IAEA'S TECHNICAL SUPPORT FOR ESTABLISHING REQUIREMENTS FOR THE SECURITY UP-GRADES AT EGYPT'S SECOND RESEARCH REACTOR COMPLEX

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Abstract

The International Physical Protection Advisory Service (IPPAS) programme, initiated in 1995, is a fundamental part of the IAEA's efforts to assist Member States to establish and maintain an effective nuclear security regime to protect against the unauthorized removal of nuclear material and the sabotage of nuclear facilities and material. The IPPAS mission has been conducted by IAEA for the Egyptian Atomic Energy Authority (EAEA) in December 2005. The purpose of the IPPAS has been to provide advice and assistance to strengthen the effectiveness of the physical protection systems of Egypt's second research reactor (ETRR-2) complex. The works is to development and finalize an action plan for the technical upgrade of the physical protection system, and contribute in the implementation of International Physical Protection Advisory Services (IPPAS) mission recommendation, 2014 to ETRR-2 nuclear complex.

The main objective of this paper shows the works has been accomplished for upgrading process and modified of the physical protection systems at ETRR-2 nuclear complex, the work determines and recovering for the weakness points in security systems on site and insure the sustainability of the physical protection system to verify; it meets the Regulatory and IAEA requirements.

This paper will present the processes and approaches adopted by the Egypt's second research reactor for inspecting and evaluating nuclear security aspects and interface of inspection with safety. This paper determines the operational requirements for the physical protection system; devices, equipment, and the systems needed to be upgraded as a part of ETRR-2 overall physical protection systems. The paper will explain how to create the statement of work (SOw), which includes the required specification and the system issues; protection, detection, surveillance television, alarm and access control. The works shows the central alarm station management, security grating barriers and entry check-point's equipment and devices used in inspection deepening on the regulatory requirements.

The work introduces the issues and challenges currently faced and explain the possible solutions. The work presents the techniques and strategy has been used for developing the physical protection systems in order to assist, the second reactor complex, in enhancing its facilities capabilities in nuclear security and improving the nuclear security regimes

Keywords: Central Alarm Stations (CASs), Isolation zone strengthen, Contraband systems, Intrusion Detection system, Access control system

1. INTRODUCTION

The International Physical Protection Advisory Service (IPPAS) programme, initiated in 1995, is a fundamental part of the IAEA's efforts to assist Member States to establish and maintain an effective nuclear security regime to protect against the unauthorized removal of nuclear material and the sabotage of nuclear facilities and material. According to the request for developing guidance and advisory services (GC(47)/17 dated 20 August 2003), the IAEA has decided to expand the scope of the IPPAS programme to include the security of radioactive material, associated facilities and transport. The IPPAS programme is offered to assist Member States, upon request, with an assessment of their State physical protection regime. This assessment includes a national level review of the legal and regulatory framework, and implementation measures and procedures in place to execute this framework at facilities and during transport. The international

physical protection advisory Service (IPPAS) mission has been conducted by IAEA for the Egyptian Atomic Energy Authority, (EAEA) in December 2005. Since its inception in 1995, the purpose of the IPPAS has been to provide advice and assistance to strengthen the effectiveness of state systems of physical protection. In November 2004, the EAEA requested an IPPAS mission from the IAEA. A preparatory was organized on 14-15 June 2005 in Cairo, Egypt, and the mission took place during the period 3-12 December 2005. This report to contribute and proceeds with the implementation of the IPPAS mission recommendations Report 2005.

1.1 IAEA Follow up IPPAS Mission

The IAEA's Division of nuclear security, EAEA and ENRRA held a joint meeting from 22-24 May 2014 in Cairo, Egypt to recommend how to proceed with the implementation of the IPPAS mission recommendation of 2005. The meeting had two objectives:

- To develop and finalize an action plan for the technical upgrade of the physical protection system of Egypt's research reactors ETRR-1 and ETRR-2
- To contribute in the implementation of IPPAS mission recommendation report of 2005

The output of the meeting was determine the first level of operational requirement (OR1), this OR1 would, in due course, be further developed to form a Statement of Work (Sow) that would define the project in detail and be subject of a competitive tender process. This document outlines the highest level requirements for the upgrading of the physical protection system and measures the nuclear research centre for ETRR-1 and ETRR-2 (plus co-located facilities) in accordance with the national regulations and IAEA nuclear security recommendations #13 and #14

After IAEA and EAEA determinate of the OR1, a site visit was done to review the existing security measures to determine the second level of the operation requirement (OR2). OR2 shall be produced for each of the security systems, to include any required technical security measures integration and situational security features relating to the security of the Egypt's research reactors ETRR-1 and ETRR-2. There are three key stages when planning the installation of security system(s) summarized below.

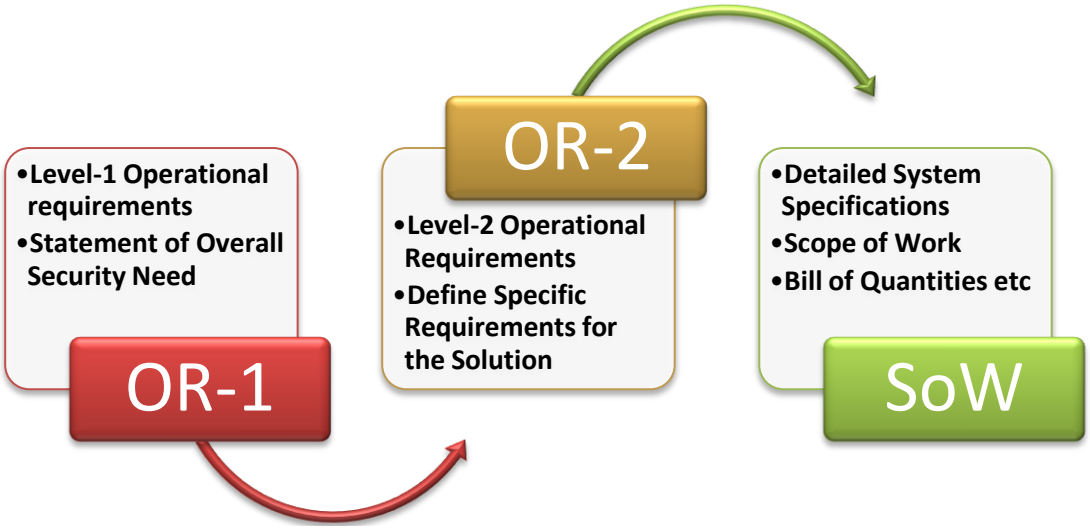

FIG. 1. Three key stages when planning

2. OPERATIONAL REQUIREMENTS (ORS) FOR EGYPT'S RESEARCH REACTORS

An Operational Requirement (OR) is a statement of need based upon a thorough and systematic assessment of the problem to be solved and the hoped for solutions. The aim of this document is to ensure that appropriate security measures are recommended to manage the risk to a level acceptable to all stakeholders. It introduces the concept of a structured methodology for determining the security requirements. Before conducting an OR you should identify the threat to the organisation or site; we

intent here Egypt's Second Research Reactors as ETRR1 and ETRR-2 sites. To simplify the process, the procedure has been broken down into two parts, Level 1 and Level 2 Operational Requirements. The level 1 OR (OR1) provides a statement of the overall security need and includes the site to be considered, asset description, perceived threat, and consequence of compromise, perceived vulnerabilities, and success criteria. The level 2 OR (OR2) follows on from the completed Level 1 OR and address individual security measures (fences, CCTV, control of access etc) in a similar fashion to the Level 1 procedure, but which together provide the basis for a fully integrated security solution. Checklists are given, in this document, for a wide range of Level 2 ORs (Check list template is attached in annex). Not all of these will be needed for every site.

3. IAEA'S TECHNICAL SUPPORT

The IAEA's Division of Nuclear Security (NSNS) and Egyptian Nuclear Regulatory Authority (ENRRA) authorized an INSSP to assist Egypt with its physical protection upgrades at second Research Reactor ETRR-2. The physical protection measures at ETRR-2 will be upgraded based on the authorized OR1, national regulations for the physical protection of nuclear material and nuclear facilities, and the IAEA Nuclear Security Series documents, particularly "Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities NSS#13(INFCIRC/225/Revision 5)".

The IAEA's Division of Nuclear Security Worked; IAEA-Egypt Nuclear Security Cooperation Program for Physical Protection Upgrades at Egypt's Research Reactors ETRR-1 and ETRR-2

3.1 IAEA Proposed Project Scope

- Upgrade Entry Control Point (ECP) with 2 pedestrian entry channels, including civil works as required,
- Replace inline CCTV system incorporating video motion detection software with the integrated security management system (changes troubled devices (According to ETRR-2 requirements table) for old CCTV system + video motion detection installation).
- Review / upgrade detection system software / equipment.
- Include automatic interlock mechanism for the 2 vehicle gates to prevent both gates being open at the same time.
- Review lighting to see if it meets current regulatory requirement and is adequate for the security system to function.
- Integrated security management system including a new access control system in the primary Central Alarm Station (upgrade or replace ACCESS control system)
- EAEA to identify a suitable location for the primary and secondary CAS.
- Both the primary and secondary CASs to be hardened according to the DBT
- Vital areas to be hardened, install necessary PPS (should determine and limit with IAEA experts), and PP monitoring systems, communications and emergency power systems as required (UPS works):
    - The reactor control room, in addition to
    - The reactor Auxiliary control room
    - Reactor Hall including the spent fuel pool, the fresh fuel room, and the reactor protection system server room door
    - Hot Area Main Entrance

This Program, aims to make the physical protection systems upgrade at Egypt's Second Research Reactors ETRR2. It is planned to be completed through three stages (Phases: #1, #2 and #3)

3.2 The Project Initiation and Planning Document (PID)

For the project to begin the Project Initiation and Planning Document (PID) has been done by EAE team. PID introduced; the ETRR-2 project objective , scope and the facility operation requirements,

constrain and assumptions-risk management strategy-project control strategy-change control document-quality assurance and control-project reporting- Financial control-information management-ETRR-2 Complex stockholders and communication-communication planning-timeline and milestone-Procurement Framework / Milestones –ETRR-2 project delivery approval

3.3 The ETRR-2 Statement of Work (SOW)

IAEA Technical team and staff of ETRR-2 invited to IAEA headquarters in Vienna to finish Statement of Work (SOw). The physical protection team at ETRR-2 finishes the SOw; which includes: general background of the ETRR-2 site; the existing system overview, facility description, applicable documents. SOw determined the scope of work (Detailed Design- Implementation and commissioning-warranty and maintenance period). SOW introduced the ETRR-2 Requirements (Technical Specifications for the new security systems and for each component in details - Environmental protection-integration strategy-surge and tamper protection- system architecture- detection criteria - civil works- Also; SOw shows the required services at ETRR-2 (Documentation and manuals- - Testing and Commissioning -Training- Warranty, Maintenance- Quality Assurance and Sketches
For the project to begin the process of upgrades: Local companies at Egypt were invited to international tender and the companies offers have been submitted to the IAEA according to the IAEA rules, after technical bit is finished by IAEA, ENRRA, and EAEA the selected company has been started and done the followings works:

4. ETRR-2 PROJECT PHASES AND PROGRESS

The Egypt's Second Research Reactors ETRR-2 Program for Physical Protection Upgrades consists of the following 3 phases:

- Phase #1 has been completed and the following systems have been installed

- Two External Intrusion Detection Systems, at Isolation Zone
- Interlock-Mechanism System at the Vehicles Checking Area
- 2 Full Height Double Sided Turnstile Gates, at Entry Check-Point
- New Access Control System, for all gates of, ETRR-1 and ETRR-2
- Pedestrian Radiation Portal Monitor Device, at Exit path Check-Point
- Metal and Weapons Detectors at Entry Checkpoints
- Reinforced and Metal Doors and Bullet Proof Glasses at control room
- X-Ray Baggage Scanner at Entry Checkpoint (ECP)
- Hand Held Metal Detector, and Pocked Radiation Detector at ECP
- Smart key cage systems for keys control
- Backup power supplies (UPSs)

- Phase #2, is in progress and the project objective to make replacement of the Internal Alarm System and associated refurbishment at the Second Research Reactor of Egypt ETRR-2, and Fuel manufacturer pilot plant FMPP, In addition to, Installation of

- New Closed Circuit Television System (CCTV), which it is includes, LED and high resolution monitors, high capacity recording devices NVR, moving PTZ IP/IR cameras, and IP/IR fixed cameras, and uses all digital controller required
- Under Vehicles Electronic Inspection System
- Backup power supplies (UPSs)
- Harden all the glass windows of the reactor and fuel manufacturer pilot plant by metal mesh grilled windows
- Motorized metal sliding doors at main entrance of the reactor building and Fuel manufacturer pilot plant
- New Metal Doors with Access Control System, for all gates located at the Auxiliary building

- Phase #3, Planning stage is finished and each of OR#1, OR#2, and PID documents are introduced to IAEA. The initialisation stage started. The project objective "'Enhancement for of the physical protection System at the radio isotopes production facility (RPF) and the determined works are: Installation of

- New Closed Circuit Television System (CCTV), which it is includes, LED and high resolution monitors, high capacity recording devices NVR, moving PTZ IP/IR cameras, and IP/IR fixed cameras, and uses all digital controller required
- Development of alarm monitoring room
- Suitable lighting fixtures around the facility
- Backup power supplies (UPSs)
- Motorized metal sliding door at main entrance of RPF
- New Access Control System, for all gates located at the isotopes production and operation areas, storages and delivery isotopes and nuclear materials storages
- Smart key cage systems for keys control

5. TRAINING OF PERSONNEL

IAEA pushed training programme to EAEA team in many countries and in parallel with the project process for designated personnel in order to operate and maintain all installed systems and equipment. The training (up till now) included the following areas:

- Security Culture
- Training course on Security Plans
- Training Program on Physical Security Operation
- Physical Protection Inspection
- Testing/diagnostic procedure to ensure the correct operation and performance of the systems
- Training Program on Advanced Security System

6. CONCLUSION

The (IPPAS) programme, initiated in 1995, is a fundamental part of the IAEA's efforts to assist Member States to establish and maintain an effective nuclear security regime to protect against the unauthorized removal of nuclear material and the sabotage of nuclear facilities and material. The IAEA Follow up IPPAS mission report, The IAEA's Division of Nuclear Security worked; IAEA-Egypt Nuclear Security Cooperation Program for Physical Protection Upgrades at Egypt's Second Research Reactor ETRR2. An Operational requirements; OR1, OR2, and Statement of work (SOw) documents has been done. The project involves three phases and it includes: installing new external intrusion systems at the isolation zone, upgrading the entry check point (ECP) and central alarm station (CASs) and alarm monitoring rooms at FMPP and RPF buildings, and new access control system, in addition to install new contraband systems at entry check point and all required civil works. Upgrading the internal alarm system and make integration with all security systems has been installed, also saving the power sources by new UPSs, IAEA pushed training programme to EAEA team in many countries and in parallel with the project process for designated personnel in order to operate and maintain all installed systems and equipment. Finally the IAEA assets Egypt for upgrading the physical protection systems

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