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TITLE: “Strengthening Cradle-to-Grave Control of Radioactive Sources in the Caribbean Region”

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ABSTRACT

The Great Caribbean region is characterized by a significant maritime trade using the sea as a highway to facilitate the movement of persons and goods among seaside countries within the region. Associated to this traffic, occurrences have been reported at borders and inland of non-regulated trade accidentally involving radioactive sources or contaminated materials which need to be properly addressed upon positive detection.

For years, the IAEA has been working on strengthening the control over radioactive sources to avoid these occurrences and to protect the public and the environment from the hazards of ionizing radiation, as well as, to prevent sources from becoming orphan. Against this background, a “cradle to grave” control of radioactive sources is essential, as promoted by the Code of Conduct on the Safety and Security of Radioactive Sources. This “Cradle-to-Grave” approach includes national policies and strategies, an adequate legal and regulatory framework, as well, as adequate resources and infrastructures to ensure safe and secure management of radioactive sources.

The IAEA technical cooperation programme provides assistance to Member States to face these challenges. Building on the experience and successes of the interregional project INT9176, titled “Strengthening Cradle-to-Grave Control of Radioactive Sources in the Mediterranean Region”, Jamaica has proposed to the IAEA a regional project proposal on “Strengthening Cradle-to-Grave Control of Radioactive Sources in the Caribbean Region”. This project aims to contribute to establish and/or improve a sustainable, safe, adequate and permanent “cradle-to-grave” control of radioactive sources following a harmonized approach consistent with the IAEA Basic Safety Standards (BSS) and other international best practices. If approved by the IAEA, it would start running in 2016 with a four-year lifetime and would focus on countries within the Great Caribbean region that are new to the TC programme or have basic needs to establish “cradle to grave” control of radioactive sources.

INTRODUCTION

The Greater Caribbean is characterized for an intense maritime traffic. From there, people and goods move farther into North, Central, and South America and the rest of the world. Throughout the Caribbean and other regions, radioactive sources are widely used for beneficial purposes in different industries, medicine, agriculture and research. Sources are present in a very wide range of equipment that is used for, inter alia, cancer treatment, killing bacteria in food, sterilizing medical supplies, measuring instruments such as, gauges used to measure soil moisture and soil density and many other components, irradiating seeds for enhancing food production, protecting buildings from lightning strikes, mapping underground sources of water, prospecting for oil and gas reserves, or even detecting smoke. At their “cradle” and when in use, radioactive sources are usually properly managed and controlled. It is when a source has reached the end of its useful life that they become at risk of being under inadequate control, poorly managed, or even becoming orphan. Sources that have reached the end of their useful life must be carefully and safely managed. The “grave” of disused sources needs proper disposal processes to prevent them from becoming orphans or from posing a potential threat to people or the environment. Exposure to large doses of

radiation from an unshielded high activity source can be lethal or cause severe radiation injury [1, 2]. If the source capsule is damaged the radioactive material can be released and dispersed, resulting in contamination to the environment. Orphan sources (those not under effective regulatory control) or malicious acts, such as, illicit trafficking or terrorism, are different ways in which a source may pose a threat to human health and the environment.

To protect the public and the environment from the potential hazards of ionizing radiation, and to prevent disused sources from becoming orphan, a “cradle-to-grave” control of radioactive sources is essential, as promoted by the Code of Conduct on the Safety and Security of Radioactive Sources. This approach requires a national policy and strategy, an adequate legal and regulatory framework, and adequate resources and infrastructure. A strong regulatory framework for the long-term management of radioactive sources must cover the entire lifecycle, from production and use to storage and disposal. Due to the lack of proper management systems or technological capabilities, the management of end-life cycle of radioactive sources - in particular disposal - has proven a complex challenge for many IAEA Member States. For many years the IAEA has been helping Member States to strengthen their national management and regulatory infrastructures to ensure that the radioactive sources are properly regulated at all times, including accountancy, licensing, inspection procedures of practices involving the use of radiation sources, controlling export–import operations of sources and training and equipping law enforcement and border control bodies.

A COMPREHENSIVE APPROACH FOR A CRADLE-TO-GRAVE CONTROL OF RADIOACTIVE SOURCES

The novelty of the cradle to grave project model consists in following a holistic approach to the control of radioactive sources, engaging policy makers, regulators and waste management operators within a common setting and encompassing a broad spectrum of capacity building, expert advice and technological developments. This approach builds on the experience of a previous “cradle-to-grave” project developed by three IAEA Technical Departments (Department of Technical Cooperation, Department of Nuclear Safety and Security Department of Nuclear Energy) involved in the implementation of the “cradle-to-grave” project model.

This approach has already provided substantive contribution towards the establishment of sustainable “cradle-to-grave” frameworks in a number of countries within other geographical regions. Such an approach focuses on supporting the development of tailor-made national policies and strategies to achieve sustainable “cradle-to-grave” control of radioactive sources, solid regulatory programs and processes, and up-to-date techniques to manage, control and authorize the use of the sources while in use and to safely manage them when they become disused. It also aims to foster international cooperation among countries of the Caribbean region to address matters of common interest, to contribute, where possible, to define and put into place region-wide harmonized policies, strategies and practices for the safe and secure management of the radioactive sources at all stages including a well-defined end-point for DSRS.

The IAEA Technical Cooperation approach promotes tangible socio-economic impact by contributing directly in a cost-effective manner to the achievement of the major sustainable development priorities of each country [3]. By strengthening the control of radioactive sources in the Caribbean region, the IAEA aims to contribute to foster the safe use of these sources according to different national development priorities, thus promoting the safe and peaceful use of nuclear technology and techniques for development.

This approach focuses on providing expert support and assistance to cover specific needs at either national or regional levels; organizing comprehensive national, regional and interregional training and capacity-building programmes, undertaking expert missions that are country-based and address specific needs, and developing and making available the necessary technological tools and means, so the Member States can perform different “cradle-to-grave” activities without being restricted by technological constraints. Ways to foster and enable transnational cooperation are being sought in order to ensure sustainability of results far beyond the time frame of the project.

CHALLENGES AND OPPORTUNITIES IN THE CARIBBEAN REGION

To date, many countries in the Caribbean region are in the process of building or strengthening their regulatory framework and infrastructures for the control of the use of radiation sources, and in particular for the control of radioactive sources, and among other activities are implementing the provisions of the Code of Conduct on the Safety and Security of Sources [4].

Nevertheless, significant gaps remain to set-up a comprehensive and safe “cradle to grave” management system of radioactive sources. Nine countries are still in need of completing or improving their national framework to manage and regulate all aspects of the use, storage and disposal of radioactive sources.

Lack of proper defined and approved disposal routes forces the storage of disused sources in temporary locations with poor supervision and in some cases has resulted in the sources being accidentally eliminated through conventional disposal routes or simply abandoned in the environment. Safe conditioning, storing and disposing of radioactive sources is not only a matter of resources; it also requires careful regulation, safety assessment and planning, including sound policy and strategy, effective institutional framework, comprehensive operational procedures, as well, as appropriate human and financial resources.

Regrettably, not all the countries of the Caribbean region have developed and enforced a national policy and strategy and corresponding management capabilities for the long-term management of disused radioactive sources. In addition to this, there is room to improve the present international cooperation between the countries of the region to tackle common problems associated with the regulated and unregulated movement of sources and radioactively contaminated materials, inter alia, notification, authorization and denial of shipments, import and export of sources, repatriation of contaminated material detected at borders and transit conditions.

Bearing in mind that there are multiple operations and shipments crossing the Caribbean Sea on a daily basis, it is essential to raise awareness of the importance of proper and safe management and disposal of disused sealed radioactive sources (DSRS), and international cooperation to enhance their control. It is also vital to establish national and regional support structures to strengthen technical and human resources to ensure sustainability. Against this background, the project intends to cooperate with participant countries to set up appropriate national policies and strategies aimed to establish safe and sustainable “cradle-to-grave” control of radioactive sources, develop and/or reinforce the existing, where available, regulatory and management capabilities and foster international cooperation among the countries within the region to address matters of common interest associated with the use of the Caribbean Sea as a transport highway and, where possible, define and establish harmonized policies and approaches in regards to the control and movement of radioactive sources.

COUNTERPARTS AND PARTNERSHIPS

The following countries are potentially interested in the project: Jamaica as leader country, Trinidad and Tobago, Bahamas, Dominica, Belize, Haiti, Cuba (resource), Dominican Republic, Mexico (resource), Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, and Venezuela.

Participating countries will also offer their expertise to other participating countries. With the support of the IAEA, those countries with more developed capacities and capabilities will share their experiences and provide expertise to other countries, thus fomenting and fostering regional cooperation and partnerships between Caribbean countries.

SCOPE, APPROACH AND OBJECTIVES

The project covers all possible aspects for a “cradle-to-grave” management of radioactive sources in a comprehensive way. Different stakeholders (policy makers, regulators and operators) are approached at different stages to tackle different challenges related to the management of DSRS. At any moment, these stakeholders are fully aware of the steps being taken by the others together with the IAEA. One of the key aspects of the project is its transparency and coordination. This project follows a logical holistic approach and is based on progressive capacity-building. The project focuses firstly on policy and strategy in order to build a solid framework for regulators and operators to act and exercise their functions. Once this framework is established, the project targets in parallel, both operators and regulators. Depending on each country’s needs, more attention is given to one or another group. This second part is propped by a sound capacity-building programme based on expert support, exchange of information, sharing of good practices and training.

The project is designed around five main outputs, each covering different aspects of the management of radioactive sources:

1. Inventory of DSRS is developed and in place
2. DSRS collected, conditioned, and safely and securely stored
3. Appropriate governmental, legal and regulatory framework on radioactive sources is established and/or improved
4. International Cooperation mechanisms promoted
5. Awareness raised on the benefits and risk of SRS

CONCLUSIONS

Radioactive sources are at the heart of the peaceful uses of nuclear technologies aimed at promoting tangible socio-economic impact and contributing to the achievement of sustainable development priorities. However, the use of these radioactive sources needs to be properly controlled, especially when they become disused or are no longer needed, in order to avoid potentially harmful situations involving orphan sources, malicious acts or other mishaps.

A proper, harmonized and comprehensive control of DSRS is fundamental to ensure the safe use of radioactive sources for nuclear applications in the Caribbean region. This control needs to include a sound policy and strategy, an adequate legal and regulatory framework, adequate resources and sufficient infrastructure. This cradle-to-grave approach needs to cover transport, conditioning, storage and disposal of radioactive sources to avoid harmful situations derived from poor or lack of appropriate management. Issues such as storage and final disposal need to be properly addressed in time in order to avoid mismanagement or undesired situations.

The IAEA, through its technical cooperation programme, supports Member States in the establishment of such cradle-to-grave management of radioactive sources. This project serves as a platform for regional and international cooperation, exchange of lessons-learned and good practices, as well, as training and capacity building.

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