



# National Radiation Protection Policy

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## Glossary

Radiation	In this text the term radiation refers to ionizing radiation.
Ionizing Radiation	For the purposes of radiation protection is radiation capable of producing ion pairs in biological material(s), which can be divided into low linear energy transfer radiation and high linear energy transfer radiation.
Low Linear Energy Transfer (LET) Radiation.	Radiation with low linear energy transfer, normally assumed to comprise photons (including X rays and gamma radiation), electrons, positrons and muons.
High Linear Energy Transfer (LET) Radiation.	Radiation with high linear energy transfer, normally assumed to comprise protons, neutrons and alpha particles (or other particles of similar or greater mass).
Orphan Source.	A radioactive source which is not under regulatory control, either because it has never been under regulatory control or because it has been abandoned, lost, misplaced, stolen or otherwise transferred without proper authorization.

# National Radiation Protection Policy

## 1.0 Introduction

1. Ionizing radiation cannot be detected by the human senses. This has been recognized since early studies on X-ray and radioactive minerals, which showed that exposure to high levels of radiation can cause clinical damage to the tissues of the human body. Radiation can induce cell death, which results in impaired function of the irradiated tissue or organ. These effects are clinically observable if the radiation dose exceeds a certain threshold which is called 'deterministic' (e.g. skin damage, nausea, vomiting, sterility, and epilation). Radiation can also induce a non-lethal transformation of a cell that still maintains its reproductive capacity. This cell transformation might lead to cancer in the exposed individual after a latency period and is called 'stochastic'.
2. The reality however, is that radioactivity is a natural phenomenon and natural sources of radiation are features of the environment. These range from the activity in geological formations, and dispersed sources in water and air. Radiation and radioactive materials have many beneficial applications, ranging from power generation to uses in medicine, industry and agriculture. The radiation risks to workers and the public and to the environment that may arise from these applications have to be assessed and, where necessary, controlled. Ionizing radiation and radioactive materials can also be used to cause intentional harm and therefore its application and use transcends safety and trade to encompass security issues.
3. There are however, significant beneficial uses of radiation in medicine, industry, agriculture, and research. Its application in economic activities continues to increase with medical applications by far the largest contributor to the radiation exposure of the general population from artificial sources globally. The situation is similar in Barbados where radiation is used in the treatment of patients, quality control, oil exploration and road construction. The benefits of radiation use are expected to exceed the adverse effect in a society but the current framework would benefit from improvements in line with international standards for sources and activities.
4. Regulating safety and security is a national responsibility. However, radiation hazards may transcend national borders, and international cooperation serves to promote and enhance safety globally by: exchanging experience and security information, improving capabilities to control hazards, preventing accidents, and responding to emergencies to mitigate any harmful consequences. To reduce the potential negative consequences of growing international security regulations on trade in

- radiation sources for medical applications, the Government of Barbados agreed to join the International Atomic Energy Agency (IAEA) and agreed to implement the requirements set out in the IAEA Statute and other relevant documents.
5. As a result of these instruments, Barbados has joined a global nuclear safety and security regime, which is being continuously improved as the security threats change. The IAEA Code of Conduct, Safety Standards, and Guidelines provide the basis to augment the national safety infrastructures, but are also the cornerstone of the global safety and security regime.
  6. The IAEA safety standards constitute a useful tool for IAEA Member States to assess their performance under these international agreements. International safety standards provide guidance for States in meeting their obligations under general principles of international law. Implementation of a legislative framework, regulatory infrastructure and safety standards at the national level, assure other Member States of the controls in place for radiation safety and security and facilitates international cooperation, and commerce.
  7. In order to ensure the protection of people and the environment from harmful effects of ionizing radiation, Barbados needs to update the national legislative framework, and regulatory infrastructure to monitor and control the radiation exposure of people and the release of radioactive material to the environment, to minimise the likelihood of events that might lead to a loss of control over a radioactive source or any other source of radiation, and to mitigate the consequences of such events if they were to occur.
  8. The process must apply to facilities and activities that give rise to radiation risks, including nuclear installations, the use of radiation and radioactive sources, the transport of radioactive material, the management of radioactive waste, the management of disused sources, recovery of orphan sources, import/export of radioactive sources and the disposal of radioactive sources.

## 2.0 Existing Situation

### 2.1.0 Background

9. After the tragic events of 11<sup>th</sup> September 2001, the United Nations Security Council adopted Resolution 1373 under Chapter 5 of the United Nations Charter. This Resolution sought to increase international cooperation and enhance national measures to prevent, suppress the financing and preparation of any acts of terrorism. Further to the above, the United Nations Security Council Resolution 1540 [38] was also adopted under Chapter VII of the Charter of the United Nations. This Resolution obliges States to adopt and enforce appropriate and effective laws, which prohibit any non-state actor to manufacture, acquire, possess, develop, transport or use (among other things) nuclear weapons, in particular for terrorist purposes. The practical effect of these instruments made trade in radioactive sources difficult as those states who are members of the IAEA are obligated by international and domestic law to adhere to IAEA's safety and security requirements.
10. As a result, Government has renewed efforts to implement historical and recently signed international agreements. Of special interest are: the Non-Proliferation Treaty, the Comprehensive Safeguards Agreement, Small Quantities Protocol and the Additional Protocol. Barbados has signed a Comprehensive Safeguard Agreement and the original Small Quantities Protocol with the International Atomic Energy Agency. However, the Government has not concluded the Additional Protocol or updated the Small Quantities Protocol which would allow IAEA to verify national compliance with the Non-Proliferation Treaty.
11. In 2004, difficulties with the import of medical substances for the diagnosis and treatment of patients resulted in Government enacting the Miscellaneous Controls (Importation and Exportation of Goods) (Prohibition) (Radioactive Materials) Regulations, 2004. This was a result of the requirement for an import and export licence regime which affected businesses that conduct practices which use radioactive source. Subsequently, the Customs (List of Prohibited and Restricted Imports and Exports) Order, 2009 was enacted and amended by the Customs (List of prohibited and Restricted Imports and Exports) (Amendment) Order, 2010. These laws are however inadequate to meet the legislative and regulatory standards of the IAEA, particularly the Code of Conduct on the Safety and Security of Radiation Sources.
12. The attack also exposed the vulnerabilities and raised security concerns associated with terrorism. Regulatory controls and powers expanded for radioactive materials, toxic chemicals and their precursors, and harmful biological matter. These regulatory controls are based on an

- interconnected superstructure of international legal instruments among supranational institutions and States (IAEA, 2002; IAEA, 2008; OPCW 2018; Haralambos and Holborn, 1993; Castells 1999). The safety and security regimes within the international legal instruments are aimed at the prevention of terrorism and to ensure non-diversion of radioactive, chemical and biological materials from peaceful activities and into the control of non-state actors for destructive purposes (IAEA, 2017; OPCW 2018).
13. The incremental changes in the safety and security infrastructure by advanced countries saw increased regulations on those materials that were declared national security threats in an effort to control the production, transportation, use and disposal of materials that could be used to cause harm on a large geographical and temporal scale. Specifically, the instruments introduced Prior Informed Consent procedures and restrictions in trade between state parties with comprehensive regulatory frameworks in place for scheduled substances and materials listed in the three treaties. The regulations were based on four main conventions namely: International Health Regulation, 2005; the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (1972); the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (1992); and the Treaty on the Non-Proliferation of Nuclear Weapons (1968 and 2017). Parties to these conventions are encouraged to ensure that the international obligations are met through grant funding to establish the regulatory infrastructure and trade restrictions.
  14. Three converging and simultaneous pressures forced Caribbean States to develop and implement clear policies and laws on chemicals, nuclear materials and biological agents to reduce the impacts of these changes on the medical, construction, agricultural, manufacturing and education sectors. These pressures were: growing diplomatic pressure from developed economies for countries to comply with the obligations outlined in international Conventions; changes to international and national laws particularly for chemicals, nuclear materials and biological agents; and the technical trade barriers to prevent trade with countries with no or weak regulatory infrastructure.
  15. Jamaica was the first to respond to these forces with the enactment of National Nuclear Law and Regulations for Control of Radiation Sources with the implementation of the “Nuclear Safety and Radiation Protection Act, 2015” and the subsequent establishment of the Hazardous Substances Regulatory Authority in September 2017 (Glenn, 2018). A driving force for in Trinidad and Tobago was the overexposure of two

hundred and twenty-three patients to radiation at the Brian Lara Cancer Treatment Centre. This added urgency to the preparation of the Ionizing Radiation Protection and Security Bill 2017 and Ionizing Radiation Regulations (Rambally, 2011; IAEA, 2017a). These legal instruments were scheduled for debate in Parliament for January 2018 (IAEA, 2017a) but were delayed. Barbados, Bahamas, Antigua and Barbuda, and Guyana are all at varying stages of the legislation development process with varying completion dates.

16. Of particular interest in Barbados is the potential impacts of the international regulatory changes on timely receipt of cancer treatment medication. As a result, Barbados established a temporary framework licensing mechanism for radiation based on existing laws between the Ministry of Commerce and Consumer Affairs and the Environmental Protection Department in 2004. This arrangement facilitated the procurement of critical short life radiation treatment units from 2004 to present. However, the new requirements are threatening future imports as this temporary regulatory arrangement is not supported by an appropriate, comprehensive legal infrastructure in accordance with the principles outlined in the IAEA Code of Conduct (IAEA, 2004). In that regard, Barbados has commenced work on a draft policy paper, an action plan and legislation guidance to facilitate the preparation of requisite legal instruments in 2018 with the assistance of the IAEA (IAEA, 2017a).

### 2.1.1 Current Regulatory System

17. The regulation of ionizing radiation in Barbados is governed by a number of agencies. These are the Ministry of Commerce and Consumer Affairs, the Environmental Protection Department, the Customs Department, the Ministry of Health and Wellness and the Labour Department. Each agency has a specific role to play—the Ministry of Commerce and Consumer Affairs and the Environmental Protection Department, for example, oversee the issuing of licenses, the Labour Department's role is to ensure the safety and health of the employees who use the sources of radioactive materials whilst the Ministry of Health and Wellness also addresses worker safety and inspection of equipment used to treat cancers.
18. The process for the application of a license to import radioactive materials is a manual one and involves the applicant having to physically move between agencies. This results in delays, duplication of effort and it is recognized that the use of ICTs could streamline this process by eliminating redundancies, provide the various regulatory agencies with a means through which they could access information needed to achieve their mandate and provide applicants with a web portal from which they could easily make their applications.

19. The Environmental Protection Department processed 407 applications for the use of radioactive materials at an average rate of 37 applications per year for the period 2008 to 2018 (See Appendix I). Medical applications are the dominant use and corroborate the discharge diagnosis and mortality information presented by the Chief Medical Officer's Report 2015 (MOH, 2015).
20. Presently, the license for the import and export of radioactive materials is issued by the Ministry of Commerce and Consumer Affairs under the Miscellaneous Controls (Importation and Exportation of Goods) (Prohibition) (Radioactive Materials) Regulations, 2004 and the Customs (List of prohibited and Restricted Imports and Exports) (Amendment) Order, 2010. Applicants are required to collect and complete import and export application forms from the Ministry of Commerce and Consumer Affairs. These forms are submitted to the Environmental Protection Department along with the completed Technical Application Form from the EPD. The final decision on the import of radiation is taken by the Ministry of Commerce and Consumer Affairs after EPD confirms that the safety, health, security and emergency response safeguards are in place.
21. Additional arrangements for the management of radiation are identified in the Safety and Health at Work Act, 2005 (SHAW) and the Radiation Protection Act CAP 353A (RPA). These instruments both require inspection of facilities that use radiation and radioactive material to determine compliance with the statutes. The SHAW Act requires a risk assessment on all activities, processes and procedure before employees can engage in the activity. The RPA requires inspection of property and equipment to ensure staff and patients are not exposed to more radiation than is necessary.
22. Further changes in the international regulatory regime prompted Barbados to join the International Atomic Energy Agency (IAEA) in 2015, which requires greater investment in the regulatory system to comply with new international obligations. The regulatory framework as required by the IAEA stipulates the establishment of an independent regulatory agency with the requisite legal authority to license and regulate processes, practices and activities that involve the use of radiation (IAEA, 2014; IAEA 2006). This involves ensuring safety, security and the national emergency response infrastructure to address both intended and unintended releases of radiation to the environment are fully established.
23. The current regulatory arrangements are not based on all the principles of the IAEA Code of Conduct but was purely established to facilitate trade. However, the grace period outlined in the Medium term implementation strategy for the IHR, 2005 elapsed in 2013 and was extended for an additional two years to 2015 (WHO, 2007). This situation of not having a

permanent legal and regulatory infrastructure in place raises the trade barrier issue again particularly for radiation. Additionally, Departments continue to operate as independent units isolated from the action of each other with little or no communication regarding how the system functions. Cultural norms and practices regarding safety and security vary significantly from international partners and raises questions particularly on how materials are secured based on contemporary understanding of risk factors.

24. In order to maintain the continuous import of equipment which contains radioactive materials for the medical, mining, research, educational and construction industries, it is imperative that Barbados establishes the regulatory framework as outlined by IAEA. Lack of access to critical pieces of equipment can result in the loss of life, a decrease comfort levels for those who depend on radiation equipment for palliative care and loss of revenue to commercial stakeholders. Given the sensitive nature of the geopolitical environment, it is therefore the intention to manage the regulation and licensing of ionizing radiation and radioactive materials and associated communication issues through the use of ICTs (website, electronic database) where appropriate.
25. Consequently, the Government of Barbados decided to join the International Atomic Energy Agency based on Cabinet Decision dated 19 February 2015 Note 15 (104) MH/(06). Amongst other things, this decision designated the EPD as the regulator for IAEA matters and directed the Minister of Foreign Affairs and Foreign Trade to prepare and sign the requisite instrument for membership to the IAEA and acceptance of the provisions of the IAEA Statute. The Instruments of acceptance to paragraph B of Article IV and Paragraph C of Article XXI of the Statute was signed in October 2015.

### **2.2.0 Use of Radiation in Barbados**

26. In Barbados radiation is used for medical, industrial, agricultural, research and education purposes. A brief description of each is presented below, which is based on information collected by the EPD.

#### **2.2.1 Medical Use**

27. The medical use of radiation is by far the most widely used. Radiation and radiation sources are utilized in hospitals, polyclinics, medical clinics, and dental clinics for various modalities such as for diagnostic investigations, radiotherapy and brachytherapy treatment of tumours and nuclear medicine diagnostic investigations and treatments. The Queen Elizabeth

Hospital utilise radiation in brachytherapy treatments and x-ray applications.

### **2.2.2 Industrial Use**

28. The use of radiation in industrial process is dependent on the nature of the industrial process and this varies from soil moisture and density testing to fill and thickness gauging. Radiation is used in road construction to determine soil moisture and density, in manufacture for density assessments and filling of bottles, and in geological assessment in the oil industry. The Ministry of Public Works and Transport, Rayside Construction, C.O. Williams Construction, and Pinnacle Feeds Ltd all use nuclear density gauges whilst the Barbados National Oil Company Ltd use radiation for well logging activities through an import export arrangement for the source.

### **2.2.3 Agricultural Use**

29. The use of radiation in agriculture varies from the implementation in tissue culture for sterilizing tissue cells to soil moisture testing. This is not a routine application and the source cannot be accounted for at this stage. The Government is currently working with the IAEA to acquire skills and knowledge to detect orphan sources of radiation in that regard.

### **2.2.4 Research and Education Use:**

30. In the educational system, sources are utilised mainly to communicate the properties of radioactive materials to students and the research of their effects on matter. The University of the West Indies and Barbados Community College are the known users of radioactive materials.

## **2. 3.0 Existing Legislation**

31. There are several primary legislative instruments that regulate practices which generate ionizing radiation, use radioactive sources or where workers are exposed to natural sources of ionizing radiation. These laws are: Customs Act CAP 66; Accident and Occupational Diseases (Notification) Act, CAP.338; Radiation Protection Act, CAP 353A; Safety and Health at Work Act Cap 356; and The Paramedical Professions Act, Cap 372C. The relevant legal clauses are identified in **Error! Reference source not found..**

32. Appendix II shows the subsidiary enactments that describe the procedures to be followed by the regulated individuals.
33. The provisions in the Acts and the subsidiary enactments address some aspects of the standards of the IAEA but these are limited to specific activities and do not address all activities, practices and sources of radiation in the country. Clearly the regulatory authority is distributed across different departments and implementation is not holistic with several information and implementation gaps.
34. It is evident that consideration needs to be given to an improved legislative infrastructure complemented by programmes to ensure and confirm the safe use of radioactive materials and ionizing radiation in a beneficial manner.

#### **2.4.0 Existing Organisational Framework**

35. There is no holistic regulatory structure specifically for safety and security against ionizing radiation, and radioactive practices and sources in Barbados. Some legislative instrument and subsidiary instrument are in use, which assign responsibilities at different stages of the life cycle of radioactive materials. These are not comprehensive and neither do they address the scope and detail of the IAEA's Code of Conduct and Safety Regime. The legal instruments were discussed in Section 2.3.0. The following section provides an overview of those agencies with legislative accountability for the Radiation Protection Act, Cap 353A; The Paramedical Professions Act, Cap 372C; Customs Act 1963 as amended 2010, Miscellaneous Controls (Importation and Exportation of Goods) (Prohibition) (Radioactive Materials) Regulations, 2004; Customs (List of Prohibited and Restricted Imports and Exports) Order, 2009, paragraphs 3, 5 (2), Second Schedule; the Safety and Health at Work Act Cap 356 (SHaW), 2005; and Schedules 2 and 3 Accidents and Occupational Diseases (Notification) CAP. 338.

#### **2.4.1 Ministry of Environment and National Beautification**

36. The EPD's mandate for environmental protection evolved from the provisions of the Health Services Act, CAP 44 and more recently the Marine Pollution Control Act CAP 392A. The institutional structure and staff competencies reflected the primary mandate of addressing the engineering issues associated with public health derived from pollution hazards originating from the air, water and soil. The Department provides services of pollution monitoring, regulatory and compliance inspections,

and assessment and regulation of discharges to the environment. An important component of the work of the Department is the review of building development applications against the Health Services (Building) Regulations, 1969 which utilises several engineering skills and knowledge. The Health Services (Building) Regulations require that all development acquires approval from the Ministry of Health and Wellness. This requires the review of all structures that involve the use of ionizing radiation and radioactive sources. This Regulation is used in conjunction with the Radiation Protection Act, CAP 353A and the Health Services (Private Hospitals and Nursing Homes) Regulations, 2005 to support the technical review.

37. In addition to the above, the Miscellaneous Controls (Importation and Exportation of Goods) (Prohibition) (Radioactive Materials) Regulations, 2004 allow the importation of radioactive sources through an import licence granted by the Customs Department. The license is granted only if the applicant can source a certificate from the Environmental Protection Department. Applicants are eligible for the certificate on provision of information on emergency procedures, storage of the radioactive source, designation of a responsible person and the provision of the name and qualifications of the operator. Table 1 presents information on the annual number of applications processed and certificates issued by categories.

**Table 1: Applications Processed for the Importation of Radiation<sup>1</sup>**

YEAR	NUMBER OF APPLICATIONS PROCESSED	CLASSIFICATION OF APPLICATIONS		
		Medical	Industrial	Research
2008	36	33	3	0
2009	42	38	3	1
2010	35	34	1	0
2011	36	29	7	0
2012	34	30	4	0
2013	31	30	1	0
2014	33	31	2	0
2015	30	27	3	0
2016	38	31	7	0
2017	48	48	0	0
2018	50	49	1	0
<b>TOTAL</b>	<b>413</b>	<b>380</b>	<b>32</b>	<b>1</b>

<sup>1</sup> Data summarised from the Environmental Protection Department's Database on File 808/2 Vol. I to Vol. VI Hazardous Substances: Radiation Materials Import Licensing.

#### **2.4.2 Ministry of Health and Wellness**

38. The Chief Medical Officer (CMO) has primary responsibility for the health of residents and citizens as required by the Health Service Act, CAP 44. Some of these responsibilities are assigned to the Environmental Health Department with the objective of “promotion and preservation of the health of the inhabitants of Barbados”. The Department therefore monitors health conditions and identifies potential health hazards at the ports of entry, communities and special establishments. The Health Services Act CAP 44 allows public health officers to enter into any premises to identify and mitigate all health threats. Authority is also granted to the CMO in the Radiation Protection Act, CAP 353A. Where ionizing radiation is utilised, the CMO is to ensure that the facilities is inspected and the necessary measures are taken to protect workers against ionizing radiation.

#### **2.4.3 Ministry of Industry, International Business, Commerce and Small Business Development**

39. The Department of Commerce and Consumer Affairs, Ministry of Industry, International Business, Commerce and Small Business Development bears responsibility for issuing import and export licence for radioactive materials under the Miscellaneous Controls (Importation and Exportation of Goods)(Prohibition) (Radioactive Materials) Regulations, 2004. Importers of nuclear materials apply for and are generally granted a licence to import nuclear medicine, nuclear gauges and well logging sensors after receiving a certificate from the EPD.

#### **2.4.4 Ministry of Labour and Social Partnership Relations**

40. The Occupational Health and Safety Section of the Ministry of Labour and Social Partnership Relations exert regulatory control over all business that can have adverse health or safety outcomes. The authority of the Division is derived from the Safety and Health at Work Act, CAP 356. This requires the conduct of risk assessments in the interest of building a safety culture and improving the safety environment at the workplace. The act gives the employee the right to refuse dangerous work and further establishes rights and responsibilities for both employers and employees. Safety and Health officers have the power of entry to conduct safety inspections. A distinct duty is also captured under the Accident and Occupational Disease (Notification) Act, CAP 338. Here, an employer is required to record all reported accidents and notify after loss of work for more than three days submit a notification to the Chief Labour Officer. Medical practitioners or employers who suspect occupational diseases

listed in the Third schedule to notify the chief labour Officer as described in **Error! Reference source not found.**

#### **2.4.5 Ministry of Tourism & International Transport**

41. The Civil Aviation Department control the operations of air traffic within the air space of Barbados. Through the Act and the subsidiary regulations the Civil Aviation Department can mandate operators of airlines to record hours logged by the crew for flights above 49,000 feet.

#### **2.5.0 Critical Issues for Consideration**

42. On becoming a member of the IAEA, countries accept the IAEA Statute and the obligations therein. Amongst other requirements, Government has to demonstrate a commitment to long term safety and security of radioactive sources and activities. The expected commitments are articulated in documents which include: Governmental, Legal and Regulatory Framework for Safety, General Safety Requirements No. GSR Part 1 (Rev. 1), Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements Part 3 No. GSR Part 3 and the Code of Conduct on the Safety and Security of Radioactive Sources.. These standards impose obligations to establish a national policy and strategy for safety, establish a legal framework for safety, security and safeguards, establish a regulatory body responsible for the implementation of the statutes, provide adequate financial and human resources for safety, security and safeguards, and establish an emergency preparedness response system. These requirements are intended to ensure that the national infrastructure for the safety, security and safeguards of activities involving the use of radioactive sources and ionizing radiation is consistent with international best practise.
43. This effectively correlates to regulatory interventions at strategic points across the life cycle of the radioactive sources or duration a practice that involves the use of ionizing radiation to reduce exposures in existing occupational, accidental and emergency situations, and ensures that exposures are as low as reasonably achievable (ALARA).
44. A second component is the issue of security and the potential for non-state actors to utilise radioactive materials to cause harm. The fundamental aim of security aspirations is to protect the health of people and the environment from contamination through non-peaceful and unjustified uses of radioactive sources. There is great concern that “soft target” may be vulnerable to incidences involving non-state actors, which

could expose the civilian population to the harmful effects of radioactive materials. The consequence of such actions could severely damage an open economy like Barbados.

45. Given that this proposal will introduce a policy for additional regulatory interventions in the area of radiation safety which has limited regulatory requirements, stakeholders across the spectrum of activities and practices must be sensitised about the planned process and be allowed to contribute to the development of the new legislation and regulatory systems.
46. The application and use of radiation is multisector and involves actors from environment, labour, health, customs, commerce, agriculture, economic affairs, defence and security and private enterprise. The pluralist nature of the activities will necessitate the establishment of an agreed mechanism for collaboration across ministries and sectors to share information, build regional and international partnerships and source financing to maintain the legal and regulatory infrastructure.

## 3.0 Policy Framework

### 3.1.0 Policy Context

47. Historically, national policy instruments have never explicitly contemplated in any significant manner, the beneficial uses or adverse health and environmental effects of nuclear materials and ionizing radiation. Government has generally focused on improvements in the quality of life and health of citizens. Some of the relevant policies with these ideas are listed below:

- a. The Barbados Sustainable Development Policy, 2004 adopts sustainable development principles namely: quality of life, conservation of resources; economic efficiency; equity; and participation.
- b. The National Strategic Plan of Barbados 2006-2025 recognises in Goal Three that people are at the heart of the development process and the need to building social capital. A well-developed public health system is critical to a good quality of life.
- c. Similarly, the Green Economy Scoping Study, 2014 identified six principles that are consistent with previous statements. These principles are:
  - i. advances the well-being of society, particularly vulnerable groups;
  - ii. achieves the protection and or restoration of ecosystems' health;
  - iii. enables efficiency in resource/energy use and management;
  - iv. promotes participatory governance;
  - v. enables responsive institutions; and
  - vi. promotes research, development and innovation.

48. In addition to the national policy instruments, it is recognised that international law, multilateral radiological and nuclear treaties and agreements, conventions, and international practice have influence on policy whether a Government is party to an international legal instrument or not. Some of the significant agreements are:

- a. Treaty for the Prohibition of Nuclear Weapons in Latin America and the Treaty on the Non-Proliferation of Nuclear Weapons;
- b. Comprehensive Safeguards Agreements: The Application of Safeguards in connect with the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Treaty on the Non-Proliferation of Nuclear Weapons;
- c. Small Quantities Protocol;
- d. United Nations Security Council Resolution 1540

- e. ILO Convention 115 on Radiation Protection (1960); and
  - f. International Health Regulations, 2005.
49. The combined direction of these international legal instruments is synergistic and propagates the enhancement of the quality of life for citizens and residents which is consistent with established international policy.
50. Taking these into consideration, this policy is intended to move beyond general statements to capitalise on potential opportunities available from membership in the International Atomic Energy Agency. The policy will outline an overall vision and strategic objectives to encourage economic activities and encourage the establishment of procedures, rules, decision making criteria and allocation of resources that provide the basis for programmes and services that meet Goal three of the National Strategic Plan.

### 3.2.0 Regulatory Principles for Radiation Safety

51. There are a number of principles that have evolved from lessons learnt to improve the safe use of radiation, practice that utilise nuclear materials, or equipment that generate ionizing radiation. The safety objective<sup>2</sup> principle is at the pinnacle in the hierarchy of the principles and subsumes the precautionary approach. The IAEA Code of Conduct, recommends model regulations as a guide and the International Basic Safety Standards No. GSR Part 3, IAEA 2014 incorporates the following principles:
- a. The safety principle;
  - b. The security principle;
  - c. The responsibility principle;
  - d. The permission principle;
  - e. The continuous control principle;
  - f. The compensation principle;
  - g. The sustainable development principle;
  - h. The compliance principle;
  - i. The independence principle;
  - j. The transparency principle;
  - k. The international co-operation principle;
  - l. Polluter pays principle; and the
  - m. Precautionary Principle

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<sup>2</sup> European Atomic Energy Community, Food and Agriculture Organization of the United Nations, International Atomic Energy Agency, International Labour Organization, International Maritime Organization, OECD Nuclear Energy Agency, Pan American Health Organization, United Nations Environment Programme, World Health Organization, Fundamental Safety Principles: safety fundamentals, IAEA Safety Standard Series No. SF – 1, IAEA, Vienna (2006).

52. Essentially, the legal framework should be designed to ensure that any process involving the use of nuclear or radioactive materials or ionizing radiation should essential have several layers of control with clear demarcation of responsibility between stakeholders to prevent injury to operators, users and third parties.

### **3.3.0 Policy Vision**

53. The vision of the Government of Barbados is that: “radioactive and *nuclear materials, and ionizing radiation are used for peaceful purposes to benefit society and enhance social and economic development within a legal and regulatory framework proportionate to the risk posed by the material, activity or practice*”.

### **3.3.1 Policy Scope**

54. The scope of this Policy includes **all** activities, processes and practices that utilise ionizing radiation, and nuclear and radioactive materials that pose a risk to the economy, environment, society and individuals. The Policy applies to medical, industrial, agricultural, construction, research, environmental protection, educational activities and all commercial activities, processes and procedures that would cause harm with controls commensurate with the risks posed by the activity or source.

55. This Policy does not apply to military operations and personnel involved in military operations.

### **3.3.2 Policy Objectives**

#### **3.3.2.1 Ensure the Safe Life Cycle Use of Ionizing Radiation and Radioactive Materials**

56. The objective is to “*ensure that the national radiation safety infrastructure complies with the basic safety standards established by the International Atomic Energy Agency and to satisfy the internationally accepted Basic Safety Standards*” in a manner that does not adversely affect the national economy.

57. The Government shall:

- a. Establish a regulatory system which incorporates the safety principles and is proportionate to the level of risk posed by an activity or practice that utilise nuclear, radioactive materials and ionizing radiation;
- b. ensure the safety and security of radiation sources;

- c. establish management systems and where possible prevent accidents and incidents that could give rise to deterministic radiation injuries;
- d. minimize occupational and public radiation exposure by ensuring that radiation doses do not exceed regulated levels;
- e. ensure that radioactive sources and waste are under a continuous regime of management control; and
- f. ensure that nuclear material, radiation sources and ionizing radiation are used for beneficial, safe and ethical purposes.

### 3.2.2.2 Strengthen the Legislative and Regulatory Framework

58. The policy objective is to “empower an independent regulatory department to monitor and regulate processes, practices and procedures that use radioactive sources and ionizing radiation in a manner consistent with the risk posed by the activity or practice.”

59. There are three accepted situations where persons and or the environment may be exposed to harmful effect of radiation or radioactive materials, these are: “*planned exposure situation*”; “*emergency exposure situation*” and “*existing exposure situation*”. The regulatory body shall ensure within the context of these situation that processes, practices and procedures do more good than harm and that optimization of protection occurs through maximizing the margin of good over harm, that is, the number of people exposed, and the magnitude of their individual doses should all be kept As Low As Reasonably Achievable(ALARA).

60. To achieve this, Government shall ensure that its regulatory body:

- a. Is staffed by qualified personnel;
- b. Has the financial resources, the facilities and equipment necessary to undertake its functions in an effective manner;
- c. Is able to draw upon specialist resources and expertise from other relevant government agencies;
- d. Establish a joint inspectorate to assist the designated regulatory authority in the execution of regulatory functions;
- e. Establish procedures for dealing with applications for authorization;
- f. Ensure that arrangements are made for the safe management and secure protection of radioactive sources, including financial provisions where appropriate, once they have become disused;
- g. Maintain appropriate records of persons with authorization in respect of radioactive sources, with a clear indication of the type(s) of radioactive sources that they are authorized to use, and appropriate records of the transfer and disposal of the radioactive sources on termination of the authorizations. These records should be properly secure against unauthorized access or alteration, and back-up copies should be made;

- h. Promote the establishment of a safety culture and of a security culture among all individuals and in all bodies involved in the management of radioactive sources;
- i. Establish systems for ensuring that, where practicable, both radioactive sources and their containers, are marked by users with an appropriate sign to warn members of the public of the radiation hazard, but where this is not practicable, at least the container is so marked;
- j. Establish systems for ensuring that the area where radioactive sources are managed are marked by users with the appropriate signs to warn workers or the public, as applicable, of the radiation hazard;
- k. Establish system for ensuring that, where practicable, radioactive sources are identifiable and traceable, or where this is not practicable, ensures that alternative processes for identifying and tracing those sources are in place;
- l. Ensure that inventory controls are conducted on a regular basis by persons with authorizations;
- m. Carry out both announced and unannounced inspections at an appropriate frequency taking into account past performance and the risks presented by the radioactive source;
- n. Take enforcement actions, as appropriate, to ensure compliance with regulatory requirements;
- o. Ensure that the regulatory principles and criteria remain adequate and valid and take into account, as applicable, operating experience and international endorsed standards and recommendations;
- p. Require the prompt reporting by authorized persons of loss of control over, and of incidents in connection with, radioactive sources;
- q. Provide guidance on appropriate levels of information, instruction and training on the safety and security of radioactive sources and the devices or facilities in which that are housed, to manufacturers, suppliers and users of radioactive sources;
- r. Require authorized persons to prepare emergency plans, as appropriate;
- s. Is prepared, or has established provisions; to recover and restore appropriate control over orphan sources, and to deal with radiological emergencies and has established appropriate response plans and measures;
- t. Is prepared in respect of orphan sources, that may have originated within the country to assist in obtaining technical information relating to their safe and secure management;
- u. Require those who intend to manage radioactive sources to seek an authorization, and to submit: a safety assessment; and a security plan or assessment as appropriate for the source and/or

- the facility in which the source is to be managed, if deemed necessary in the light of the risk posed and, in the case of security, the current national treat assessment;
- v. Obtain all relevant information from an applicant for an authorization;
  - w. Issue, amend, suspend or revoke, as necessary, authorization for the management of radioactive sources
  - x. Categorise radiation sources based on practice in a manner consistent with Schedule II of GRS Part 3 as shown in Table 2 and Table 3.

**Table 2: Categorisation of Radioactive Sources Based on Practice<sup>3</sup>**

Category	Practices
I	Radioisotopes thermoelectric generators (RTG), irradiators, teletherapy sources, fixed multi-beam teletherapy (gamma knife) sources.
II	Industrial gamma radiography sources, high/medium dose rate brachytherapy sources.
III	Fixed industrial gauges that incorporate high activity sources, well logging gauges.
IV	Low dose rate (LDR) brachytherapy sources, industrial gauges that do not incorporate high activity sources, bone densitometers, static eliminators.
V	LDR brachytherapy, X-ray fluorescence devices, electron capture devices, Mossbauer spectrometry, positron emission tomography (PET) check sources.

**Table 3: Categorisation of Radioactive Sources Based on Activity Ratio**

Category	Danger	Activity Ratio (A/D)
I	Extremely Dangerous	$A/D \geq 1000$
II	Very Dangerous	$< 1000$ and $\geq 10$
III	Dangerous	$< 10$ and $\geq 1$
IV	Unlikely to be Dangerous	$< 1$ and $\geq 0.01$
V	Most Unlikely to be Dangerous	$< 0.01$

<sup>3</sup>European Commission, Food and Agriculture Organization of the United Nations, International Atomic Energy Agency, International Labour Organization, OECD Nuclear Energy Agency, Pan American Health Organization, United Nations Environment Programme, World Health Organization, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards General Safety Requirements Part 3, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014).

61. As part of the international obligation, the Regulatory Authority must be an independent body whose decision making is not influenced by factors other than radiation safety and security. The Environmental Protection Department was designated by Cabinet as the regulatory authority for radiation protection on the island as the Department is independent of the Ministry of Health and Wellness, the focal point for the implementation of both IAEA and International Health Regulations, 2005 matters.
62. A Radiation Protection Board (RPB) will be established, which would comprise of the three permanent members: Director, Environmental Protection Department, Ministry of Environment and National Beautification; Chief Fire Officer Barbados Fire Service Department; and the Chief Labour Officer, Ministry of Labour and Social Partnership Relations and the Chief Medical Officer as a non-voting member. The Chair of the Board should be the head of the designated regulatory agency, the Director of the Environmental Protection Department. The RPB would be supported by a legislated Radiation Protection Advisory Group (RAG) composed of the technical representatives from Ministry of Environment and National Beautification, Ministry of Health and Wellness, Ministry of Labour and Social Partnership Relations, Ministry of Industry, International Business, Commerce and Small Business Development, Ministry of Home Affairs, an expert in industrial radiation applications and an expert in medical applications of radiation.

**Table 4: Proposed Responsibility of Competent Departments**

<b>Department/Ministry</b>	<b>Recommended Responsibility</b>
Environmental Protection Department—Ministry of Environment and National Beautification	Designed Regulatory Authority and Secretariat for the Radiation Protection Board and Regulatory Advisory Group for all radioactive sources, procedures, practices and procedures. This involves issuing import/export license, licensing of sources, practices, facilities and operators, inspection of all facilities and issuing compliance certificates. Conduct inspection on industrial operations and medical facilities.
Environmental Health Department—Ministry of Health and Wellness	Conduct public health inspections on medical facilities.
Occupational Safety and Health Section—Ministry of Labour and Social Partnership Relations	Regulate occupational exposure in all facilities including medical applications and dose to patients in medical institutions.
Barbados Fire Service	Respond to emergency situation involving

	radioactive material. Safe guarding of materials during emergency incidents. Advisor to the regulatory agency and the Department of Emergency Management on contingency planning for radioactive materials.
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### 3.2.2.3 Effective Human Resources Utilization, Agency Collaboration, Stakeholder Communication and Programme Administration

63. *The policy objective is to: create a stakeholder collaboration mechanism to facilitate information exchange among stakeholders, build human resource capacity and effectively manage radiation sources.*

64. The Review of the current systems shows that there are a number of regulators and operators all with varying skills and knowledge about radiation and with different perceptions on the expected outcomes and application of the international standards for the management of radiation and radioactive materials. Some of the policies, standards and processes require new skills and knowledge that is either absent or limited in availability particularly within the context of a small island developing state like Barbados. Based on a review of the international obligations from the IAEA Code of Conduct, Fundamental Safety Principles, and IAEA Safety Standards. The following will be accomplished:

- a. Prepare an information management system to capture, process, distribute and add value to the management of ionizing radiation and radioactive materials will be designed;
- b. Automate and optimize the licensing process to convert the current regulatory and licensing system to a fully digitized process with the appropriate security features to safeguard licensee information from third party access;
- c. Conduct further assessments should be conducted to determine the interoperability of the software being donated by the IAEA for the regulation of radiation sources and materials and the existing software used by the Ministry of Commerce, Ministry of Labour, Ministry of Health, Ministry of Environment and the Customs Department;
- d. Develop a data sharing protocol and information security policy for the information management systems to regulate stakeholders access and level of access;

- e. Integrate the information management system with the emergency response mechanism to ensure first responders are aware of the locations where radioactive material are stored and establish a mechanism to routinely distribute that information at agreed periods;
- f. Train regulators and operators in the policies, standards and processes prescribed by the IAEA through the proposed national hazardous material training programme being planned in collaboration with the Barbados Fire Service;

## 4.0 Policy Targets

- 65. A Radiation Protection Board established by January 2020.
- 66. The roles and responsibilities for the respective regulatory agencies identified in Table 4 be approved and where necessary translated into the appropriate legal instrument to facilitate implementation by the end of 2020.
- 67. The Radiation Protection Board should be directed to prepare an implementation plan and a communications strategy to facilitate the broad base education of all relevant stakeholders and competence base training for regulators by June 2020.
- 68. Comprehensive Radiation Protection Act and Regulations for Safety and Security prepared by the Chief Parliamentary Counsel before December 2019. The proposed laws and subsidiary regulations should control radiation sources and ionizing radiation used in medicine, industry, agriculture, research, and education.
- 69. A Radiation Protection Board should be chaired by the Director, Environmental Protection Department and comprising of the Environmental Protection Department, Chief Medical Officer (non-voting member) Chief Labour Officer, Chief Fire Officer, Union Representative and the University of the West Indies be established for a period of five year to formalise and implement the framework.
- 70. A Radiation Protection Advisory Group comprising representative from the Ministry of Environment and National Beautification, Ministry of Health and Wellness, Ministry of Labour and Social Partnership Relations, Ministry of Industry, International Business, Commerce and Small Business Development, Ministry of Home Affairs, an expert in industrial radiation applications and an expert in medical applications of radiation.

71. A joint Inspectorate be established amongst the Environmental Protection Department, Ministry of Environment and National Beautification; Occupational Safety and Health, Ministry of Labour and Social Partnership Relations; and Environmental Health Department, Ministry of Health and Wellness.

## 5.0 Guidelines for Local Legislation

72. The IAEA's handbook on Nuclear Law, and Model Regulations for the Use of Radiation Sources and for the Management of the Associated Radioactive Waste should be used as the basis to prepare legislation to govern safety associated with ionizing radiation, radioactive sources and activities. The proposed law must also address the national obligations and requirements of the Non-Proliferation Treaty, Comprehensive Safeguards Agreement, Small Quantities Protocol and the Additional Protocol.

73. The law should be structured as follows:

Title of the Law: Radiation Safety and Protection Bill, 2017

- Objectives of the law
- Scope of the law
- Definitions of key terms
- The regulatory body
- Authorizations (licences, permits, etc.)
- Inspection
- Enforcement
- Responsibilities of licensees, operators, users
- Specific chapters or sections for relevant subject areas, such as:
  - i. Radiation protection
  - ii. Radioactive sources and radioactive material
  - iii. Safety of nuclear facilities and decommissioning
  - iv. Emergency preparedness and response
  - v. Mining and processing of radioactive material
  - vi. Transport of radioactive material
  - vii. Radioactive waste and spent fuel
  - viii. Nuclear liability and coverage
  - ix. Safeguards
  - x. Export and import control
  - xi. Nuclear security and physical protection
  - xii. Final clauses (entry into force, amendments, repeals, etc.)

74. The Act should be supported by Regulations to give clarity to the procedure to be used to implement the national obligation as detailed in the Act for the safe use of ionizing radiation and radioactive material within the diverse practices nationally. An outline of the proposed regulations is presented in Appendix I.

75. The Regulations should amongst other requirements ensure that the regulatory body established by its legislation has the authority to:

- a. establish regulations and issue guidance relating to the safety and security of radioactive sources;
- b. require those who intend to manage radioactive sources to seek an authorization, and to submit:
  - (i) a safety assessment; and
  - (ii) a security plan or assessment as appropriate for the source and/or the facility in which the source is to be managed, if deemed necessary in the light of the risks posed and, in the case of security, the current national threat assessment;
- c. obtain all relevant information from an applicant for an authorization;
- d. issue, amend, suspend or revoke, as necessary, authorizations for the management of radioactive sources.
- e. attach clear and unambiguous conditions to the authorizations issued by it, including conditions relating to:
  - i. responsibilities;
  - ii. minimum operator competencies;
  - iii. minimum design and performance criteria, and maintenance requirements for radioactive sources and the devices in which they are incorporated;
  - iv. minimum performance criteria and maintenance requirements for equipment and systems used to ensure the safety and security of radioactive sources;
  - v. requirements for emergency procedures and communication links;
  - vi. work procedures to be followed;
  - vii. the safe and secure management of disused sources, including, where applicable, agreements regarding the return of disused sources to a supplier;
  - viii. measures to determine, as appropriate, the trustworthiness of individuals involved in the management of radioactive sources; and
  - ix. the confidentiality of information relating to the security of sources;
- f. obtain any relevant and necessary information from a person with an authorization, in particular if that is warranted by revised safety or security assessments;
- g. require those supplying or transferring radioactive sources or devices incorporating radioactive sources to provide the recipient with all

relevant technical information to permit their safe and secure management.

- h. enter premises in order to undertake inspections for the verification of compliance with regulatory requirements;
- i. enforce regulatory requirements;
- j. monitor, or request other authorized bodies to monitor, at appropriate checkpoints for the purpose of detecting orphan sources;
- k. ensure that corrective actions are taken when a radioactive source is in an unsafe or non-secure condition;
- l. provide, on a case-by-case basis, to a person with an authorization and the public any information that is deemed necessary in order to protect individuals, society and the environment;
- m. liaise and co-ordinate with other governmental bodies and with relevant non-governmental bodies in all areas relating to the safety and security of radioactive sources;
- n. liaise with regulatory bodies of other countries and with international organizations to promote co-operation and the exchange of regulatory information;
- o. establish criteria for intervention in emergency situations;
- p. ensure that radioactive sources are stored in facilities appropriate for the purpose of such storage; and
- q. ensure that, where disused sources are stored for extended periods of time, the facilities in which they are stored are fit for that purpose.

## 6.0 Recommendations

76. The Ministry of Environment and National Beautification therefore recommends that:

- a. The roles and responsibilities for the respective regulatory agencies identified in Table 4 be approved and where necessary translated into the appropriate legal instrument to facilitate implementation.
- b. The appropriate department should be directed to prepare an implementation plan and a communications strategy to facilitate the broad based education of all relevant stakeholders and competence based training with the assistance of the International Atomic Energy Agency.
- c. The Chief Parliamentary Counsel should be directed to prepare the necessary law and subsidiary regulations before June 2020 to control radiation sources and ionizing radiation use in all applications including medicine, industry, agriculture, research, and education.
- d. The legislation should include provisions for the authorisation and licensing of facilities, processes, practices, radiation workers, radiation protection officers and activities that involve the use of radiation sources and ionizing radiation.
- e. A Radiation Protection Board should be established and chaired by the Director, Environmental Protection Department and comprising of the Environmental Protection Department, Chief Medical Officer (non-voting member) Chief Labour Officer, Chief Fire Officer, Union Representative and the University of the West Indies be established for a period of five year to formalise and implement the framework.
- f. A Radiation Protection Advisory Group comprising representatives from the Ministry of Environment and National Beautification, Ministry of Health and Wellness, Ministry of Labour and Social Partnership Relations, Ministry of Industry, International Business, Commerce and Small Business Development, Ministry of Home Affairs, an expert in industrial radiation applications and an expert in medical applications of radiation.
- g. The Draft Radiation Protection Policy be adopted as Policy;
- h. A Radiation Protection Board and Advisory Body be established to manage all radiation protection matters.

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## Appendix I

### Radiation Protection: Relevant Legal Clauses in the Respective Statutes

Law	Relevant Section
Customs Act, CAP 66	An Act relating to Customs
Accident and Occupational Disease (Notification) Act, CAP 338	<p>An Act to provide for the notification of accidents and occupational diseases.</p> <p>Section 3 (1) Where any accident arising out of and in the course of the employment of any worker occurs and</p> <p style="padding-left: 40px;">(a) causes loss of life to such worker; or</p> <p style="padding-left: 40px;">(b) disables such worker, for more than 3 days, from doing the work at which he was employed at the time of such accident,</p> <p>written notice of the accident, in the form, and accompanied by the particulars, set out in the First Schedule shall forthwith be sent by the employer to the Chief Labour Officer.</p>
The Paramedical Professions Act, Cap 372C	<p>An Act to provide for the registration of members of certain professions supplementary to medicine, the regulation of the conduct of, and the training for, members of those professions, and for related purposes.</p> <p>25. Nothing in this Act prevents the performance of paramedical services in any paramedical profession by a person in training therein if those services are performed under the direct supervision and control of a paramedical practitioner registered in that paramedical profession, or of a medical or dental practitioner.</p> <p>26. (1) Subject to subsection (3), a person who for the purpose of practising a paramedical profession has in his possession or control paramedical appliances or supplies is guilty of an offence and liable on summary conviction to a fine of \$1 000 or to Imprisonment for 6 months or both.</p> <p>(2) For the purposes of subsection (1), possession or control of paramedical appliances or supplies by a person is prima facie evidence that the possession or control is for the purpose of practising a paramedical profession.</p> <p>(3) Subsection (1) does not apply to the possession or control of paramedical appliances or supply by</p> <p style="padding-left: 20px;">(a) a person registered under this Act;</p> <p style="padding-left: 20px;">(b) a dealer in paramedical appliances or supplies;</p> <p style="padding-left: 20px;">(c) a person permitted by the Council to have such possession or control; or</p> <p style="padding-left: 20px;">(d) a person registered under the Medical Registration Act, or the Dental Registration Act,</p>

Law	Relevant Section
	<p>or any person acting under the instructions of a person registered under those Acts.</p> <p>(4) A magistrate who is satisfied upon information on oath that there are reasonable grounds for believing that there are in any building or premises paramedical appliances, supplies or other devices which will afford evidence as to the commission of an offence under this section, may issue a warrant under his hand authorising any member of the Police Force named in the warrant to enter and search the building or premises and to seize such paramedical appliances, supplies or devices.</p> <p>(5) Subsections (2) and (3) of section 84 of the Magistrate's Courts Act, apply to a search warrant issued under subsection (4) as they apply to a search warrant issued under that section.</p>
Radiation Protection Act, CAP 353A	An Act to give effect to Article 10 of the Radiation Protection Convention, 1960, Convention of the International Labour Conference, relating to the protection of workers against ionising radiations.
Safety and Health at Work Act, CAP 356	<p>An Act to make provision</p> <p>(a) for securing the health, safety and welfare of persons at work;</p> <p>(b) for protecting other persons against risks to health and safety in connection with the activities of persons at work;</p> <p>(c) for controlling certain emissions into the environment;</p> <p>(d) to consolidate the law relating to health, safety and welfare in the workplace; and</p> <p>(e) for related matters.</p>
Accidents and Occupational Diseases (Notification) Cap 338	<p>Section 5 (1) Every registered medical practitioner attending on or called into visit a patient whom he believes to be suffering from any occupational disease contracted in the course of his employment as a worker shall, unless such a notice has been previously sent, forthwith send addressed to the Chief Labour Officer a notice stating the name and full postal address of the patient and the disease from which, in the opinion of such medical practitioner, the patient is suffering and the name and address of the place at which, and of the employer by whom, he is or was last employed.</p> <p>(2) Any registered medical practitioner who fails to send any notice in accordance with the requirements of this section shall be guilty of an offence against this Act and liable to a fine of ten dollars.</p> <p>(3) Any employer who believes or suspects, or has reasonable grounds for believing or suspecting, that a case</p>

<b>Law</b>	<b>Relevant Section</b>
	<p>of occupational disease has occurred among the workers employed by him f shall forthwith send written notice of such case in the form, and accompanied by the particulars, set out in the Second Schedule to the Chief Labour Officer and to the Chief Medical Officer, and the provisions of this Act with respect to the notification of accidents shall apply to any such case in like manner as to any such accident as is mentioned in those provisions.</p> <p>(4) The Minister may, as respects any class or description of place where workers are employed, by regulations, apply the provisions of this section to any disease other than an occupational disease.</p>

## Appendix II

### Radiation Protection Subsidiary Enactments

Subsidiary Instrument	Relevant Regulations
Civil Aviation (Air Operator Certification and Administration) Regulations, 2007	Reg. 90 (5) A national air operator shall maintain records for each flight of an aeroplane above 49 000 feet so that the total cosmic radiation dosage received by each crew member over a period of 12 consecutive months can be determined.
Civil Aviation (Aircraft Operations) Regulations, 2007	<p>Reg. 2. In these Regulations, "dangerous goods incident" means an occurrence, other than a dangerous goods accident, associated with and related to the transport of dangerous goods not necessarily occurring on board an aircraft, which results in injury to a person, property damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained or any occurrence relating to the transport of dangerous goods which seriously jeopardises the aircraft or its occupants.</p> <p>"serious injury" means an injury which is sustained by a person in an accident and which</p> <p>(f) involves verified exposure to infectious substances or injurious radiation.</p> <p>Reg. 21. An operator shall ensure that</p> <p>(a) any contamination found as a result of the leakage or damage of dangerous goods is removed without delay; and</p> <p>(b) an aircraft which has been contaminated by radioactive materials is immediately taken out of service and not returned until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.</p>
Civil Aviation (Instruments and Equipment) Regulations, 2007	<p>Reg. 2. In these Regulations,</p> <p>"cosmic radiation" means the total ionizing and neutron radiation of galactic and cosmic origin;</p> <p>Reg. 68. (1) No air operator shall conduct operations in an aeroplane above 49 000 feet unless the aeroplane is equipped with an instrument to continuously measure and</p>

Subsidiary Instrument	Relevant Regulations
	indicate to flight crew the dose rate of total cosmic radiation being received and the cumulative dose on each flight.
Post Office (Overseas Parcel Post) Regulations, 1980	Reg.7 restricts the transmission by post articles amongst other that are not acceptable for transmission by post that, by their nature or their packing, are likely to expose officers of the Post Office to danger, or (ii) soil or damage other parcels or postal equipment;
Customs (List of Prohibited and Restricted Imports and Exports) Order, 2009,	<p>paragraphs 3, The goods set out in Part I of the Second Schedule are prohibited exports within the meaning of section 89(2) of the Customs Act, and shall not be exported from Barbados</p> <p>(2) The goods set out in Part II of the Second Schedule are restricted exports within the meaning of section 89(2) of the Customs Act, and may, subject to the conditions stipulated with respect to the exportation of such goods, be exported.</p> <p>5 (2), (2) No person shall export any of the goods set out in the Second Schedule to this Order except that person is authorised to do so by a licence issued, in respect of the goods, by the Minister under the Miscellaneous Controls Act.</p> <p>Second Schedule Part I Prohibited Goods 2. Goods the exportation of which is prohibited by any other law of Barbados.</p>
Miscellaneous Controls (Importation and Exportation of Goods)(Prohibition) (Radioactive Materials Regulations, 2004	<p>2. No person shall, except under the authority of a licence granted by the Minister, import into Barbados (a) any goods specified in the <i>Schedule</i>; or (b) any goods referred to in paragraph (c) that are intransit or in transshipment to any country.</p> <p>3. No person shall, except under the authority of a licence granted by the Minister, export from Barbados (a) any goods specified in the <i>Schedule</i>; or (b) any goods referred to in paragraph (a) with intent to transship or cause the goods to be transshipped to any country.</p> <p>Schedule Radioactive chemical elements and radioactive isotopes (including the fissile or fertile chemical elements and isotopes) and their compounds; mixtures and residues containing these products.</p>
<i>Civil Aviation (Aviation Security) Regulations,</i>	<b>52.</b> (2) An aircraft operator may be authorised by the Director, to use X-ray systems for inspecting carry-on or

<b>Subsidiary Instrument</b>	<b>Relevant Regulations</b>
2007	<p>checked baggage under an approved aircraft operator security programme where he shows that</p> <p>(b) a programme for initial and recurrent training of operators of the system is established, which includes training in radiation safety, the efficient use of X-ray systems, and the identification of weapons and other dangerous articles; and</p> <p>(3) An aircraft operator shall ensure that an X-ray system is not used</p> <p style="padding-left: 40px;">(c) unless within the preceding 12 months, a radiation survey has been conducted which shows, that the system meets the applicable performance standards or guidelines prescribed by the Director;</p> <p>(6) An aircraft operator shall maintain at least one copy of the results of the most recent radiation survey conducted in paragraph (3) and shall make it available for inspection upon request by the Director at each of the following locations:</p> <p style="padding-left: 40px;">(d) the principal business office of the aircraft operator; and</p> <p>(b) the place where the X-ray system is in operation.</p>

RADIATION SAFETY AND PROTECTION ACT  
CAP.  
RADIATION SAFETY AND PROTECTION REGULATIONS,2017

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