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AN OVERVIEW OF THE GLOBAL THREAT REDUCTION INITIATIVE'S PHYSICAL PROTECTION WORK IN TANZANIA

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ABSTRACT:

The U.S. Department of Energy's (DOE) National Nuclear Security Administration (NNSA) established the Global Threat Reduction Initiative's (GTRI) mission to reduce and protect nuclear and radiological materials located at civilian sites worldwide. Internationally, over 80 countries are cooperating with GTRI to enhance security of facilities with these materials. In 2004, a GTRI delegation began working with the Tanzania Atomic Energy Commission, (TAEC). The team conducted site assessments for the physical protection of radiological materials in Tanzania. Today, GTRI and the Government of Tanzania continue cooperative efforts to enhance physical security at several radiological sites, including a central sealed-source storage facility, and sites in the cities of Arusha, Dar Es Salaam, and Tanga. This paper describes the scope of physical protection work, lessons learned, and plans for future cooperation between the GTRI program and the TAEC. Additionally the paper will review the cooperative efforts between TAEC and the International Atomic Energy Agency (IAEA) with regards to a remote monitoring system at a storage facility and to the repackaging of radioactive sources.

INTRODUCTION:

The threat of terrorists obtaining radiological material for malevolent purposes is real. The malevolent use of such material could cause detrimental physiological, economic, environmental, and health effects.

Part of the mission of the U.S. DOE/NNSA's GTRI program is to protect high-activity radiological material at civilian sites worldwide. Currently the benchmarks for materials to be protected under the GTRI program are found in the GTRI Protection and Sustainability Criteria[1]. This document concludes that radiological sources with an activity greater than 10 Curies meet the criteria for assistance.

The radiological materials in question, mainly cobalt-60 and cesium-137, are used for legitimate purposes and are found in cancer treatment facilities, commercial irradiators, and research facilities. The goal of the GTRI effort is to work with the country's regulators and the individual sites to protect radiological materials from theft and sabotage by improving physical security at the sites. The concern is that radiological materials could be stolen and used for a radiological dispersal device (RDD) also commonly known as a dirty bomb.

GTRI PROGRAM:

In May 2004, the U.S. DOE's NNSA established the GTRI program. The mission of GTRI is to reduce and protect nuclear and radiological materials located at civilian sites worldwide. Internationally, over 80 countries are cooperating with GTRI to enhance security of facilities with these materials.

TANZANIAN REGULATORY BODY OVERVIEW:

The TAEC is a government institution based in Arusha and was established in 2004 by the Atomic Energy Act No. 7 of 2003, which repealed the Protection from Radiation Act 1983. The TAEC is vested with the important responsibility to advice the Government on matters relating to radiation; regulate the use of radiation sources, and to promote the application of nuclear technology for peaceful purposes.

TAEC is charged with the functions in relation to the control of the use of ionizing and non ionizing radiation sources, the promotion of safe, secure and peaceful use of nuclear technology and atomic energy; and to advise the government on the implementation of international conventions related to nuclear technology and atomic energy.

The TAEC regulates both ionizing and non ionizing radiation practices and also provides a wide range of nuclear technology applications related services to various stakeholders including radiation safety inspections, radioanalytical services and radioactive waste management, dosimeter and calibration services, repair and preventive maintenance services, and training.

The top management of the TAEC is made up of the Commission (Board of Directors), a Director General and the Directorate Heads. The Commission is responsible for ensuring that the functions of the Commission are implemented efficiently and effectively according to the enabling Act. The Director General with the assistance of the heads of directorates is responsible for supervising and monitoring the Commission's work programs and activities. TAEC has two technical Directorates (Radiation Control and Nuclear Technology), one support Directorate (Finance and Administration) and two units under the Director General's office (Legal Unit and

Internal Audit). There are also the zonal offices (Branch Offices) in Zanzibar and Dar es Salaam, which report to the Directorate General.

Currently, Tanzanian laws and regulations are in effect that specify security requirements for different types and amounts of nuclear and radioactive sources in country. These have been developed by working closely with the IAEA to ensure compliance with international standards.

COOPERATION PROGRAM BETWEEN GTRI AND TAEC:

The cooperation activities between the GTRI program and TAEC began in 2004. In addition to the physical protection upgrades at the sites described in this paper, the NNSA/GTRI program has sponsored two Search and Secure training sessions and an Interpol meeting with the Tanzanians. The search and secure training covered the use of radiation detection equipment, how to locate sources, the identification of unknown sources, and surveying the radiation levels in an area. This training was conducted along with representatives from Uganda, Kenya, and South Africa. Radiation detection equipment was provided to Tanzania after the training.

At the Interpol training, representatives from the Tanzanian police were instructed on how to identify sources, locate sources, measure radiation fields, and how to report the findings to subject matter experts to resolve any issues.

In the fall of 2007, Firmi Banzi, the paper author and Director at the TAEC, was hosted for two months at Sandia National Laboratories as a visiting scholar. During this time, he toured the physical protection equipment testing facilities at Sandia National Laboratory. Mr. Banzi researched radiological regulatory requirements while at Sandia and visited radiological survey equipment manufacturers. While in New Mexico, Mr. Banzi also toured the radiological sources recovery and repackaging group at the Los Alamos National Lab. Mr. Banzi completed his time in the United States with a visit to the GTRI program offices in Washington D.C.

PHYSICAL PROTECTION UGPRADES:

The implementation of GTRI-funded physical protection upgrades at facilities in Tanzania began in 2004. Since that time, cooperative work efforts have been implemented at sites in and around the Tanzanian cities of Arusha, Dar es Salaam and Tanga. The project work began with an initial review of listed radiological materials provided by TAEC and with preliminary site visits to the sites in Arusha, Dar es Salaam and Tanga. Based on this initial review, contracts were signed with TAEC to begin implementation of some site security upgrades.

To date six sites in Tanzania have received GTRI funded security upgrades: two medical facilities, two disused radiological sealed-source storage sites, a biological irradiator, and one university research facility. The need for security at one medical facility and the temporary source storage facility has ended as the sources housed there have since been moved to the long-term source storage facility. Subsequent trips to Tanzania in the years since by some of the members of the GTRI team have resulted in formalizing agreements on the detailed designs and the installation and upkeep of the physical protection systems at the sites that still possess large sources.

Typically on an initial visit, the GTRI teams gather relevant information concerning the site. This information includes; the specific radiological source, the inherent delay of the equipment the source was used in, its location in the facility, the type of site personnel needing access to the facility, the relative threat to the source (generally the crime rate in the surrounding area), and the type and time-line of local response forces. In some facilities, components of a physical security system were already in place and only minor adjustments to the security systems were necessary while at others, the security system had to be designed from the ground up.

Some physical protection system designers may use a design philosophy that starts with a fence around the entire facility and installs detection as far from the target as reasonable. However, the GTRI program basic design philosophy starts at the target (the source) and works its way out to the perimeter. Because some of these sources are in medical treatment equipment that is in use daily, that perimeter typically was limited to the room or area in the medical facility where the source was located. Since this is a voluntary program, the requests of the individual sites were also primary considerations in system design. Given patient treatment and confidentiality concerns at medical treatment facilities, it was imperative that the installed systems be operated in a manner that addresses these concerns.

For most of the medical facilities the basic design included security access doors with magnetic door alarm switches, other means to harden the room or area from intrusion such as window bars, wall plates (if necessary), room or area access control, intrusion detection devices, closed circuit television camera coverage with video recording (in most cases), and monitoring of the alarms. The system design was reviewed with the site owners who gave their approval before hardware was installed.

Given the radiological source quantities and the limited access issues related to the national radiological waste storage sites and the biological irradiator, the physical security deigns for these locations included other enhancements. Additional security enhancements included interior storage provisions, such as locking cabinets and a backup power supply generator. The majority of the site upgrades were completed in 2008. Some pictures, showing examples of the site upgrades are included in the conference presentation.

Similar upgrades have been provided to a tsetse fly irradiator facility in the city of Tanga and the national radioactive sealed source storage facility in Arusha. This storage facility for orphan and disused sealed sources contains many sources that are no longer needed in the country. A large disused medical source from the Muhimbili hospital in Dar es Salaam was removed to the national storage facility in 2005. The facility also houses other smaller sources that were no longer needed or have been seized from the possessor of an unlicensed source.

IAEA INTERACTIONS:

The United Republic of Tanzania (URT), as a member state of the IAEA since 1976, has been involved in a number of IAEA projects on the safe use of radioactive materials for development within and outside the continent of Africa. The URT is a signatory or in the process to sign or accede with the international obligations and compliances including Agreement, treaties and

conventions. Since 2003, the URT is participating in the IAEA projects related to the security of nuclear and radioactive materials: RAF/0/021, RAF/9/36 and RAF/9/41 within the region of Africa aiming at preventing, detecting and response to malicious use of radioactive materials. Through the IAEA, the URT has been able to conduct training courses and provided detection equipment to the front line officers and MEST for combating the Illicit trafficking of radioactive materials. In collaboration with the IAEA, the URT has collected and managed about sixty five disused and spent sources and kept them safe and secure in its central radioactive waste management facility. In 2009, the IAEA program of the management of Spent High Activity Radiation Sources (SHARS) came to Tanzania. This mobile hot-cell was used to condition over 100 large radioactive sources and put them into a single shielded shipping container.

FUTURE COOPERATION:

GTRI program personnel continue to remain in contact with partners at the TAEC to ensure the installed systems are operating as designed. Both the GTRI program and the National Regulatory Authority receive quarterly reports from the local alarm monitoring contractor on system operability status and any system repairs that were made. As new radiological sources that meet the Protection and Sustainability Criteria Document criteria are imported into Tanzania, the project team will work to see that the same security upgrade support is offered. The GTRI program funds the maintenance and monitoring of the installed systems for the first three years of operation. After this three-year time period expires, it is the expectation that the site will ensure the continued operation and maintenance of the security system.

CONCLUSION:

Over the past 6 years, the GTRI program has worked with the TAEC to ensure that the large radioactive sealed sources in Tanzania have appropriate security upgrades implemented at those sites. In addition, training has been provided to representatives from Tanzania on the proper use of radiation detection equipment, how to search for and identify radioactive sources, and how to recover, package, and safely store those sources.

REFERENCES:

1. National Nuclear Security Administration, Office of Global Threat Reduction, Protection and Sustainability Criteria, February 2010, Washington, DC.