



**ZIMBABWE NATIONAL REPORT FOR THE JOINT CONVENTION ON THE
SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF
RADIOACTIVE WASTE MANAGEMENT**

March 2022

Zimbabwe National Report for the Joint Convention on the Safety of Spent Fuel
Management and on the Safety of Radioactive Waste Management

The National Report has been prepared in fulfillment of Zimbabwe's obligations pursuant to Article 32 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The report details measures Zimbabwe has taken in implementing its obligations under the Joint Convention. The report adhered to the guidelines on the structure and form established by contracting parties pursuant to the Convention's Article 29.

March 2022



Office of the President and Cabinet
Implementation and Monitoring
Harare
Zimbabwe



Radiation Protection Authority
of Zimbabwe
Harare
Zimbabwe

TABLE OF CONTENTS

TABLE OF CONTENTS	2
SECTION A. INTRODUCTION	4
A.1 Background and Provisions of the Joint Convention	4
A-2 Regulation and Main Safety Issues	5
A-3 Purpose and Structure of this Report	6
A-4. Overview Matrix for Used Fuel and Radioactive Waste Management	7
SECTION B. POLICIES AND PRACTICES	8
B-1 Legislative Provisions and National Policy	8
B-2 Radioactive Waste Management Practices	9
SECTION C. SCOPE OF APPLICATION	11
C-1 Spent Fuel Reprocessing and Safety of Radioactive Waste Management	11
SECTION D. INVENTORIES AND LISTS	12
Radioactive Waste Management Facilities	12
SECTION E. LEGISLATIVE AND REGULATORY SYSTEM	15
E-1 Implementing Measures	15
E-2 Legislative and regulatory framework	15
E-3 Regulatory Body	17
SECTION F. OTHER GENERAL SAFETY PROVISIONS	24
F-1 Responsibility of the Licence Holder	24
F-2 Human and Financial Resources	25
Article 23. Quality Assurance	26

Article 24. Operational Radiation Protection-----	26
Article 25. Emergency Preparedness-----	27
Article 26. Decommissioning-----	27
SECTION G. SAFETY OF SPENT FUEL MANAGEMENT -----	28
SECTION H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT -----	29
SECTION I. TRANSBOUNDARY MOVEMENT-----	32
SECTION J. DISUSED SEALED SOURCES-----	34
SECTION K. GENERAL EFFORTS TO IMPROVE SAFETY -----	36
K-1 Radiation Safety Infrastructure-----	36
K-2: Review of the Radiation Protection Act -----	37
K-3: International Conventions and Instruments-----	38
SECTION L. ANNEXES-----	39

SECTION A. INTRODUCTION

A.1 Background and Provisions of the Joint Convention

The Joint Convention was adopted on 5 September 1997 and was opened for signature at the IAEA General Conference on 29 September 1997. Pursuant to Article 40, the Joint Convention entered into force 90 days after the date of deposit with the IAEA on 18 June 2001. The Convention is aimed at achieving and maintaining a high level of safety in spent fuel and radioactive waste management, ensuring that there are effective defences against potential hazards during all stages of management of such materials, and preventing accidents with radiological consequences.

The Joint Convention is the first legal instrument to address the issue of spent fuel and radioactive waste management safety on a global scale. It does so by establishing fundamental safety principles and creating a similar “peer review” process to the Convention on Nuclear Safety. The Convention applies to:

- spent fuel resulting from the operation of civilian nuclear reactors,
- radioactive waste resulting from civilian applications
- spent fuel and radioactive waste from military or defence programmes if such materials are transferred permanently to and managed within exclusively civilian programmes, or when declared as spent fuel or radioactive waste for the purpose of the Convention by the Contracting Party concerned and
- planned and controlled releases into the environment of liquid or gaseous radioactive materials from regulated nuclear facilities.

Contracting Parties must review safety requirements and undertake environmental assessments at both at existing and proposed spent fuel and radioactive waste management facilities. It provides for the establishment and maintenance of a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.

A-2 Regulation and Main Safety Issues

The legislative framework for the radiation safety in Zimbabwe is provided through the Radiation Protection Act [Chapter 15:15] No. 5/2004 that seeks to ensure the protection of people and the environment against the effects of radiation. The sole regulatory body for radiation safety and security of radioactive sources is the Radiation Protection Authority of Zimbabwe (RPAZ) that commenced full scale regulatory operations in 2010. The Act stipulates that *“Subject to exemptions that may be prescribed or provided under the Act, no practice shall be adopted, introduced, conducted, discontinued, or ceased and no radiation source within a practice shall, as applicable, be mined, milled, processed, designed, manufactured, constructed, assembled, acquired, imported, exported, distributed, sold, loaned, hired, received, sited, located, commissioned, possessed, used, operated, maintained, repaired, transferred, decommissioned, disassembled, transported, stored or disposed of except in accordance with prescribed requirements”*

Radiation sources in Zimbabwe are used in industrial applications, medicine, research, security, and quality control. There are no nuclear installations in the country. The regulatory body implements a system of notification authorisation and inspections for compliance assurance to ensure the safe and secure use of the radiation for socioeconomic development. While RPAZ ensures compliance to requirements, the prime responsibility for radiation safety resides with the licensed holder.

Radioactive waste management and management of disused sealed radioactive sources is a priority area for government. The Technical Services Department of RPAZ has been assigned responsibility for operating radioactive waste management facility, while the Regulatory Department is required to ensure adherence to provisions of the Act and related regulations. RPAZ operates an interim waste management facility for conditioned sources and orphaned sources. The government is constructing a centralized radioactive waste management facility to provide adequate storage of radioactive waste and disused sources prior to return to supplier.

A-3 Purpose and Structure of this Report

The government of Zimbabwe pledged its commitment to global nuclear safety and security by becoming party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management in September 2021. Each Member State having ratified the Joint Convention (Contracting Party) is obligated to prepare a National Report covering the scope of the Joint Convention and subject it to review by other Contracting Parties at Review Meetings held in Vienna, Austria. This report is therefore the first National Report for Zimbabwe in fulfilment of reporting obligations under the Joint.

The report details measures Zimbabwe has taken in implementing its obligations under the Convention and satisfies the requirements for reporting on the status of safety of spent fuel and radioactive waste management facilities. This report is structured according to the “guidelines regarding national reports” for the Joint Convention.

The various reports on the relevant topics are presented in the order prescribed by the guidelines as follows:

- Section B: Policy and practices under the Joint Convention (Article 32-1),
- Section C: Scope (Article 3),
- Section D: Spent-fuel and radioactive-waste Inventories (Article 32-2),
- Section E: Legislative and regulatory system in force (Articles 18 to 20),
- Section F: Other general safety provisions (Articles 21 to 26),
- Section G: The safety of spent-fuel management (Articles 4 to 10),
- Section H: The safety of radioactive-waste management (Articles 11 to 17),
- Section I: Transboundary movements (Article 27),
- Section J: Disused sealed sources (Article 28),
- Section K: Planned safety-improvement actions, and
- Section L: Annexes in support of Section D.

A-4. Overview Matrix for Used Fuel and Radioactive Waste Management

The Guidelines Regarding the Form and Structure of National Reports require National Reports to contain an overview matrix given below:

Application waste	Decay in store	<ul style="list-style-type: none">• Storage at facilities pending return to supplier.• Storage at interim facility in the case of orphaned sources.• Radioactive Waste Management Facility when operational.
Disused Sources	Return to supplier or repatriation	<ul style="list-style-type: none">• Storage at facilities pending return to supplier.• Storage at interim facility in the case of orphaned sources.• Radioactive Waste Management Facility when operational.

SECTION B. POLICIES AND PRACTICES

Article 32. Reporting

In accordance with the provisions of Article 30, each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party, the report shall also address:

- i. spent fuel management policy,
- ii. spent fuel management practices,
- iii. radioactive waste management policy,
- iv. radioactive waste management practice, and
- v. criteria used to define and categorize radioactive waste.

B-1 Legislative Provisions and National Policy

The Radiation Protection Act [Chapter 15:15] is the sole legislation for radioactive waste management. Applicable regulations include

- i. Statutory Instrument 62 of 2011, Radiation Protection (Safety and Security of Sources) Regulations, 2011.
- ii. Statutory Instrument 99 of 2013, Radiation Protection (Naturally Occurring Radioactive Material) Regulations, 2013.
- iii. Statutory Instrument 91 of 2014, Radiation Protection (Medical Practices) Regulations

Registrants and licensees shall bear the responsibility for the safe management of radioactive waste and disused sealed radioactive sources. The regulatory body shall bear the responsibility for orphaned sources.

Zimbabwe does not have spent fuel management policy and practices.

The Radioactive Waste Management Policy and Strategy is in draft form; however, policy positions exist as directives issued from time to time by government. The radioactive waste

management policy and strategy will serve as the national commitment to address radioactive waste management and the management of disused sources in a coordinated manner.

Zimbabwe does not manufacture radiation sources and does not have a radioactive waste disposal nor long-term storage facility. As such, Zimbabwe has a “return to supplier” policy. All imports of radioactive sources require an authorization to be issued by the regulator, whose prerequisite includes a commitment/agreement by supplier to take back the sources at the end of their useful life (return to supplier) and to facilitate its repatriation.

Once the sources become disused, the Licensees are issued with authorization to possess and store until the sources are repatriated back to the country of origin. In the case of export, a facility looking to return disused/spent radioactive sources back to the country of manufacture must submit first a notification for decommissioning then apply for an export licence. The export licence is issued free of charge to encourage repatriation of sources. Provisions of the Supplementary Guidance on the Import and Export of Radiation Sources are implemented during the export processes.

Given challenges faced in return to supplier arrangements and the presence of legacy disused sources, the Government of Zimbabwe has prioritized the establishment of a centralized waste management repository for long term storage of radioactive waste and disused sources. This facility shall house orphan and other disused sources and radioactive waste awaiting final disposal.

B-2 Radioactive Waste Management Practices

There is no operational centralized storage facility nor disposal facility for radioactive waste in Zimbabwe.

The Act mandates RPAZ to establish strategies to minimize the likelihood of a loss of control and regaining control of orphaned sources. Orphaned sources are managed by the Technical Services Department of RPAZ through an interim radioactive waste storage facility set up. Search and secure exercises are undertaken to identify and safety store vulnerable sources.

Some radioactive waste, such as that from hospital nuclear medicine departments, contains only small amounts of radioactive materials that have short half-lives. These materials are held until the radioactivity has decayed and it is then treated through conventional means (decay in store).

Disused sealed radioactive sources in the mining, industrial and research facilities are stored at the licensee facility pending return to supplier, with the regulatory body undertaking compliance assurance inspections to evaluate safety and security measures. The temporary storage is also approved by the regulator.

Implementing financial guarantees to manage radioactive sources throughout their life cycle is not under implementation in Zimbabwe.

Work is currently in progress to construct a radioactive waste processing and storage facility (centralized store) with funding from government and technical expertise from IAEA. The physical structure of the facility is anticipated to be completed in August 2022, with arrangements for operationalization having been prioritized.

The NORM regulations of 2013 establish requirements for management of waste generated from NORM operations and facilities are required to establish adequate waste management measures for waste emanating from their operations such as scaling. Current programmes and activities are aimed identifying NORM inventories including any waste that may arise.

SECTION C. SCOPE OF APPLICATION

Article 3. Scope of Application

1. This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.
2. This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source, or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.
3. This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes, when such materials are transferred permanently to, and managed within exclusively civilian programmes.

C-1 Spent Fuel Reprocessing and Safety of Radioactive Waste Management

Statutory Instrument 62 of 2011: Radiation Protection (Safety and Security of Sources) Regulations, 2011 defines radioactive waste as material remaining from practices or interventions and for which no further use is foreseen.

Zimbabwe does not possess nor handle spent fuel. Therefore, pursuant to Article 3(1) of this Joint Convention, Zimbabwe declares that reprocessing activities are not included as part of this report and that Zimbabwe does not handle spent fuel.

The Radiation Protection Act [Chapter 15:15] applies only to peaceful applications and excludes defence or military applications. As such in accordance with Article 3 (3), this report will not apply to the safety of spent fuel management or radioactive waste management within military or defence programs. No form of radioactive waste of military origin has been declared in Zimbabwe and this report does not discuss this type of waste.

SECTION D. INVENTORIES AND LISTS

Article 32. Reporting, Paragraph 2

This report shall also include:

- i. a list of the spent fuel management facilities subject to this Convention, their location, main purpose, and essential features,
- ii. an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity,
- iii. a list of the radioactive waste management facilities subject to this Convention, their location, main purpose, and essential features,
- iv. an inventory of radioactive waste that is subject to this Convention that:
 - a. is being held in storage at radioactive waste management and nuclear fuel cycle facilities,
 - b. has been disposed of,
 - c. has resulted from past practices. This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity, and specific radionuclides.
- v. a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

Radioactive Waste Management Facilities

The government of Zimbabwe is constructing a Centralized Radioactive Waste Management Facility for processing and long-term storage of radioactive waste and disused sealed sources in Harare. The centralized store shall be operated by the Technical Services Department of RPAZ.



Fig: D2: Radioactive Waste Management Facility under Construction

The facility shall receive, characterize, segregate, process, condition and store all forms of waste generated in the country. The construction is set to be completed by August 2022 and shall be approved for storage of unprocessed and processed waste awaiting permanent disposal or in the case of disused sources return to supplier. Adequate safety and physical protection provisions are being finalized with assistance from IAEA.

An IAEA expert mission to assist in the Physical Protection of the facility is scheduled for May 2022 to ensure all the basic requirements and standards for the physical protective measures are put in place prior to operationalization of the facility.

Currently, the Authority is operating an Interim Radioactive Waste Storage Facility for orphaned sources and other waste conditioned in prior years. The interim facility was designed to meet basic minimum requirements for capability for conditioning of low-level gamma and neutron sources.



Fig: D2: Interim Radioactive Waste Storage Facility

RPAZ has been providing guidance on set up of adequate storage to facilities of the safe storage of sealed radioactive sources, including that that are having challenges returning to supplier and legacy sources.



Fig D3: Storage units within facilities with sources awaiting repatriation

SECTION E. LEGISLATIVE AND REGULATORY SYSTEM

E-1 Implementing Measures

Article 18. Implementing Measures

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory, and administrative measures, and other steps necessary for implementing its obligations under this Convention.

In conformance with Article 18 of the Joint Convention, Zimbabwe has taken legislative, regulatory, and administrative measures and provisions in fulfillment of its obligations under the Joint Convention, these measures are detailed in this report.

E-2 Legislative and regulatory framework

Article 19. Legislative and Regulatory Framework

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory, and administrative measures, and other steps necessary for implementing its obligations under this Convention.

The Zimbabwe national safety policies to ensure the protection of people and environment against the hazards of ionizing radiation are mainly provided for through the Radiation Protection Act [Chapter 15:15] No.5/2004.

A National Nuclear Safety and Security Committee is in place that oversees the coordination of nuclear security matters, emergency preparedness and response as well as other areas that require national coordination. The Committee has adequate representation of departments with a responsibility for radiation safety and security including but not limited to Customs, Police, Security, RPAZ, it is chaired by the Office of the President and Cabinet.

The Act establishes the Radiation Protection Board (RPB) and the Radiation Protection Authority of Zimbabwe (RPAZ) as the regulatory body. The RPB is responsible for formulating policy of RPAZ and controlling its operations. RPAZ is empowered to issue standards and norms, conduct inspections, issue authorization and approve notifications for users and practices, and

to take such action as is necessary to enforce any prescribed requirements. The Act is administered by the Office of the President and Cabinet as from January 2011 moving from the Ministry of Health and Child Care as per Statutory Instrument 162 of 2012.

The Act empowers RPAZ through the Minister to develop and gazette regulations providing for matters which in terms of this Act are required or permitted to be prescribed. This also includes setting guidance documents for the safe application of radiation sources. The following regulations have been issued:

- Statutory Instrument 62 of 2011, Radiation Protection (Safety and Security of Sources) Regulations, 2011 (General Regulations)
- Statutory Instrument 99 of 2013, Radiation Protection (Naturally Occurring Radioactive Material) Regulations, 2013,
- Statutory Instrument 91 of 2014, Radiation Protection (Medical Practices) Regulations, 2014, and
- Statutory Instrument 281 of 2020, Radiation Protection (Safety and Security of Radiation Sources) (Amendment) Regulations, 2020 (No. 5).

Specific regulations on radioactive waste management are in the drafting stage. Detailed information on the regulations is provided in Annex 6.

The Government of Zimbabwe is in the final stages of reviewing the Radiation Protection Act [Chapter 15:15] to strengthen provisions for safety, security, and safeguards to fully meet international standards, guidelines, and other national obligations. Radioactive waste management provisions shall be strengthened through the review of the Act.

The functioning of the regulatory body is also governed by the Public Entities Corporate Governance Act [Chapter 10:31] that details the relevant corporate governance requirements as prescribed. This allows for improved governance and effectiveness of boards of directors and operation of public entities.

In addition to being a member of the IAEA since 1986, Zimbabwe is also a party to the following International Legal Instruments:

- Comprehensive Safeguards Agreement in connection with the Treaty on Non-Proliferation of Nuclear Weapons,
- Additional Protocol to the Agreement on Safeguards in connection with the Treaty on Non-Proliferation of Nuclear Weapons,
- Comprehensive Nuclear Test Ban Treaty (CBTB),
- African Nuclear Weapons Free Zone Treaty (Pelindaba)
- Convention on Physical Protection of Nuclear Material and currently working on the Amendment
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste
- Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency
- Convention on Early Notification of a Nuclear Accident

Zimbabwe has expressed support for the Code of Conduct on the Safety and Security of Radioactive Sources and its Supplementary Guidance on the Import and Export of Radioactive Sources. Plans are underway to express commitment for the Supplementary Guidance on Radioactive Waste Management and the Management of Disused Radioactive Sources.

E-3 Regulatory Body

Article 18. Implementing Measures

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory, and administrative measures, and other steps necessary for implementing its obligations under this Convention.

RPAZ is the sole regulatory body responsible for nuclear and radiation safety matters. It has a mandate to protect people and the environment against radiation effects. RPAZ is headed by a Chief Executive Officer (CEO) who supervises and manages the day-to-day affairs and reports directly to the Board and the Office of the President and Cabinet.

The functions and powers of RPAZ as prescribed by the Act are to: To establish and implement a system of notification and authorisation for practices, facilities and activities;

- i. To issue, amend, suspend or revoke authorizations and grant exemptions concerning the possession and use of radiation sources, and the safe management of radioactive waste, including clearance and discharges;
- ii. To establish and maintain national registers of radiation sources and of persons authorized to carry out an activity or practice, occupational exposure doses;
- iii. To review and assess submissions on safety and security from operators both prior to authorisation and periodically during operation;
- iv. To conduct inspections to assess radiation safety and security conditions and compliance with this law, applicable regulations and other requirements specified in the authorization;
- v. To conduct inspections and visits, separately or together with designated inspectors of the IAEA in accordance with any relevant protocols thereto;
- vi. To issue directives on necessary measures to be taken to mitigate an undue threat or to enforce the requirements set out in the applicable regulations and authorizations, with the aim of protecting the health and safety of people and the environment, and their security;
- vii. To participate with other relevant state ministries, departments and agencies in the definition of domestic threat and the assessment of the state's vulnerability with respect to this threat for the variety of sources used within its territory, based on the potential for loss of control and malicious acts involving one or more radioactive sources;
- viii. To establish, if necessary, in cooperation with other ministries, departments and agencies, a system of control and consent for the import and export of nuclear material, radioactive sources and other items required to be controlled pursuant to treaty obligations undertaken by the state;
- ix. To establish and maintain a state system of accounting for and control of nuclear material and a national system for the registering of licences for nuclear material, and to establish the necessary reporting and record keeping and requirements pursuant to the comprehensive safeguards agreement and any protocols thereto;

- x. To establish plans for performing its assigned functions in accordance with national arrangements for emergency preparedness and response;
- xi. To communicate directly with relevant interested parties in all cases in which it considers necessary for the effective exercise of its functions;
- xii. To promote or carry out research on issues of regulatory concern;
- xiii. To maintain contacts for information exchange and co-operation with regulatory authorities of other countries and relevant international organizations;
- xiv. To enter into collaborative agreements with other regulatory authorities of other countries
- xv. To establish appropriate mechanisms for informing the public about the regulatory process and radiation safety aspects of regulated activities or practices;
- xvi. To make available to other governmental bodies, national and international organizations, and the public, information on incidents and abnormal occurrences, and other information, as appropriate;
- xvii. To take the necessary enforcement action in the event of violations flowing from this act, regulations hereunder and conditions of authorizations;
- xviii. To approve persons as suppliers of certain services or facilities necessary to enable licensees, registrants or notifying parties to comply with conditions or requirements imposed by or under this act;
- xix. To establish mechanisms for protective actions to reduce undue radiation risks associated with unregulated sources and contamination from past activities or events;
- xx. To conduct computer security assessments to help operators establish, implement, maintain and, where appropriate, strengthen their facilities' computer security, and to help their competent authorities evaluate the effectiveness of the measures taken; and
- xxi. To develop and issue guides for radiation safety and security.

The organisational structure of RPAZ is influenced the Authority's 2021-2025 Strategic Plan , which is aligned to government's priority objectives as outlined in the National Development Strategy 1 (2021-2025) of an upper middle income society by 2030. The RPAZ staffing levels

cover the essential elements of regulation including waste management. The management structure for RPAZ is detailed below:

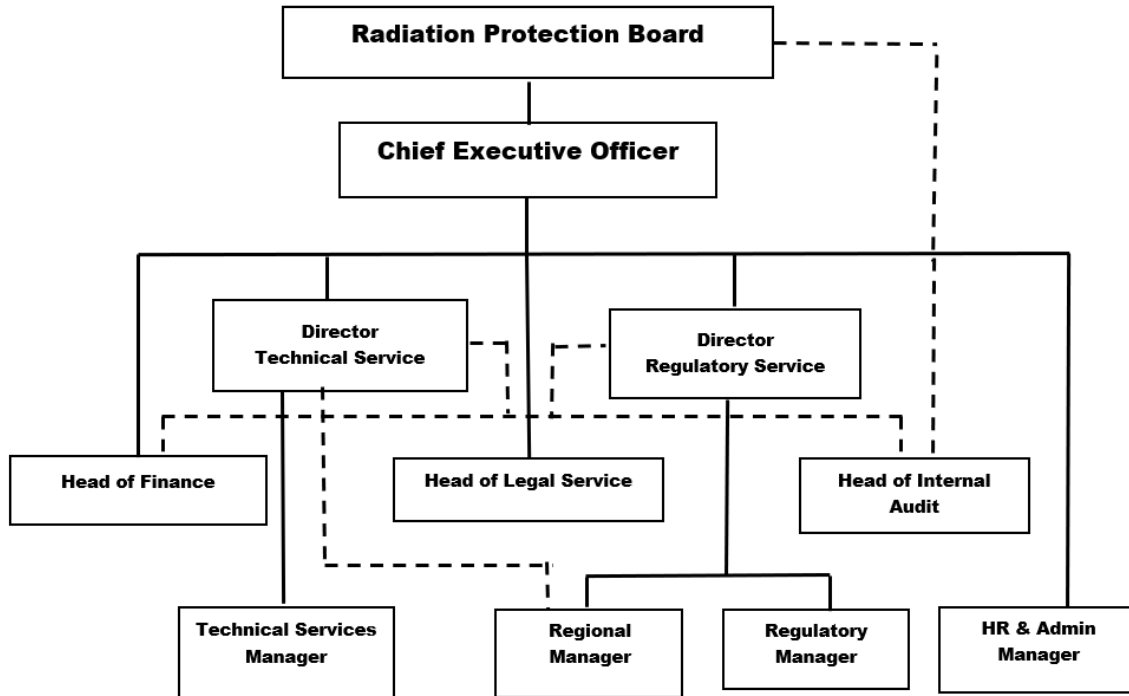


Fig E3: Management Structure for RPAZ

Plans are underway to allocate additional human resources to cover improved provisions for public and environmental exposure control and strengthening the authorisation and inspection regime.

RPAZ operates from its Head Office in Harare and a Regional Office covering the Southern Region. Officers are also stationed at five land borders (Beitbridge, Forbes, Chirundu, Kariba and Victoria Falls). This ensures the authority can deliver its mandate effectively throughout the country and respond timeously when the need arises.

The funds of the Authority shall consist of—

- a. any moneys that maybe payable to the Authority from moneys appropriated for the purpose by Act of Parliament,
- b. any donations, grants, bequests, or loans made to the Authority by any person or organization or any government of any country, and
- c. any other moneys accruing to the Authority by way of licence fees or other payments charged in respect of any services rendered by the Authority and for which fees may be charged under this Act.

In addition to regulatory functions, RPAZ has also been assigned functions related to technical support activities that promote compliance, including management of the national dosimetry laboratory, environmental monitoring, operation of the interim waste management facility and training. Deliberate separation of regulatory and technical support functions is in place to minimize as practicable as possible any conflict of interest and independence issues that may arise.

RPAZ Notification system is in place and the National Inventory of sources including disused sealed radioactive sources and radioactive waste is kept and regularly updated using the Regulatory Authority Information System (RAIS). RPAZ maintain records of the register of sealed radioactive sources and radiation generators, authorisations, inspections, enforcement actions, occupational doses, events, and inventories of radioactive waste.

In line with the Act, no practice can be adopted, introduced, conducted, discontinued, or ceased and no radiation source within a practice shall, as applicable, be mined, milled, processed, designed, manufactured, constructed, assembled, acquired, imported, exported, distributed, sold, loaned, hired, received, sited, located, commissioned, possessed, used, operated, maintained, repaired, transferred, deco decommissioned, disassembled, transported, stored or disposed of except in accordance with prescribed requirements.

Licensees have the prime responsibility for radiation safety and are required to put in place adequate radiation safety and security measures to protect workers and the public. A system of

authorization is in place through either licensing or registration. A graded approach is being used for the licensing and registration of ionizing radiation equipment and sources based on the IAEA source categorization. Authorizations are given through a multi-stage licensing approach for facility design, construction, importation/exportation of sources, use, possession, storage and decommissioning of facilities and sources. Requirements and license conditions exist for each authorized practice.

RPAZ has *return to supplier* requirements prior to authorizing the import of sources. When these become disused, an authorisation to store sources is issued awaiting their return to supplier. Authorisation of radioactive waste management facilities is also done, and requirements exist from design to decommissioning. Authorisations are valid for such a period as RPAZ may determine; and contain such conditions as RPAZ prescribes as necessary for the safe use or disposal of irradiating devices or radioactive materials. The holder of a licence shall be responsible for ensuring that exposure to ionizing radiation resulting directly or indirectly from its operation, conditions of storage, transport or disposal is kept as low as reasonably practicable and below the prescribed limits.

An inspection programme is in place and fully implemented to verify compliance with requirements, the inspection and regulatory decisions follows a graded approach. Where non-compliances exist enforcement actions may be taken in the form of notices, licence suspension, revocation, prohibition, or prosecution.

RPAZ runs an environmental monitoring laboratory for NORM, food, water, and materials testing

Capacity for radioactive waste management and the management of disused sealed sources have been strengthened through competence building and infrastructure development.

In the discharge of its functions RPAZ is empowered to collaborate with key agencies or bodies with a responsibility for safety and security. Currently, RPAZ has signed Memorandum of Understanding (MoU) with the following:

- i. Zimbabwe Revenue Authority (ZIMRA), customs office for import and export control and management of transshipment activities,
- ii. Environmental Management Agency (EMA), on environmental protection matters
- iii. Zimbabwe Republic Police, for enforcement matters and response to radiation events,

SECTION F. OTHER GENERAL SAFETY PROVISIONS

F-1 Responsibility of the Licence Holder

Article 21. Responsibility of the Licence Holder

- i. Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.
- ii. If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party, which has jurisdiction over the spent fuel or over the radioactive waste
- iii. Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory, and administrative measures, and other steps necessary for implementing its obligations under this Convention.

In line with Statutory Instrument 62 of 2011, the responsibility for safety and security of sources and facilities including for radioactive waste rests with the licensee. The authorisation, review and assessment, inspection and enforcement activities of the regulatory body are aimed at ensuring licensees adhere to this responsibility. Applicants for licensing must demonstrate the ability to safely manage all radioactive waste that may result from the proposed operations.

The Act mandates RPAZ to establish strategies to minimize the likelihood of a loss of control and regaining control of orphaned sources. Resources are available every year for inspections, as well as search and secure exercises that are conducted nationwide. Any recovered sources are placed in the interim storage facility that is managed by RPAZ.

Registrants and licensees shall ensure that the generation of radioactive waste shall be kept to the minimum practicable and shall prepare temporary storage to keep the waste until the radioactivity of the waste is reduced below the exempted level and properly discharged or disposed of. In addition registrants and licensees shall prepare radioactive waste for transport in accordance with the directive and the waste acceptance criteria issued by the authority and shall keep the data that shows the amount of radioactive waste under their possession and other

detailed information is required by the authority and shall report and update their report frequently. All discharges of radioactive substance into the environment shall be done according to the authority and any special program shall verify this.

Currently Zimbabwe does not have an operational centralized radioactive storage facility nor a disposal facility.

F-2 Human and Financial Resources

Article 22. Human and Financial Resources

Each Contracting Party shall take the appropriate steps to ensure that:

- i. qualified staff are available as needed for safety-related activities during the operating lifetime of a spent fuel and a radioactive waste management facility,
- ii. adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning,
- iii. financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary, following the closure of a disposal facility.

Adequate human resource capability is a critical component and a requirement for operating a waste management facility. RPAZ is preparing to complete and operationalize the radioactive waste management facility and pursuing the development of competence for officers that will run the facility.

Zimbabwe is participating in regional AFRA and IAEA training programs to capacitate a team of scientists on radioactive waste management. Previous activities have been on strengthening capability, particularly participating in and hosting conditioning demonstration exercises under the supervision of IAEA experts.

In general, the financing for decommissioning and waste management follows the rule of the “Polluter pays” principle, as such licensees are responsible for ensuring adequate financing for waste management activities.

Article 23. Quality Assurance

Quality management for radioactive waste management facilities has not been addressed in the regulations.

Article 24. Operational Radiation Protection

Dose limits for workers and members of the public are prescribed as well as the setting of dose constraints for public exposure. The occupational exposure of any worker shall be so controlled that the following limits are not exceeded:

- a. an (average) effective dose of 20 mSv per year averaged over five consecutive years.
- b. a (maximum) effective dose of 50 mSv in any single year.
- c. an equivalent dose to the lens of the eye of 150 mSv in a year, and
- d. an equivalent dose to the extremities (hands and feet) or the skin of 500 mSv in a year.
- e. Apprentices and Students, for apprentices of 16 to 18 years of age who are undergoing training for employment involving exposure to radiation and for students of age 16 to 18 who are required to use sources during their studies, the occupational exposure shall be so controlled that the following limits are not exceeded:
 - an effective dose of 6 mSv in a year.
 - an equivalent dose to the lens of the eye of 50 mSv in a year, and
 - an equivalent dose to the extremities or the skin of 150 mSv in a year.

Exposure of members of the public attributable to practices shall not exceed the following limits

which shall apply to the estimated average doses to the relevant critical groups:

- an effective dose of 1mSv in a year.
- an equivalent dose to the lens of the eye of 15mSv in a year, and
- an equivalent dose to the extremities or the skin of 50 mSv in a year.

Article 25. Emergency Preparedness

The Radiation Protection Act, the regulations and requirements of authorisation detect facilities put in place emergency preparedness and response plan that is tested from time to time.

The national emergency preparedness and response framework for radiological matters is in draft form. Arrangements for emergency preparedness and response measures for licensees are considered during authorisation or renewal of licenses for the facility.

Article 26. Decommissioning

Section 14 of the Act prohibits the disposal of radioactive material unless it is in accordance with prescribed requirements. Section 15 provides powers for RPAZ to issue authorisation to dispose of radioactive materials. According to Section 12 of the Radiation Protection (Medical Practices) Regulations (SI 91 of 2014) waste 31 management and disposal of radioactive sources is an activity which requires authorisation.

Section 12 of the Radiation Protection (Medical Practices) Regulations (SI 91 of 2014) waste management and disposal of radioactive sources is an activity which requires authorisation. Similarly, Section 4(7) obligates the licensee to comply with radiation safety requirements during the stage of decommissioning (partial or total) and return or disposal of radioactive sources.

In line with the regulation, a decommissioning strategy must be submitted to the RPAZ as part of the prior safety assessment and must be updated throughout the operation of the authorized activity as basis for detailed decommissioning plan. The decommissioning plan must be submitted to the authority as a basis for authorization of specific activities or phases of decommissioning. It must specify any inspections that are required to maintain radiation safety after termination of the period of responsibility of the holder of a license or registration. The authorized holder must manage my as far as reasonable the need for such institutional controls that are in place. The transportation of radioactive maintenance must be in accordance with the requirements of the applicable regulations for the safe transport of radioactive materials issued by the International Atomic Energy agency.

SECTION G. SAFETY OF SPENT FUEL MANAGEMENT

Article 4. General safety requirements

Article 5. Existing facilities

Article 6. Siting of proposed facilities

Article 7. Design and construction of facilities

Article 8. Assessment of safety of facilities

Article 9. Operation of facilities

Article 10. Disposal of spent fuel

Zimbabwe does not have a nuclear power plants and research reactors, no spent fuel in Zimbabwe.

SECTION H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

- Article 4. General safety requirements
- Article 5. Existing facilities
- Article 6. Siting of proposed facilities
- Article 7. Design and construction of facilities
- Article 8. Assessment of safety of facilities
- Article 9. Operation of facilities
- Article 10. Disposal of spent fuel

The Radiation Protection Act and the General Regulations (Statutory Instrument 66 of 2011) sets out the basic minimum requirements for radioactive waste management. There currently is no existing operational radioactive waste management facility in Zimbabwe. A centralized waste facility is however under construction at the RPAZ Head Office site in Harare. Requirements exist for design, siting, construction, operation and decommissioning of waste management facilities in line with multi-stage licensing requirements.

The design of the radioactive waste management facility under construction was done with expert support from the IAEA.

Section 14 of the Act prohibits the disposal of radioactive material unless it is in accordance with prescribed requirements. Section 15 provides powers for RPAZ to issue authorisation to dispose of radioactive materials.

According to Section 12 of the Radiation Protection (Medical Practices) Regulations (SI 91 of 2014) waste management and disposal of radioactive sources is an activity which requires authorisation. Section 4(7) of the same regulation obligates the licensee to comply with radiation safety requirements during the stage of decommissioning (partial or total) and return or disposal of radioactive sources.

The Radiation Protection Amendment Bill under consideration provides that at all stages in the management of radioactive waste, the following principles shall be applied by all persons and entities, including governmental bodies:

- That people and the environment are adequately protected against radiological and other hazards,
- That the generation of radioactive waste is kept to the minimum practicable,
- That the interdependence among the different steps of radioactive waste management is considered,
- That protective measures for radioactive waste management in Zimbabwe are implemented in a manner that reflects internationally recognized criteria, standards and guidance, specifically those adopted by the International Atomic Energy Agency,
- That biological, chemical, and other hazards that may be associated with radioactive waste management are adequately addressed,
- That criticality and removal of residual heat generated during radioactive waste management are adequately addressed,
- Those actions imposing reasonably predictable impacts on future generations greater than those permitted for the current generation are avoided,
- That undue burdens on current and future generations are avoided, and
- That appropriate funding arrangements are in place

An Integrated Regulatory Review Service (IRRS) mission was undertaken from 9 to 18 November 2014 by a team comprising nine international reviewers drawn from United States of America, Nigeria, Sweden, Belgium, Namibia, Hungary, and the IAEA. The mission reported noted that the radiative waste management operations including management of the interim facility and provision of other technical services functions such as dosimetry was being done within the same department responsible for regulatory functions. It was recommended that *the operation of the technical services and waste facilities needs to be formally accredited and the responsibilities for it be transferred to a unit of RPAZ that does not perform regulatory functions such as authorisation, inspection, and enforcement. Furthermore, the interim storage facility*

under the custody of RPAZ needs to be licensed to a unit that does not have regulatory functions.

For the 2021-2025 Strategic period RPAZ separated regulatory and technical services functions with two distinct directorship reporting to the Chief Executive Officer.

SECTION I. TRANSBOUNDARY MOVEMENT

Article 27: Transboundary Movement

1. Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments. In so doing:
 - i. Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;
 - ii. transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;
 - iii. a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;
 - iv. a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;
 - v. a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.
2. A Contracting Party shall not licence the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.
3. Nothing in this Convention prejudices or affects:
 - i. the exercise, by ships and aircraft of all States, of maritime, river and air navigation rights and freedoms, as provided for in international law;
 - ii. rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of origin;
 - iii. the right of a Contracting Party to export its spent fuel for reprocessing;
 - iv. rights of a Contracting Party to which spent fuel is exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing

In line with requirements, transboundary movement must be done in accordance with the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition)) published by the International Atomic Energy Authority (IAEA 2012) to which Zimbabwe adopted.

RPAZ is the national competent authority in connection with the IAEA's Regulations for the Safe Transport of Radioactive Material. The Act and regulations and national policy does not authorize the importation of radioactive waste.

Zimbabwe is a transit corridor within the SADC region and has significant transit shipments by road. RPAZ issues transit permits as part of implementation of this requirement, as such transport of radioactive materials has activity concentrations above the exclusion levels as specified by IAEA regulations requires prior authorisation from RPAZ. Collaborative arrangements exist with Customs, Police and other key departments or agencies to ensure the safe, secure transshipments of the materials. Training of these stakeholders is in progress as part of the National Nuclear Security Committee objectives.

Arrangements to deploy radiation detection monitors at the ports of entry have been prioritized in the medium term and the requisite training of stakeholders (Customs, Security, Aviation) in the detection and response issues is underway.

SECTION J. DISUSED SEALED SOURCES

Article 28: Disused Sealed Sources

1. Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.
2. A Contracting Party shall allow for reentry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.

Zimbabwe does not manufacture radiation sources and does not have a radioactive waste disposal nor long-term storage facility. As such, Zimbabwe has a “return to supplier” policy, all imports of radioactive sources require an authorization to be issued by the regulator, whose prerequisite includes a commitment/agreement by supplier to take back the sources at the end of their useful life (return to supplier) and to facilitate its repatriation.

Once the sources become disused, the Licensees are issued with authorization to possess and store until the sources are repatriated back to the country of origin. The responsibility for the safe management of the disused sources in line with Statutory instrument 62 of 2011 is with the authorized party until the sources has been transferred to the supplier or a disposal facility.

In the case of export, a facility looking to return disused/spent radioactive sources back to the country of manufacture must submit first a notification for decommissioning then apply for an export license issued by RPAZ. Provisions of the Supplementary Guidance on the Import and Export of Radiation Sources are implemented during the export processes.

The challenge is with a number of legacy sources that are not within the framework of returning to supplier and at times the costs associated with the return. Currently, discovered orphan sources are stored in an interim storage facility owned and controlled by RPAZ. Disused sources are stored at the premises of the licensee’s awaiting repatriation or return to supplier

and are subject to regulation. There is need to strengthen arrangements for the return to supplier by putting in place financial guarantees prior to import of sources. Implementing financial guarantees to manage radioactive sources throughout their life cycle is not under implementation in Zimbabwe.

The following criteria is also in place:

- Prohibition of import of radioactive waste, radioactive waste generated in another country shall not be imported into the country for any purpose.
- Criteria for the export of Disused Radioactive Waste Sources:
 - disused radioactive waste sources generated within Zimbabwe may be exported only upon the issuance of an authorisation by the Authority.
 - Radioactive waste shall not be authorised for export to a destination south of latitude 60 degrees for storage or disposal.
 - whether the importing State will be notified of the transfer of Disused Radioactive Sources radioactive waste prior to its receipt and has consented to such transfer.
 - whether movement of the exported material will be conducted in conformity with relevant international obligations in all States through which the material will transit.
 - whether the importing State possesses the administrative and technical capacity, as well as the regulatory structure, needed to manage the exported radioactive waste in a manner that ensures its safety and security, consistent with relevant internationally recognised standards, particularly those promulgated by the International Atomic Energy Agency.
 - If an authorised export of Disused Radioactive Sources radioactive waste cannot be completed in conformity with this Act, the Disused Radioactive Sources radioactive waste shall be re-imported into Zimbabwe unless alternative safe and secure arrangements can be made.

SECTION K. GENERAL EFFORTS TO IMPROVE SAFETY

K-1 Radiation Safety Infrastructure

Zimbabwe is committed to continuously improve and strengthen the radiation safety infrastructure. An Integrated Regulatory Review Service (IRRS) mission was undertaken from 9 to 18 November 2014 on request by the Government of Zimbabwe.

The following good practices and key recommendations related to the Joint Convention were made, and considerable progress has been made to address these recommendations and highlighted below:

R.1 The Government should establish a national policy and strategy for safety to ensure that the Safety Fundamentals are explicitly adopted in a high-level document.

R.3 The Government should designate a responsible organization and create a system to ensure that protective actions to reduce risks from unregulated sources and past contamination can be carried out.

R.4 The government should establish a national policy and strategy to include financial provisions for the decommissioning of facilities, the safe management and disposal of radioactive waste.

R.5 The Government should provide for building and maintaining the available national arrangements for education and training to address the competence needs of all parties in relation to safety of facilities and activities, based on proper analysis.

R.6 The Government should ratify the international instruments related to nuclear safety and radiological protection and should demonstrate that respective international obligations are fulfilled by participation in its relevant international arrangements

S.8 RPAZ should consider providing for a further operational separation between technical services and the regulatory function to minimize the potential for conflicts of interests.

R.10 RPAZ should develop a formal mechanism to communicate with authorised parties on all safety related issues.

R.16 RPAZ should implement a multi-staged authorisation system for facilities and activities as appropriate.

R.17 RPAZ should license the interim waste storage facility to a unit within its organisation that is not tasked with authorisation or inspection until such time that custody can be transferred to a proper utility outside RPAZ.
R.20 RPAZ should develop regulatory and guidance documents for the licensees to perform threat assessment on which their EPR arrangements will be based.
R.21 RPAZ should develop, in cooperation with the emergency response coordinating authority, an incident command and control system.
R.23 The government should establish a permanent contact point for notification of a radiation emergency, both for domestic emergency notification and to function as a National Warning Point.
R.24 RPAZ should develop generic and operational intervention and action levels, in accordance with the international standards.
R.25 RPAZ should initiate the process, in cooperation with other government agencies, needed for officially defining the term “emergency workers” and developing the regulatory provisions for their protection.
R.26 The Government should adopt, based on proposals and regulatory requirements developed by RPAZ, the optimized intervention levels and action levels for agricultural countermeasures, countermeasures against ingestion and longer-term protective actions.
R.27 RPAZ should develop the necessary requirements regulating the recovery operation and facilitating the smooth transition to normal social and economic conditions.
R.28 RPAZ should develop guidance for the applicants/licensees on the preparation of facility emergency plans. This should also serve as acceptance criteria for the evaluation of the emergency plans during the authorization process.
R.29 RPAZ should develop its own radiation emergency response plan

A follow-up IRRS mission has been requested and shall be undertaken in May 2022. Zimbabwe experts to further draw experiences in the management of radioactive waste and the management of disused sources from the follow-up review mission that will also lead to meeting of the Joint Convention Obligations.

K-2: Review of the Radiation Protection Act

The Radiation Protection Act [Chapter 15:15] is currently under review with a Radiation Protection Bill currently under consideration and the drafting being finalized by the Attorney General’s Office. The Bill seeks to improve provisions for safety, security and safeguards with the following key matters having been incorporated:

- Comprehensive inclusion of security and safeguards and emergency preparedness and response arrangements
- Incorporation of obligations arising from the ratification of the following international conventions:
 - Convention on the Physical Protection of Nuclear Material CPPNM
 - Convention on Early Notification of a Nuclear Accident
 - Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
 - Joint Convention on the Safety of Spent Fuel Management and Safety of Radioactive Waste Management
 - Additional Protocol to the Comprehensive Safeguards Agreement between the IAEA and Government of Zimbabwe.
- Strengthening the shortcomings addressed in the RASIMS profiles particularly TSA 2, 3 and 4.
- Provision of financial provisions for the management of radioactive waste and disused sources and creation of a radioactive waste management fund.
- Strengthening corporate governance issues and review of representation of the Radiation Protection Board.

K-3: International Conventions and Instruments

In addition to implementation of the already acceded and ratified , processes to ratify the following conventions are underway:

1. Convention on Nuclear Safety.
2. Vienna Convention on Civil Liability for Nuclear Damage.
3. Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage.
4. Amendment to the Convention on the Physical Protection of Nuclear Material.

SECTION L. ANNEXES

Annex: 1

List of Spent Fuel Management Facilities:

- None

Annex: 2

List of Radioactive Waste Management Facilities:

Name of Facility	Details
Interim Radioactive Waste Management and Disused Sources Storage Facility Radiation Protection Authority of Zimbabwe Technical Services, Hatcliffe, Harare	Operational, housing conditioned sources and disused and orphaned sources
National Waste Management Repository Radiation Protection Authority of Zimbabwe Technical Services, Hatcliffe, Harare	Under Construction

Annex: 3

List of Nuclear Facilities in the Process of being Decommissioned:

- None

Annex: 4

Inventory of Spent Fuel

- None

Annex: 5

List of radioactive waste and Disused Sources in the Interim Storage Facility:

Name of Facility	Details
Conditioned Radium Sources	4 Drums
Conditioned low level neutron sources (Am-241 Sources)	1 Drum
Conditioned low level neutron gamma sources (Cs-137 and Co-60 Sources)	2 Drums
Disused Sealed Radioactive Sources (Orphaned)	4

Annex: 6

References to National Laws, Regulations, Requirements and Guides:

- Radiation Protection Act [Chapter 15:15].
- Radiation Protection (Safety and Security of Radiation Sources) Regulations, 2011 (Statutory Instrument 62 of 2011).
- Radiation Protection (Naturally Occurring Radioactive Materials) NORM Regulations, 2013 (Statutory Instrument 99 of 2013).
- Radiation Protection (Medical Practices) Regulations, 2014 (Statutory Instrument 91 of 2014).
- Radiation Protection (Safety and Security of Radiation Sources) (Amendment) Regulations, 2020 (No. 5) (Statutory Instrument of 281 of 2020).

Annex: 7

References to reports on international review missions performed at the request of a Contracting Party:

- IAEA Advisory Mission Report to Zimbabwe, 2009
- Integrated Regulatory Review Service (IRRS) Mission to The Republic of Zimbabwe, Harare, Zimbabwe, 9 To 18 November 2014