
  - Inspection of equipment fabrication, procurement, installation and testing (mechanical engineering) and related quality control and quality assurance programmes.
  Task 4 was successfully completed; all necessary documents were provided and the final version of the Task 4 report was prepared. The two training workshops (provided by STUK, Finland) were successful and the involvement of the trainees was outstanding. Workshop presentations focused on inspection of civil works during construction and inspection of fabrication, procurement, installation and testing of mechanical equipment and related quality management programmes. On-the-job training sessions were organised at the Olkiluoto construction site and were managed by resident inspectors.

- Task 5: Strengthening ENRRA capability in the area of physical security
  Task 5 was aimed to define the basic principles of planning and constructing a reliable physical security system for an NPP. A training programme was also developed on the following subjects: (1) methodology of threat identification and analysis; (2) design and evaluation of physical protection systems of NPPs or other nuclear installations.
  Task 5 was successfully completed; all necessary documents were provided and the final version of the Task 5 report was prepared. Main objectives Task 5 were achieved and the on-the-job trainings contributed to enhance the capabilities of the ENRRA staff to a great extent. In the future the time allocated to on-the-job trainings should be increased and more on-site visits should be organised, because the participants valued these training activities the most.

The final project meeting was held on the 17th of May 2017 in Brussels. According to the evaluation presented in the Final Report, all project objectives were duly achieved. All task activities were completed before the final meeting and all technical visits and on-the-job trainings were held according to schedule. Altogether 19 workshops were organised, while
three workshops in subtasks 2.2.1, 2.2.2 and 2.2.3 were cancelled due to the delay in the delivery of three key documents: the Preliminary Safety Assessment Report, Environmental Impact Assessment Report and Site Evaluation Report corresponding the El-Dabaa NPP would be available at a later date due to delays in the related preparatory activities. The reviews of the above three delayed documents were replaced according to the proposal of ENRRA: documents on design requirements and acceptance criteria for the Gen III+ VVER reactors were revised instead. All expected technical deliverables were provided except the updated ENRRA Action Plan for implementing the ENRRA Strategic Plan between 2016 and 2020. The approach and strategy of ENRRA for implementing a proper and effective public information dissemination procedure is still to be developed, as well. All draft task- or subtask reports (except subtask 2.1.2 report) were delivered before the final meeting and the first draft of the final report was distributed, as well.

As a summary it can be stated that the EG3.01/10 (EG/RA/02) regulatory support INSC project was implemented according to plans and the few modification requests of the Beneficiary were handled by the Consultant and the EC in a flexible and effective manner. These modification requests were basically due to the delays in the preparatory activities related to the design, licensing and construction of the El-Dabaa NPP. The work carried out in the project helped the Beneficiary to strengthen its capabilities in the area of safety assessments related to licensing and construction of nuclear facilities. It also provided an effective contribution to the capacity building efforts of ENRRA and enhanced the professional level of its staff to a great extent. During the project implementation, a very effective knowledge- and methodology transfer took place between the EU and Egyptian experts.

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**General Information**

**Title:** Provision of assistance related to developing and strengthening the capabilities of the Egyptian Nuclear Regulatory Authority

**Programme:** INSC

**Amount:** € 1.462.855,27

**Budget year:** 2010

**Countries:** Egypt

**Nature:** Services

**Types of activities:** Regulatory Authorities

**Sector:** RA - Regulatory Authorities

**Duration (months):** 36

**Contracting:** European Commission

**Status:** Completed

**CRIS number:** 279446

**Project reference:** EG3.01/10

**Decision number:** NSI/2010/022-628

**Method of procurement:** Service contracts - Exceptional Negotiated Procedure with a single offer

**Signature date:** 24/06/2014

**Effective contract date:** 26/06/2014

**Contract end date:** 25/06/2016
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