Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

7th Review Meeting

National Report of the Kingdom of Saudi Arabia

هيئة الرقابة النووية والإشعاعية
Nuclear and Radiological Regulatory Commission

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Nuclear and Radiological Regulatory Commission

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Section A. Introduction

Since the late fifties and sixties, different applications of nuclear technologies have been implemented in the Kingdom of Saudi Arabia (KSA), such as those introduced in the field of medicine and mining related activity with emphasis being placed on oil and gas. These applications have evolved significantly and have widened in their related fields. Obviously, this have resulted in generating different types of radioactive wastes which require proper and formal management.

KSA works on integerating peaceful atomic energy into the national energy mix and maintaining the Kingdom as a leading energy-efficient country to achieve the ambitious Saudi Vision 2030. Therefore, a National Policy for the Atomic Energy Program was approved in March 2018. The Kingdom's desire to fulfill its obligation towards the international community as defined by several and different international instruments (treaties, conventions, resolutions, and Codes of Conducts), and following international best practices. The Kingdom has adopted the following essential principles in its Atomic Energy Program:

1- Limiting all nuclear development activities to peaceful purposes within the limits of legislations and international treaties and conventions;

2- Complying in both regulatory and operational aspects with the principle of transparency;

3- Applying nuclear safety and security standards in nuclear and radiological facilities, in accordance with an independent regulatory and monitoring framework;

4- Ensuring optimal use of the Kingdom's natural resources of nuclear material and applying the international best standards and practices for radioactive waste management; and

5- Achieving sustainability by developing local contents in the atomic energy sector.

The Charter of the Nuclear and Radiological Regulatory Commission (NRRC) was approved on March 13, 2018 in KSA and NRRC has started to execute its mandates and roles for more than one year. This is followed by approving The Law on Nuclear and Radiological Control on April 10, 2018. NRRC has drafted all nuclear and radiation regulations with the assisstance of IAEA, and other similar international regulatory bodies. Radioactive waste safety is one of these regulations.

On September 19, 2011, the Kingdom signed the Joint Convention and entered into force on December 18, 2011. As part of the national policy, the Kingdom remains firmly committed to meeting its obligations and maintains a radioactive waste management program consistent with the international standards and best practices for the management of radioactive waste generated by current radiological practices. The program includes two parallel activities:

1- The application of regulatory aspects through instructions to regulate the safe disposal of radioactive waste; and

2- Designating a national site for the establishment of radioactive waste management facilities.

KSA is hereby presenting its national report to the seventh review meeting of the the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management – hereafter referred to as (the Joint Convention) prepared by NRRC the competent national authority responsible for regulating activities, practices and facilities involving peaceful use of nuclear energy and ionizing radiation. This is in conjunction with King Abdullah City for Atomic and Renewable Energy (K.A.CARE), the responsible governmental authority for the management of radioactive waste.

This report aims to demonstrate how the Kingdom continues to meet its obligations under the terms of the Joint Convention. It focuses specifically on legislative and regulatory framework, the regulatory body, the Kingdom's policies, technical safety obligations related to the safety of radioactive waste, inventories, transboundary movement and other safety provisions. The report reflects new development, current activities and the Kingdoms plan. It has been prepared in accordance with Article 32:"each Contracting Party shall submit a national report to each review meeting of Contracting Parties" and structured in accordance with the instructions of the IAEA Information Circular INFCIRC/604/Rev.3, titled, "Guidelines regarding the Form and Structure of National Reports".

KSA's utilization of nuclear-based technologies is limited to industrial applications, research and education, medical applications and does not entitle in nuclear power generation. KSA does not have industries that are related to the production or utilization of nuclear material. As such, this report reflects the national status regarding the safety of radioactive wastes mainly resulting from disused and spent radioactive sources, and medical applications. Most of the radioactive waste available for the safe management in the KSA is linked to disused sources. Other legacy sources are related to Radioisotope Thermoelectric Generator (RTGs) used a long time ago to provide electrical supply for few remote weather monitoring stations.

Finally , it is worth to mention that KSA is one of the world's largest producers of oil and seawater desalination and brackish water treatment, naturally occurring radioactive materials (NORMs) are being generated, but are explicitly excluded from the scope of this report under the terms of the Convention.

Section B. Policies and Practices

ARTICLE 32. REPORTING

1. 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 its:

(i) spent fuel management policy;

(ii) spent fuel management practices;

(iii) radioactive waste management policy;

(iv) radioactive waste management practices;

(v) criteria used to define and categorize radioactive waste.

A national policy for radioactive waste management is currently under the approval process. The national policy focuses on the following objectives:

- Adherence to international principles for the management of radioactive waste.
- Assigning the roles and responsibilities of national organizations concerned with radioactive waste management;
- Defining the directions for radioactive waste management generated in the Kingdom;
- Ensuring sustainable and adequate resource for the management of radioactive waste;
- Committing to transparency.

KSA is not a nuclear power state, so spent nuclear fuel is not part of the current waste issues; and it is therfore excluded from this national policy for radioactive waste management. There is currently a program of work in progress to develop and implement a national strategy for radioactive waste management. The strategy aims to:

- Outline arrangements for ensuring that the national policy for radioactive waste management is implemented;
- Assign responsibilities;
- Ensure the alignment of roles;
- Conform to other strategies and good international practice;
- Determine the optimum strategy (or strategies) based on generic technical options for predisposal management, desired endpoints, resources, country specifics, required infrastructures, cost, public sensitivities, and uncertainties;
- Specify to the extent possible potential infrastructures that will be necessary, such as disposal sites, and provide plans to ensure that they are met; and
- Incorporate arrangements for implementation and supervision in relation to radioactive waste.

To date, radioactive waste in KSA is generated almost exclusively from research, industrial and medical applications. Each waste producer manages the waste they generate locally, including their temporary on-site storage until one or more disposal routes are available. The radioactive waste generated and accumulated varies in terms of physical form and activity.

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 if and when such materials are transferred permanently to and managed within exclusively civilian programmes.

4. This Convention shall also apply to discharges as provided for in Article 4, 7, 11, 14 24 and 26.

This report covers the safe management of radioactive waste resulting from civilian applications. As the KSA does not have activities related to the production or utilization of Nuclear Materials. Therefore, no nuclear material other than depleted uranium employed in shielding is in use within the country in addition to the under construction Research Reactor (low power research reactor), the fuel will be kept in the facility as part of the operation for the next 40 years. As a consequence, this report does not deal with the safety of Spent Fuel Management at all.

Most of the radioactive waste is associated with the disused or spent radioactive sources. Even though KSA is one of the largest countries in the world in terms of oil production, sea-water desalination and brackish water treatment, NORMs are being generated which are explicitly excluded from this report as per the terms of the Joint Convention.

Section D. Inventories and List

ARTICLE 32. REPORTING
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; or
(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.

The site of the candidate radioiactive wate storage facility is located west of the capital Riyadh which is dedicated for the management of radioactive waste. At the time being, the site is only used as an interim storage facility for legacy NORM Waste, Disused Sealed Radioactive Sources (DSRS), and RTG, and it is currently not configured to receive operational waste from other facilities. However, it is expected that once operational, this facility will be receiving radioactive waste generated in the Kingdom.

The kingdom does not have spent nuclear fuel at the moment, hence no facilities for the storage of such. There are also no existing nuclear facilities and certainly no nuclear facilities in the process of being decommissioned. The radioactive waste handled by the Kingdom are as follows:

- Disused sealed radioactive sources.
- Spent sealed radioactive sources (mainly damaged mobile nuclear gauges).
- Radioisotope Thermoelectric Generators-RTGs (recovered three large Sr-90 for historical remote weather stations).
- Depleted Technetium Generators (legacy containers of depleted Tc-generator)
- Depleted uranium (remains of decontaminated soils from the firing ranges during the Gulf war which needs further characterization for free-release decision).
- Natural Occurring Radioactive Waste (NORM) from Oil and gas industries, and ground brackish-water treatment plants.
- Collected and recovered remains of Co-60 self-contained irradiator accident.

The NRRC has been promoting the drafting process of the National Radioactive Waste Management Policy since the beginning of its actions. It is also working on a systematic comprehensive review of the national radioactive waste inventory and its safety condition . However, the updated radioactive waste inventory report is not ready.

Section E. Legislative and Regulatory System

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.

ARTICLE 19. LEGISLATIVE AND REGULATORY FRAMEWORK

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management

2. This legislative and regulatory framework shall provide for:

(i) the establishment of applicable national safety requirements and regulations for radiation safety;

(ii) a system of licensing of spent fuel and radioactive waste management activities;

(iii) a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a license;

(iv) a system of appropriate institutional control, regulatory inspection and documentation and reporting;

(v) the enforcement of applicable regulations and of the terms of the licenses;

(vi) a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management.

3. When considering whether to regulate radioactive materials as radioactive waste Contracting Parties shall take due account of the objectives of this Convention.

ARTICLE 20. REGULATORY BODY

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.

2. Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation.

The Kingdom of Saudi Arabia is committed to the long-term objective of safe,secure and responsible use of nuclear technology for the welfare of its people. Furthermore, as these applications involve components of high technology, the Kingdom will accordingly develop expertise. The government is committed in developing legislation and enacting laws; this includes safety regulations, developing a suitable country-specific institutional framework, which provides the regulatory body with functional independence, ensuring sufficent resources available for the regulatory body, establishing relations with regulatory authorities of other countries, etc. The Nuclear legislative framework of the Kingdom of Saudi Arabia consists of three different layers as shown in **Figure 1**; the top layer is the Legislation, which consists of the laws issued by the government (Royal Decree), the middle layer is the regulations issued by the board of the NRRC, those regulations contain obligatory requirements that shall be followed by licensees. The third layer of the legislative framework is the regulatory guides which are issued by the NRRC and provide guidance and interpretations on how the regulations are implemented.

Figure 1. Hierarchy of KSA legal and regulatory framework compared to IAEA safety standards.

Since the last review meeting KSA has been in advance in terms of the legislative and regulatory framework. A National Policy for the Atomic Energy Program was issued by the Cabinet of Ministers on March 3, 2018. Furthermore, the Kingdom of Saudi Arabia enacted three comprehensive laws listed below. One of these laws is the charter for the establishment of the NRRC. The laws were developed after an extensive assessment of the local and international related laws, and engagement with national stakeholders and international legal firms and other organizations. The NRRC then has hosted an expert mission from the IAEA to review the laws before the process of approval. Comments from the IAEA were taken into account. The three laws are:

1- **The Charter of the Nuclear and Radiological Regulatory Commission ("the Charter", approved on March 13, 2018**). The Charter establishes the legal framework of an independent regulatory body and assigning its mandates. In the following section, a description of this Charter is given.
2- **The Law of Nuclear and Radiological Control ("the Nuclear Law", approved on April 10, 2018**). The Nuclear Law is drafted, taking into account IAEA Safety Fundamentals SF-1 along with international best practices, then reviewed for feedback by regulatory authorities, utilities, and legal firms and the IAEA to ensure the law's inclusion as well as its alignment with the IAEA's terminology.
3- **The Law on Civil Liability for Nuclear Damage ("the Liability Law", approved on April 10, 2018).** The purpose of this law is to specify the governing compensation for nuclear damage. It contains provisions on definitions, operator's liability, liability during transport, liability amount, financial guarantee, etc. The law is aligned with Vienna Convention on Civil Liability for Nuclear Damage and its amendments, as the Kingdom of Saudi Arabia is a party of Vienna Convention and Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage.

The Nuclear Law empowers the NRRC to set up the licensing process and develop license classifications. The Regulatory Commission responsibilities include safety, security, and safeguards. The Nuclear Law explicitly requires applicants for a nuclear facility to inform the NRRC of their intention to establish a nuclear facility in advance. Furthermore, the NRRC is responsible for establishing an inspection program on nuclear and radiological activities and facilities. Also, Article 20 of the Nuclear Law empowers the regulatory authority to assign inspectors, conduct inspections, and monitor activities and facilities to verify compliance with the license conditions. It also gave the NRRC the responsibility to set the licensing terms and conditions for radioactive waste and spent fuel management facilities.

Article 19 in the Nuclear Law stated in paragraph 1 "The prime responsibility for ensuring the safety and security of radioactive waste and spent fuel inside and outside a disposal facility shall rest with the licensee" and bullet 2 " if the licensee fails to undertake the responsibility referred to in paragraph 1 of this article, King Abdullah City for Atomic and Renewable Energy shall assume such responsibilities, without relieving the licensee from his obligation under the Commission laws, including his financial responsibilities."

The Kingdom of Saudi Arabia is also a party to international legal instruments and has been participating in related meetings, these instruments have been going through actions on national level, those instruments are as follows:

- Convention on Early Notification of a Nuclear Accident (INFCIRC/335);
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (INFCIRC/336);
- Convention on Nuclear Safety (INFCIRC/449) ("CNS");
- Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management ("Joint Convention") (IN-/274/Rev.1/Mod.1);
- Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/500);
- Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/566);
- Comprehensive Safeguards Agreement with the IAEA; and
- Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA.
- Convention on the Physical Protection of Nuclear Material (INFCIRC/274)
- Amendment to the Convention on the Physical Protection of Nuclear Material (INFCIRC/274/Rev.1/Mod.1)

NRRC is a recent established regulatory body for the nuclear and radiological sector in the Kingdom of Saudi Arabia by the decision of the cabinet of ministers No. 334. The NRRC oversees the protection of the public and the environment by legislating regulations and the implementation of nuclear regulatory programs in safety, security, radiation protection and safeguards. This is to be achieved in accordance with the best international practices and with the cooperation of IAEA. The NRRC Charter states all NRRC 's duties and powers, governance, functions, as well as its financial resources. According to the Charter of NRRC in Article (3), it is the responsibility of NRRC "to regulate activities, practices, and facilities involving peaceful use of nuclear energy and ionizing radiation; to control and ensure the safety and security of such use and compliance with nuclear safeguards, to protect humans and the environment against any actual or potential exposure to radiation, including exposure to natural radiation, and to implement the Kingdom's obligations under relevant treaties and conventions". The duties and powers of the Commission as defined in theCharter are:

- Setting policies and regulations to ensure the monitoring of activities, practices, and facilities;
- Setting regulations on safety, security, and nuclear safeguards as well as ensuring implementation thereof;
- Monitoring the processes of exporting, importing, and circulation of nuclear materials, nuclear-related items, and radioactive materials;
- Setting requirements for nuclear and radiological emergency preparedness;
- Controlling and inspecting activities, practices, and facilities within its jurisdiction;
- Raising awareness of the risks of ionizing;

- Cooperating with relevant governmental agencies and similar authorities in other countries and international organizations;
- Representing the Kingdom in the IAEA and other relevant international organizations; and
- Any other task the Commission deems necessary to protect humans and the environment from the risks of ionizing radiation.

NRRC has a board of directors consisting of a chairman appointed by a Royal Order, the chief executive officer of the Commission (CEO), and five members are appointed pursuant to a decision by the Council of Ministers upon a recommendation by the chairman of the board. The NRRC is now at the establishment phase, where many aspects and activities are being assessed thoroughly.

A human resource development plan was also developed in the NRRC to assess the actual needs for each sector and the required competencies based on benchmarking studies and the amount of current and future regulatory work. In relation to this, the NRRC is working on enhancing the staff's competencies on a continuous basis through training and development programs. For example, a training program was held for several professionals from NRRC on nuclear safety in South Korea in cooperation with the Korean Institute of Nuclear Safety (KINS). The NRRC is also planning to utilize experienced international technical support organizations to support its regulatory activities. The NRRC is preparing to obtain technical support from expert organizations for reviewing the application of the site license of the first nuclear power plant in 2020.

NRRC has also begun to develop a management system manual that includes the framework for the management system (MS). Many references have been taken into consideration while drafting this manual. However, the manual is still in the drafting process, and the references listed below are examples (and are subject to change). **SF-1, Fundamental Safety Principles.**

- GSR Part 1: Governmental, Legal, and Regulatory Framework for Safety, 2016.
- GSR Part 2: Leadership and Management for Safety, 2016.
- DS472: Organization, Management, and Staffing of the Regulatory Body.
- DS473: Regulatory Functions and Processes.
- Nuclear Law of the KSA.
- ISO 9000:2015, Quality Management Systems- Fundamentals and vocabulary.
- ISO 9001:2015, Quality Management Systems- Requirements.
- ISO 9004:2009, Managing for the sustained success of an organization. A quality management approach.

NRRC has also developed a roadmap for developing the required set of regulations and guides in consultation with a number of related resources. The Finnish regulatory authority STUK, one of NRRC's strategic partners, has provided support in this respect. These Draft Regulations have been identified to ensure the safety, security, and safeguard of nuclear facilities a performance-based approach was adopted in the Draft of Regulations. The Draft Regulations include mandatory performance-based

requirements complemented if necessary by other prescriptive requirements. The structure of the Draft Regulations is in line with the 2008 IAEA Safety Requirements, complemented by regulations concerning the construction of a nuclear power plant, safeguards and nuclear security. IAEA Safety Requirements updated due to the lessons learned from the TEPCO Fukushima Daiichi accident in 2011 have been used as a reference for drafting the Regulations. The Draft Regulations will be presented to the NRRC board for approval. Those regulations are listed below:

1. Radiation Safety.
2. Notification and Authorization of Facilities and Activities with Radiation Sources.
3. Licensing and Regulatory Oversight of Nuclear Facilities.
4. Leadership and Management for Safety.
5. Site Evaluation of Nuclear Facilities.
6. Design of nuclear facilities.
7. Safety Assessment of Nuclear Facilities.
8. Construction and Commissioning of Nuclear Facilities.
9. Operations of Nuclear Facilities.
10. Decommissioning of Nuclear Facilities.
11. Nuclear Security.
12. Nuclear Safeguards.
13. Nuclear Facilities Radioactive waste and spent fuel management.
14. Nuclear Facilities Emergency Preparedness and Response.
15. Safe Transport of Radioactive Material.
16. Radioactive Waste Safety.

Since the Draft Regulations have not been issued yet, the Council of Ministers of the Kingdom has issued a resolution No. 225 on January of 2019 stating that KSA will use IAEA safety standards as the minimum safety requirements until the regulatory authority issues its own regulations that should be consistent with the IAEA recommendations. The NRRC is currently preparing to develop regulatory guides and will start the development process of those guides in 2020. The NRRC is prioritizing the development of those guides based on both significance and relevance. For example, those guides related to licensing, siting and design will be developed and drafted first as compared to operation and decommissioning guides .

The NRRC undertakes a series of action plans and procedures in the process of drafting the set of regulations. these actions and plans are summarized in **Error! Reference source not found.** A cooperation with the Finish regulatory authority STUK has been initated for the purpose of drafting, reviewing and finalizing the regulations documents. To achieve this purpose, both the content of each regulation and the references to be used in the development of this regulation must be agreed upon at the beginning. the regulation then is drafted in its first version. After the first draft of regulation is developed, it goes through five milestones as follows:

- NRRC committee review.
- International expert review.
- National stakeholders review.
- IAEA expert mission review.
- Final draft preparation for the board approval.

At the end of each milestone, NRRC discuss the feedback with STUK, and all recommendations are being followed in the regulation document. Moreover, the Kingdom of Saudi Arabia has performed an INIR mission in 2017 in which the regulation development process has been presented and where positive remarks have been raised.

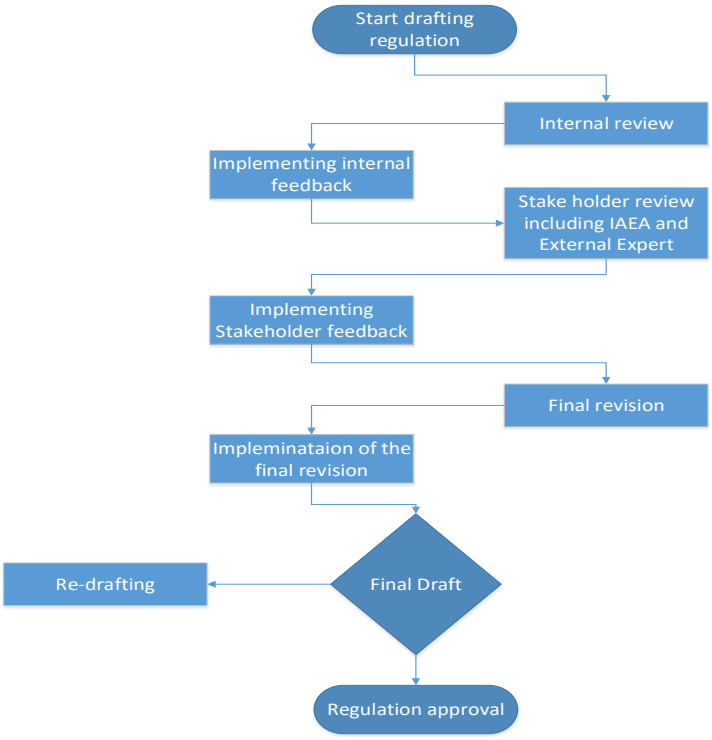

Figure 2: Regulatory process in the development of national regulations

The Nuclear Law empowers the NRRC to set up both the licensing process and the license classifications. The responsibilities of the NRRC, being the national regulatory authority, include ensuring and maintaining safety, security and safeguards.The Nuclear Law explicitly requires applicants for a nuclear facility to inform the NRRC of their intention to establish a nuclear facility in advance. In addition, in Article 6 of the Nuclear Law requires that any organization intending to establish and operate a nuclear facility to get the approval of the council of ministers prior to initiating the licensing process with the NRRC. The Law is prohibiting any aspect related to starting of any nuclear or radiological activities without a license from NRRC. This prohibition is stated in article 5 bullet 1 of the

Law "No person shall carry out any activity without a license or an exemption from the Commission in accordance with its laws".

Under the Nuclear Law, the NRRC is responsible for developing an inspection program on nuclear and radiological activities and facilities. Furthermore, Article 20 of the Nuclear Law empowers the NRRC to assign inspectors, conduct inspections and monitor activities and facilities for the purpose of verifying compliance with the license conditions.

The NRRC is committed to further developing inspection activities for all nuclear and radiological activities and facilities. In addition, the NRRC also plans to supervise all relevant areas of nuclear safety in different phases of the facilities lifecycle within its inspection program. This program consists of periodic inspection procedures and technical conformity inspections focusing on manufacturing, installation, and commissioning.

The enforcement of the NRRC has been explicitly addressede in The Nuclear Law. Article 20 of the Law shows that this enforcement consist of a set of rights to access any facility and enforce facility operators to take corrective measures. Article 22 also details the regulatory authority's rights to impose fines and penalties on any violation of the law. It also gives the right to the licensee to apply for an appeal against the accusation of violating enforcement measures in an independent court.

The NRRC, is directly linked to the Prime Minister to ensure its independency and autonomy as stated in Article (2) of the Charter of the regulatory commission, "The Commission shall enjoy a public legal personality with financial and administrative autonomy. It shall report to the Prime Minister". Effective separation is ensured between the duties and responsibilities of NRRC and any other promoting organizations such as K.A. CARE, through the granted power given to NRRC by the three approved laws.

Section F. Other General Safety Provisions

ARTICLE 21. RESPONSIBILITY OF THE LICENCE HOLDER

1. 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 license and shall take the appropriate steps to ensure that each such license holder meets its responsibility.

2. If there is no such license holder or other responsible party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.

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.

ARTICLE 23. QUALITY ASSURANCE

Each Contracting Party shall take the necessary steps to ensure that appropriate quality assurance programmes concerning the safety of spent fuel and radioactive waste management are established and implemented.

ARTICLE 24. OPERATIONAL RADIATION PROTECTION

1. Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:

(i) the radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;

(ii) no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and

(iii) measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.

2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:

(i) to keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and

(ii) so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.

3. Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility, in the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, appropriate corrective measures are implemented to control the release and mitigate its effects.

ARTICLE 25. EMERGENCY PREPAREDNESS

1. Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate onsite and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.

2. Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.

ARTICLE 26. DECOMMISSIONING

Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:

(i) qualified staff and adequate financial resources are available;

(ii) the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;

(iii) the provisions of Article 25 with respect to emergency preparedness are applied; and

(iv) records of information important to decommissioning are kept.

It is KSA's Principle to ensure that the license holder is vested with the prime responsibility for the safety of radioactive waste management. This is implemented in the formulation of relevant regulations and regulatory guides. Pursuant to the Nuclear Law in article 19, “The Prime responsibility for ensuring the safety and security of radioactive waste and spent fuel inside and outside a disposal facility shall rest with the licensee” and bullet 2 ”if the licensee fails to undertake the responsibility referred to in paragraph 1 of this article, King Abdullah City for Atomic and Renewable Energy shall assume such responsibilities, without relieving the licensee from his obligation under the Commission laws, including his financial responsibilities”. Thus, if the waste generator and/or licensee fails in doing his responsibilities, K.A.CARE shall assume the responsibility of the safe and secure management of RW, without relieving the licensee from his obligations, including his financial responsibilities.

According to the Nuclear Law in article 5, bulletin 3 “A license applicant shall have the means, capabilities and financial resources needed to carry out the activity subject of the license, taking into consideration fulfillment of the requirements of nuclear safety, security and safeguards.” Experience gained in respect to existing practices has provided the Kingdom with firm radiation safety capacity and expertise, along with a sustained radiation safety regulatory framework. Nevertheless, the introduction of a nuclear power programme into the Kingdom necessitates upgrading the Kingdom's radiation safety capabilities for radiation safety matters related to nuclear power plants. Building human capacity is vital to the success of radioactive waste management in the KSA. There is a plan to develop, implement and monitor strategies to establish an effective human capacity building program. Efforts are being made at the newly established regulatory Commission in relation to building human capacity. With regard to radiological safety, KSA has already established the NRRC with a core of competent qualified staff and is investing heavily in recruitment and training through relationships with several educational and training institutions. Accordingly, NRRC is planning its training programs in collaboration with the IAEA and other partner institutions in the national capacity building program providing a range of educational, training and development opportunities in KSA and overseas.

The Radioactive Waste Management unit within K.A.CARE manages the current interim radioactive waste storage facility and the national inventory of radioactive waste. The unit organizational structure is shown in **Figure 3** below. The unit consists of 10 scientists and engineers. The RWMU has launched a program of resource development and is now being supported by a new task force and several international experts**.** The required expertise and skills are expected to range from setting policies and strategies to siting, designing, constructing, operating and decommissioning or closing infrastructures. Technical and non-technical skills will be built to support developers, operators, and other independent functions at the national level in areas such as safety assessments, predisposal management, transport, geological disposal, funding… etc.

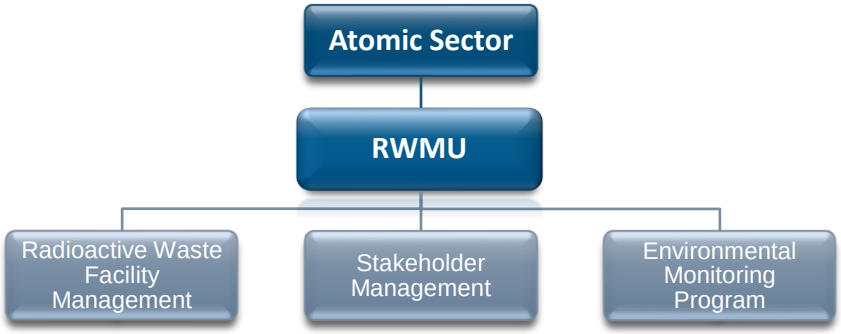

Figure 3. The RWMU Organization.

Having an adequate financial resources is one of the main requirements that the license applicant should have in compliance with Article 5 of the Law mentioned above, Bulletin 3 of the Nuclear Law stresses that license applicants shall demonstrate the sufficient financial resources required to carry out the activity subject of the license. Furthermore, the draft of the National Policy for the Radioactive Waste Management of Kingdom of Saudi Arabia, the licensee is responsible for the funding in regards to the management of radioactive waste during the lifecycle (including decommissioning) of authorized Radiation and/or Nuclear facilities. The necessary funding must be foreseen and arranged from the beginning of a facility's lifecycle to address all relevant costs and expenses, including as appropriate, economic contributions to the fund for the management of radioactive wastes and decommissioning activities. According to the draft regulation of Radioactive Waste and Spent Fuel Management NRRC-NR-13, "The Licensee shall demonstrate that provision is made for adequate resources and funding, including for the predisposal management and disposal of radioactive waste and spent fuel, as well as for decommissioning and closure of facilities, with due consideration given to the protection of future generations.''Each radioactive waste generator or operator of a source that generates radioactive wastes shall undertake the classifying, assembly, treatment, preparation for storage, transportation, or final disposal of that waste in accordance with the requirements of the NRRC. if NRRC receives an application for an authorization for the use of radioactive source and at NRRC own convenience, the following relevant information are required:

- Radioactive Waste Management Plan or a Supplier Commitment to return back
- Financial Guarantees
- Organization Chart
- Quality Assurance and Management Plan
- Radiation Protection Program
- Radioactive Source Security Plan
- Emergency Preparedness and Response Plan
- Inventory of Radioactive sources
- Register all radiation Workers
- Providing the reading of personal for radiation workers periodically

The Law of Nuclear and Radiological Control applies to any actual or potential radiation exposure to humans or the environment in the Kingdom. The licensees, employers, and registrants are responsible for the protection of the worker who are engaged in activities in which they are or could be subject to occupational exposure in planned exposure situations. Additionally, the draft regulation of Radiation safety NRRC-R-01 states “For occupational exposure and public exposure, the relevant principal party shall ensure that the magnitude of individual doses, the likelihood of exposure and the number of individuals exposed are kept as low as reasonably achievable, taking economic and societal factors into account.”

KSA has a nuclear and radiological emergency preparedness and response plan at the national level. This is considered to sufficiently cover the emergency preparedness provisions for radioactive waste, KSA has been and it is actively involved at the regional and international levels on nuclear and radiological preparedness and response through constant participation in emergency drills and exercises planned and executed by the IAEA. During the exercises and depending on their scope, KSA has activated the system at least at a partial level. The Nuclear Law empowers the NRRC to establish the requirements for nuclear and radiological emergency plans, approve the licensee emergency plan for the facility and develop its own emergency plan. NRRC also leads the efforts in the revision of the National Response Plan for Radiological and Nuclear Emergencies. NRRC also controls the implementation of the plans and communicates with stakeholders, including members of the public.

There are currently no facilities in the KSA for the disposal of radioactive wastes. At the current candidate radioactive waste storage facility, no final arrangements for emergency preparedness and response, and no decommissioning plans. However, work is underway to address these shortfalls as part of an overall improvement program. According to the draft regulation on Radioactive Waste and Spent Fuel Management NRRC-R-13, “At the design stage, the Licensee shall develop an initial plan for the shutdown and decommissioning of the predisposal radioactive waste or spent fuel management facility, and shall periodically update it throughout the operational period.”

According to the draft of the National Policy for the Radioactive Waste Management of Kingdom of Saudi Arabia, The Kingdom shall develop a strategy for sustainable funding, technical, and human capabilities for the safe management of all radioactive waste generated within the territories of the Kingdom, including establishing a national fund for radioactive waste management and decommissioning.

Section G. Safety of Spent Fuel Management

ARTICLE 4. GENERAL SAFETY REQUIREMENTS

Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the environment are adequately protected against radiological hazards. In so doing, each Contracting Party shall take the appropriate steps to:

(i) ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;

(ii) ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;

(iii) take into account interdependencies among the different steps in spent fuel management;

(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;

(v) take into account the biological, chemical and other hazards that may be associated with spent fuel management;

(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

(vii) aim to avoid imposing undue burdens on future generations.

ARTICLE 5. EXISTING FACILITIES

Each Contracting Party shall take the appropriate steps to review the safety of any spent fuel management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility.

ARTICLE 6. SITING OF PROPOSED FACILITIES

1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed spent fuel management facility:

(i) to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime;

(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment;

(iii) to make information on the safety of such a facility available to members of the public;

(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.

ARTICLE 7. DESIGN AND CONSTRUCTION OF FACILITIES

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

(i) the design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;

(iii) the technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.

ARTICLE 8. ASSESSMENT OF SAFETY OF FACILITIES

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

(i) before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

(ii) before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

ARTICLE 9. OPERATION OF FACILITIES

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

(i) the license to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;

(v) incidents significant to safety are reported in a timely manner by the holder of the license to the regulatory body;
(vi) programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;
(vii) decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.
ARTICLE 10. DISPOSAL OF SPENT FUEL
If, pursuant to its own legislative and regulatory framework, a Contracting Party has designated spent fuel for disposal, the disposal of such spent fuel shall be in accordance with the obligations of Chapter 3 relating to the disposal of radioactive waste.

The Kingdom of Saudi Arabia currently has neither nuclear reactors nor fresh fuel of any type and thus has not produced, accumulated or stored any material that can be regarded as spent fuel. Currently KSA does not have industries related or engaged in the production or utilization of nuclear material. Therefore, no nuclear material other than depleted uranium employed in shielding is in use in the country and the research reactor which is under construction, and its fuel will remain in the facility as part of the operation for the next 40 years. In consequence, this report does not deal with the safety of Spent Fuel Management at all.

Section H. Safety of Radioactive Waste Management

ARTICLE 11. GENERAL SAFETY REQUIREMENTS

Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards. In so doing, each Contracting Party shall take the appropriate steps to:

(i) ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;

(ii) ensure that the generation of radioactive waste is kept to the minimum practicable;

(iii) take into account interdependencies among the different steps in radioactive waste management;

(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;

(v) take into account the biological, chemical and other hazards that may be associated with radioactive waste management;

(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

(vii) aim to avoid imposing undue burdens on future generations.

ARTICLE 12. EXISTING FACILITIES AND PAST PRACTICES

Each Contracting Party shall in due course take the appropriate steps to review:

(i) the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;

(ii) the results of past practices in order to determine whether any intervention is needed for reasons of radiation protection bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.

ARTICLE 13. SITING OF PROPOSED FACILITIES

1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility:

(i) to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;

(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;

(iii) to make information on the safety of such a facility available to members of the public;

(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.

ARTICLE 14. DESIGN AND CONSTRUCTION OF FACILITIES

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

(i) the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;

(iii) at the design stage, technical provisions for the closure of a disposal facility are prepared;

(iv) the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.

ARTICLE 15. ASSESSMENT OF SAFETY OF FACILITIES

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

(i) before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

(ii) in addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;

(iii) before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

ARTICLE 16. OPERATION OF FACILITIES

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

(i) the licence to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;

(v) procedures for characterization and segregation of radioactive waste are applied;

(vi) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;

(vii) programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;

(viii) decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;

(ix) plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.

ARTICLE 17. INSTITUTIONAL MEASURES AFTER CLOSURE

Each Contracting Party shall take the appropriate steps to ensure that after closure of a disposal facility:

(i) records of the location, design and inventory of that facility required by the regulatory body are preserved;

(ii) active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and

(iii) if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary

Article 18 of the Nuclear Law stated that "The Commission shall, upon setting the licensing terms and conditions for radioactive waste and spent fuel management facilities, consider the following:

1. Keeping the generated radioactive waste at the practical minimum level;
2. The interdependence among the steps of radioactive waste and spent fuel management;
3. Biological, chemical and other hazards that may be associated with radioactive waste management;
4. Adequate protection for the criticality and removal of residual heat generated during radioactive waste management;
5. Measures that reasonably minimize predictable impacts on future generations that might exceed those permitted for the current generation; and
6. Avoiding placing any costly additional burdens on future generations.

The NRRC within the regulatory frameworks, have developed requirments to ensure safety in the management of radioactive waste that cover the predisposal management of radioactive waste of all types and covers all the steps in its management from its generation up to its disposal, including its

processing (pretreatment, treatment and conditioning), storage and transport. The regulatory framework has been demonsrated in (section E) of this report.

Currently, The Kingdom of Saudi Arabia has a candidate radioactive waste storage facility west of Capital Riyadh used as an interim storage. The interim facility has security arrangements in place that includes both physical and administrative protection measures. A routine monitoring program is also in place to measure, on a quarterly basis, radiation doses at 120 fixed locations using Thermoluminescent Dosimeters (TLD), radioactivity and suspended solids in water samples taken from 16 borehole locations. A recent review of site arrangements has identified a number of shortfalls particularly in the areas of safety documentation, competencies, and quality assurance.

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) a 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 license 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 ;

(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 operations to the State of origin.

The transport of radioactive material in KSA is controlled by competent authorities and only licensed carriers are allowed to transport radioactive materials prior to its notfication to the NRRC and if quantities are above the exemption level. Although the National Policy for the Radioactive Waste Management is under development, it states that the importation of radioactive waste are prohibited in KSA legislation and all disused radioactive sources shall be repatriated to the country of origin (if possible). On the other hand, the draft of related regulations, as explained in Section E of this report, has been developed and it complies with IAEA requirements prescribed in the Regulations for the Safe Transport of Radioactive Material (**IAEA Safety Standards Series No. SSR-6**).

The sealed sources that the license holder does not need anymore, following the obtaining of the corresponding explicit authorization of NRRC is granted if following minimum basic conditions are met:

- All sealed sources shall be returned to the supplier once the purpose of usage has ended.
- All users of radioactive sources shall include the following in his contract with the supplier.
- The necessity to return the radioactive source to the supplier within a period that does not exceed 45 days from the export request date.

A copy of the supplier agreement to reclaim the source shall be given to the competent authority as one of the license approval documents for the possession of the source.. These arrangements shall be monitored by the NRRC.

Section J. Disused Sealed Sources

ARTICLE 28. DISUSED SEALED SOURCES

This section should give a comprehensive description of the legislative and regulatory system governing the management of disused sealed sources, including the following issues:

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.

Regarding the legislative and regulatory system governing the management of disused sealed sources. Further details are related to this is provided in Section [E]. At present, and as part of the criteria for granting licenses, all radioactive sources users/licensees must:

- A pledge from manufacturers, suppliers, owners, and users of sealed sources for their end-of-life management to return and receive disused sealed sources.
- Establish a safe and secure temporary onsite storage and notify the NRRC if a source/sources become disused and propose an acceptable destination for them ,such as storage for decay or transfer to the responsible entity for the management of waste (KA.CAER).
- The users must keep records of all sources at their sites including disused sources.

NRRC since the early days of its action has promoted the drafting process of the National Policy for Radioactive Waste Management. In addition, it is working on a comprehensive review of the national disused sealed sources inventory and safety condition. Yet, the revised inventory report of disused sealed sources is not ready.

Section K. General Efforts to Improve Safety

The Kingdom of Saudi Arabia is in an advance phase in terms of the legislative regulatory system since the last Joint Convention review meeting. The nuclear laws set have been enacted in 2018. Therefore, the responsibilities of relevant governmental agencies have become clearer. K.A.CARE by its laws shall be the responsible entity for the management of radioactive waste. While NRRC shall ensure the safety management of radioactive waste. Accordingly, the overall ecosystem for the national radioactive waste program is under revision to harmonize all efforts between governmental relevant agencies.

On January of 2019, The Council of Ministers of the Kingdom has issued a resolution No. 225 stating that KSA will use IAEA safety standards as the minimum safety requirements until the regulatory authority issues its own regulations that should be consistent with the IAEA recommendations. NRRC is also in the process of preparing to developing regulatory framework in accordance with IAEA safety standards.

Self-Assessment of KSA Needs on Nuclear Safety

The Kingdom conducted a self-evaluation study of infrastructure for nuclear power with the participation of 12 organizations involved in the nuclear power program and corresponding to its infrastructure development. The Integrated Nuclear Infrastructure Review (INIR) that had been resulted from this self-evaluation process was based on the IAEA Nuclear Series publication entitled Evaluation of the Status of National Nuclear Infrastructure Development (NG-T-3.2 (Rev.1)). The mission ended up assisting the Kingdoms infrastructure for further progress by giving 21 recommendations and 10 suggestions it also identified 5 good practices that may benefit new countries in the introduction of nuclear power. The NRRC is also in the process of undertaking an Integrated Regulatory Review Service (IRRS) mission by the IAEA. The processes of self-assessment underlying the preparation of the IRRS will contribuite in significant progress in providing the national regulatory body with an opportunity for constant development.

Human Resources:

In collaboration with its strategic partners, the NRRC has implemented many human capacity-building projects. These include the following :

1- Training and development

NRRC implemented an Extensive long-term nuclear safety training program with the Korean Institute for Nuclear Safety, Review and Assessment, and Inspection on NFs for 15 specialists of NRRC staff. The Arrangement is underway with the IAEA to develop special diploma programs in Nuclear and Radiological regulatory activities for the NRRC staff.NRRC is also participating in several IAEA activities such as trainings, workshops, Expert Forums.

2- Technical Support Organizations (TSO) and knowledge transfer:

NRRC has just signed a technical support service contract with a TSO to support the activities of the site license application review for the NPP site.

The Kingdom of Saudi Arabia also takes advantage in the Technical Cooperation (TC) Programme with the IAEA. Such initiatives and activities will support the human capacity building to improve the national competence. NRRC is currently developing a safety culture program that aims at raising the awareness of the NRRC staff about safety culture and the importance and characteristics of healthy safety culture which involves an initial assessment of the current safety culture and the preparation and execution of the implementation plan for the safety culture lastly the performing of Safety Culture Assessment (ISCA) peer review with the IAEA.

Challenges of the Sixth JC review meeting

The Kingdom made significant progress against the challenges identified in the 6th Joint Convention review meeting, These challenges are:

"Challenge 1: Human resourcing to deliver the right number of sufficiently qualified Saudi national staff in the mid to long term for the development of nuclear power in the country of Saudi Arabia."

After the last JC review meeting, the Kingdom of Saudi Arabia has defined the legislative framework. In addition, relevant governmental agencies have begun to prepare and develop a human capabilities development program to ensure its continuity in carrying out its charter-driven functions. Such program include a strategy for human resources, an accumulation of human capital, the identification of the requisite competence and a training strategy for development.

"Challenge 2: Regulatory enforcement of the old DSRS to be shipped back to their origin."

The Law of Nuclear and Radiological Control empowers the NRRC to access any facility and enforce facility operators to take corrective measure. Article 22 also details the regulatory authority's rights to impose fines and penalties on any violation. In this respect, the NRRC has been planning to develop an inclusive inspection-enforcement program in order to establish regulatory control over DSRS within the Kingdom. However, further development are required in this regard.

"Challenge 3: Finalizing the establishment of a national RW management program."

The Kingdom of Saudi Arabia has been working promptly in the developing of its national policy for radioactive waste and is currently under the approval process. As stated in Section B of this report, the policy sets out the directions for radioactive waste management generated in the Kingdom. As soon as the national policy is approved, the national program will be established.