Convention on Nuclear Safety

KSA NATIONAL REPORT

For the 7th Review Meeting of the

CONVENTION ON NUCLEAR SAFETY

Aug/2016

I. INTRODUCTION

1.1 Purpose and Scope of this Report

On 20 September 1994 the Convention on Nuclear Safety was open for signature at the headquarters of the International Atomic Energy Agency in Vienna. The Kingdom of Saudi Arabia (KSA) signed the Convention in September 1994, and deposited the instrument of ratification with the Depositary on 18 March 2010.
The Convention objective is to achieve and maintain a high level of nuclear safety throughout the world. One of the obligations of the Parties to the Convention is the preparation of a periodical National Report describing the national nuclear program, the nuclear installations involved according to the Convention definition, and the measures taken to fulfill the objective of the Convention.
KSA is hereby presenting its first National Report prepared by the Competent Authority responsible for the Saudi Atomic Energy Program, namely, King Abdullah City for Atomic and Renewable Energy (K.A.CARE).
Article 5 of the Convention on Nuclear Safety states, *"Each Contracting Party shall submit for review, prior to each meeting referred to in Article 20, a report on the measures it has taken to implement each of the obligations of this Convention"*
This report was prepared in accordance with Article 5 of the Convention on Nuclear Safety (CNS) for review to which the Kingdom of Saudi Arabia (KSA) is a contracting party. The report describes the measures of nuclear safety as structured and specified by the CNS taken by KSA.
The report is structured in accordance to the instructions of the IAEA Information Circular INFCIRC/572/Rev.5, "*Guidelines regarding National Reports under the Convention on Nuclear Safety"*.

The kingdom of Saudi Arabia is licensing, and building a Low Power Research Reactor (LPRR) which is becoming a leading experience in developing the nuclear regulatory functions and understanding the national and international obligations in the areas of nuclear safety, nuclear security, and nuclear materials safeguards.

Part I of the report this introduction. Part II is a summary summarizing the significant developments in the KSA nuclear energy program. Part III describes the nuclear safety measures of KSA's obligated by the CNS, i.e. Articles 6 through 19 of the Convention.

II. SUMMARY

2.1 KSA Policy on Nuclear Safety

The KSA is a signatory to the 1994 Convention on Nuclear Safety, and as such is legally obliged to maintain the highest level of safety when utilizing atomic energy technologies.

But, as for today, KSA has no nuclear facilities as defined in the CNS. Present official nuclear related practices and activities are essentially related with the import, utilization, transportation, and disposal of radioactive sources and materials as applied in medical, industrial, educational, and other nuclear technology related activities.
However, in 2010, by Royal Order, a new organization with a rank similar to a Ministry called King Abdullah City for Renewable and Atomic Energy (K.A.CARE) has been appointed as the governmental entity responsible for the development, implementation and initial regulation of the civil nuclear and renewable energy projects in KSA. Accordingly, K.A.CARE is in the process of inheriting and assimilating existing nuclear technology related activities and, planning future nuclear projects ranging from national nuclear laboratories (which foresee the use of research reactors) to nuclear power plants.
Therefore, this report should be read and understood within the context above quoted.

An initial Policy of the KSA on the Evaluation and Potential Development of Peaceful Nuclear Energy (hereinafter referred to as the Nuclear Policy) was adopted by the Royal Order of April 2010.

The Nuclear Policy outlines the role of nuclear energy in the KSA's energy program and states the KSA's commitment to operational transparency and to the highest standards of safety, security and non-proliferation throughout the life of the nuclear program. The Nuclear Policy also discusses the KSA's intent to develop its peaceful domestic nuclear power capability in partnership with the governments and firms of responsible nations, as well as with the assistance of appropriate expert organizations, including the International Atomic Energy Agency (IAEA), in a manner that best ensures long term sustainability. Furthermore, the recently concluded National Transformation Program (NTP) fully reinforced above quoted vision by declaring that the Royal Order which created K.A.CARE is the country's National Position on this matter.

The KSA is moving forward on the commitments in the Nuclear Policy through the adoption of the relevant international instruments for nuclear safety, security and non-proliferation, through the establishment of a legal framework and governmental framework within the KSA, and through the on-going support for the development of the KSA peaceful nuclear energy program.

2.2 Actions taken in light of the accident at Fukushima Daiichi

Following the events of the Great Eastern Japan Earthquake and Tsunami in March 2011, Saudi Arabia's nuclear and radiological safety entities, immediately mobilized its resources to provide KSA's Government and the public with accurate and timely advice on the event's status, potential effects on the Kingdom (if any) or in the imported products and consumables, on the spread of radioactive substances, on the potential consequences for human health and the environment in Japan and Saudi Arabia and, in implementing protective measures if needed.
On top and in due course, KSA is to consider applicable lessons learned from the Fukushima events in a systematic and technically detailed manner to ensure that the design, construction, and operation of potential nuclear facilities will mitigate the type of consequences experienced at the Fukushima facility even when challenged by very unlikely but extreme events within the KSA.

2.3 Actions Planned Based on the KSA's Self-Assessment and the IAEA Generic Milestone Approach

KSA has conducted a detailed Self-Assessment study even in the early planning phases of the nuclear program benchmarked against the IAEA's Milestone Approach for the Introduction of Nuclear Power. The most important findings of the study indicated two issues that require substantial attention and efforts. Namely, 1) Nuclear Legislative and Regulatory Framework, and 2) Human Resource Development.

Progress with Building KSA Legislative and Regulatory Framework

K.A.CARE has administered several activities with an ultimate objective of establishing a robust nuclear legislative framework. Those efforts are merely distributed into the following Phases:

1. Development of comprehensive laws including Nuclear Law, Regulatory Establishment Law, and Civil Liability Law.
2. Benchmarking the Nuclear Law against IAEA's recommendations on the attributes of nuclear legislations and regulatory guidance.
3. Enactment of the laws (in process, including feedbacks from national stakeholders).
4. Development of a regulatory policy and a licensing scheme following the enactment of the laws. A graded approach is being adopted for all regulatory issues related to the licensing of the Low Power Research Reactor (LPRR).
5. Development of an effectively independent Regulator that will spin off K.A.CARE by 2020 as planned in the NTP.

Presently, KSA is the process of the submission of the proposed nuclear legislation for enactment. However, it is important to point out that work on other phases is also advancing in parallel. As such, K.A.CARE is actively engaged with a partner experienced regulator and technical support contractors to serve the development of regulations, regulatory guidelines, licensing schemes, and regulatory control schemes along with serving knowledge transfer and training which would help providing necessary resources for the implementation phase.

Progress with Human Resources

One of the most important actions for K.A.CARE to undertake in the short term is the identification of the Kingdom's nuclear energy program human resource requirements, and from which to formulate a human resource development plan and hiring strategy.

The progress of the KSA's nuclear regulator would be strongly determined by the availability of qualified staff. The human resource needs of the regulator in terms of immediate needs, have been identified in the conducted Self-Assessment Analysis, including identification of required Skills and Competencies.

However, creating the pipeline of human resource which delivers the right number of sufficiently qualified staff in the mid- to long term is a challenging and slowly advancing task by nature and will require strong effort from a large number of stakeholders in particular the educational sector.

Therefore, as mentioned above, embedding an experienced partner regulator and technical support teams within the regulator is seen as an effective way to fast track the program and will provide the opportunity for significant knowledge transfer and training of domestic staff.

With regard to radiological safety, KSA has already established a core of competent staff and is investing heavily in recruitment and training through relationships with several KSA educational and training institutions. Accordingly, K.A.CARE's regulatory unit complements its in-house training programs through collaboration with the IAEA and other partner institutions in the national capacity building program which offers to citizens a range of education, training and development opportunities in the KSA and overseas.

Progress with Emergency Preparedness

The present KSA's Nuclear Emergency Preparedness and Response Plan, dating back to 2008, prescribe requirements mainly for radiological emergencies.
The plan includes detailed emergency procedures for any action that could give rise to a need for emergency intervention, including accidents with off-site consequences, and aim to minimize the consequences and ensure the protection of on-site personnel, the public and the environment.
The emergency plan was successfully activated recently in the IAEA's "BAB AL MAGHRIB Conv Ex-3 (2013)" emergency drill conducted in collaboration with 57 participant countries. Analysis of the drill outcomes, showed a satisfactory performance of the entities included in the emergency plan in relation to the level of participation in the drill.
However, work is continuing to define on-site and off-site emergency plans to support the future operation of nuclear facilities in KSA. The plan is therefore a 'living' one and will correspondingly be updated on the light of this continuous work.

2.4 Transparency and communications with the public and other national and international organizations

Communication with the Public

K.A.CARE has maintained active programs of public engagement. Those programs range from K.A.CARE's website (providing as much as possible simplified information with regard to KSA's nuclear program), to an Interactive Exhibition called (Mishkat) and located at K.A.CARE's headquarters. The exhibition is particularly designed to introduce nuclear and renewable technologies to general public and school children in a simplified yet attractive fashion, explaining KSA's justifications and strategies to safely introduce nuclear power into its future energy mix.

Communications with national organizations

The principal agencies involved in nuclear safety in Saudi Arabia are:

- Ministry of Energy, Industry, and Minerals (MEIM)
- King Abdullah City for Atomic and Renewable Energy (K.A.CARE), for the purpose of this report is the "Acting Saudi Nuclear Regulatory Body", and reporting directly to MEIM.
- Saudi atomic energy regulator (currently under development and administered by K.A.CARE)
- Ministry of Foreign Affairs (MOFA)

- King Abdulaziz City for Science and Technology (KACST), current licensee of the LPRR project and dedicated to many research and development activities
- Ministry of Interior (MOI)
- Saudi Customs
- Other Ministries and Government agencies on ‘ad hoc’ basis

Communication with international organizations

K.A.CARE has maintained active programs of stakeholder engagement at the national and international levels. The KSA gives great importance to cooperation with international organizations, such as the IAEA and foreign nuclear regulatory bodies, and other stakeholders. The KSA's interactions with these entities enabled it to access information, resources, best practices and lessons learned.

In this context, K.A.CARE has formulated a comprehensive Technical Cooperation Program (TC) with the IAEA spanning over a two years period (2015-2016) and designed to cover a wide range of areas. Similarly, K.A.CARE is actively engaged with an experienced nuclear regulator aiming to establish a robust national nuclear regulatory framework.

Safeguards

KSA does not have nuclear materials other than depleted uranium used for shielding and some extremely low quantities of fissionable material contained in sealed sources used for education and research activities. Nonetheless KSA through K.A.CARE is dedicating a strong effort towards the implementation of a State System for Accounting and Control and to subsequently submit its annual transaction reports as per its Small Quantities Protocol obligations. Based on the foreseen national plans under NTP, K.A.CARE has drafted a roadmap to transition from SQP to Full CSA in due course.

III. OBLIGATIONS OF THE CONVENTION (ARTICLES 6 – 19)

Article 6: Existing Nuclear Installations

KSA has no nuclear facilities as defined in the CNS. Present official nuclear related practices and activities are essentially related with the import, utilization, transportation, and disposal of radioactive sources and materials as applied in medical, industrial, educational, and other nuclear technology related activities.
However, in 2010, by Royal Order, a new organization with a rank similar to a Ministry called King Abdullah City for Renewable and Atomic Energy (K.A.CARE) has been appointed as the governmental entity responsible for the development, implementation and initial regulation of the civil nuclear and renewable energy projects in KSA. Accordingly, K.A.CARE is in the process of inheriting and assimilating existing nuclear technology related activities and, planning future nuclear projects ranging from national nuclear laboratories (which foresee the use of research reactors) to nuclear power plants.

Article 7: Legislative and Regulatory Framework

7.1 Legislative framework

The KSA legislative system is inclusive of national laws, and ratified multilateral and bilateral treaties, conventions, and agreements to which KSA is a party. By a Royal Order, a new organization with a rank similar to a Ministry called King Abdullah City for Renewable and Atomic Energy (K.A.CARE) has been appointed as the governmental entity responsible for the development, implementation and initial regulation of the civil nuclear and renewable energy projects in KSA. The following, lists the respective categories of legal instruments pertinent to nuclear safety.

7.1.1 Laws, Decrees and Regulations of the Kingdom of Saudi Arabia

KSA has a very simple body of regulations essentially dedicated to dealing with Radiation Safety and the Transportation of Radioactive Sources as well as with NORMs.

7.1.1.1 History and Evolution

- In 1989, Prime Minster Decision No. 113/8 assigns KACST (King Abdulaziz City for Science and Technology) as the Technical Competent Authority. This law calls for the creation of the Radiation Protection Center (RPC).
- In 2008, a “National law” approved by all relevant ministries was submitted for its promulgation.
- In 2007, several regulations were officially printed and released:
  1. Basic Regulation for Radiation Protection against Ionizing Radiation
  2. Regulations for Safe Transport of Radioactive Materials
  3. Regulations for Radioactive Waste Management
- In 2008, other publications were officially released:
  1. Radiation Protection Regulations for Water Purification Plants

2. Radiation Protection Program at Water Purification Plants
3. Management and Transport of NORM Related Radioactive Wastes

- Establishing Emergency Management and Operations
  1. In September 2008, the "National Response Plan for Radiological and Nuclear Emergencies" was officially approved by the Prime Minister.
  2. A "National Response Committee for Radiological and Nuclear Emergencies" was formed accordingly.
  3. The Plan is consistent with IAEA guidelines.
  4. The plan assigned the functions and responsibilities of each participating party.
  5. The Lead Agency in response is the Civil Defense (Ministry of the Interior) and K.A.CARE is the Lead Technical Agency.

7.1.1.2 Today

KSA is in the process of reviewing and finalizing a comprehensive legislative framework that is aimed to establish and promote regulatory independence and credibility plus an up to date system to cope with nuclear liabilities. The corresponding laws have been drafted as per IAEA recommendations and practices, peer reviewed by experts and consultants from the financial system, electric utilities and other regulatory bodies and, today are under the analysis of the Legal Bureau of Experts, advisory body to the Shoura (Parliament - like organization within the KSA).

7.1.2 Multilateral instruments adopted by the Kingdom of Saudi Arabia

KSA has acceded to the following international instruments in the areas of nuclear safety, nuclear security, and non-proliferation as listed below:

- Convention on Nuclear Safety, acceded on 18 March 2010.
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, acceded on 19 Sep 2011.
- Convention on Early Notification of a Nuclear Accident, acceded on 03 Nov 1989.
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, acceded on 03 Nov 1989.
- Convention on the Physical Protection of Nuclear Material, acceded on 07 Jan 2009.
- Amendment to the Convention on the Physical Protection of Nuclear Material, accepted on 21 Jan 2011.
- Comprehensive Safeguards Agreement between the Kingdom of Saudi Arabia and the International Atomic Energy Agency ("Comprehensive Safeguards Agreement"), signed on 16 June 2005, entered into force 13 Jan 2009.
- Treaty on Non-Proliferation of Nuclear Weapons (NPT), acceded on 3 October 1988.

- Vienna Convention on Civil Liability for Nuclear Damage, as amended by the 1997 Protocol, acceded on 17 March 2011.

7.1.3 Bilateral cooperation agreements

KSA has signed the following Nuclear Cooperation Agreements (NCAs) with a number of nations in the peaceful uses of nuclear energy:

- KSA-France Cooperation Agreement on the Development of Peaceful Uses of Nuclear Energy, 22 February 2011.
- KSA-Republic of Korea Agreement for Cooperation in the Peaceful Uses of Nuclear Energy, 15 November 2011.
- KSA -Argentina Cooperation Agreement on Peaceful Nuclear Energy, 28 June 2011
- KSA-China Agreement for Cooperation in Peaceful Uses of Nuclear Energy, 15 January 2012.
- KSA-Finland Agreement for Cooperation in Peaceful Uses of Nuclear Energy, 08 Sept 2015
- KSA-Jordan Agreement for Cooperation in Peaceful Uses of Nuclear Energy, 22 January 2014
- KSA-Russia Agreement for Cooperation in Peaceful Uses of Nuclear Energy, 18 June 2015
- KSA-Hungary Agreement for Cooperation in Peaceful Uses of Nuclear Energy, 19 October 2015
- KSA-Egypt Agreement for Cooperation in Peaceful Uses of Nuclear Energy, 08 April 2016

7.2 Regulatory framework

KSA originally assigned regulatory functions to a unit within KACST which were recently transferred to K.A.CARE through the Royal Order issuing its creation. KSA has a very simple body of regulations essentially dedicated to dealing with Radiation Safety and the Transportation of Radioactive Sources as well as with NORMs.
But KSA's government is committed to establish and maintain an updated appropriate governmental, legal and regulatory framework for nuclear and radiation safety within which responsibilities are clearly allocated. To meet this requirement K.A.CARE, following IAEA recommendations and practices and other best world practices has drafted, peer reviewed and proposed to higher authorities two fundamental laws: A Nuclear Law establishing a fully-fledged independent Regulatory Body and a Nuclear Liability Law.

7.2.1 Regulations and regulatory guidance

Present official regulations are limited to regulating import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications. A summarized list of such regulations is shown in section 7.1.1 of this report.
However, for preparatory purposes, K.A.CARE has proceeded with drafting a limited number of core regulations needed to establish a future nuclear program. The regulations being developed will be further reviewed along with an experienced partner regulator and eventually legally put in place.

7.2.2 System of licensing

Present official licensing schemes are mainly concerned to authorizing import/export, utilization, transportation, and waste management of radioactive sources as used in medical, industrial, educational, and other applications.
However, for preparatory purposes, K.A.CARE has proceeded with drafting licensing schemes that will define the regulatory control over any future nuclear facilities or activities in KSA. The draft licensing system will be further reviewed along with the experienced partner regulator and legally put in place.
The Nuclear Law will provide the necessary umbrella for such a scheme.
The Nuclear Law gives exclusive authority to the Saudi regulator for issuing licenses to practice any of the Regulated Nuclear Activities in the KSA and permits the regulator to impose conditions on licenses. The draft Nuclear Law requires the applicant for a license to submit detailed evidence of safety that shall be reviewed and assessed by the regulator in accordance with established procedures.
As mentioned in the 'Introduction', KSA is in the process of licensing and constructing a research reactor (the LPRR). This facility to be built around a 30 KW thermal research reactor (operable up to 100 KW thermal) will allow the introduction of nuclear reactor technology at a minimum risk (since it is an inherently safe design). The reactor already has a construction license granted after a thorough review of the corresponding safety documentation (the Preliminary Safety Analysis Report for the LPRR and the supporting design documentation). The LPRR should be an excellent tool for the initial training of future nuclear operators, nuclear engineers and future nuclear experts in KSA. For the case of the licensing of the LPRR a specific 'facility dedicated' licensing scheme is adopted. This licensing scheme follows the graded approach recommended by the IAEA.

7.2.3 System of Regulatory Inspection and Assessment

Present official inspections and assessments are limited to conduct safety inspection and assessment for import/export, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.
However, for preparatory purposes, K.A.CARE has included in the drafted Nuclear Law provisions to authorize the regulator to conduct functions of safety inspection and assessment of any future nuclear facilities or activities in KSA. The preparation of a detailed inspection and assessment system will be further addressed in partnership with the experienced partner regulator along with building the human resources needed for such tasks.

7.2.4 Enforcement

Present official Enforcement systems are limited to imposing enforcements related to import/export, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications. To date, no significant enforcement actions pursuant to the above authorities have been necessary with regard to the nuclear activities in KSA.
However, for preparatory purposes, K.A.CARE has included in the drafted Nuclear Law provisions to authorize the regulator to layout and impose enforcement measures to address any safety related violations at any future nuclear facilities or activities in KSA. The preparation of a detailed enforcement system will be further addressed in partnership with the experienced partner regulator along with building the human resources needed for such tasks.

Article 8: Regulatory Body

8.1 Establishment of the Regulatory Body

KSA originally assigned regulatory functions to a unit within KACST which were recently transferred to K.A.CARE through the Royal Order issuing its creation. Regulatory Functions are within K.A.CARE and in particular within a Division of its Atomic Energy Sector. The Regulatory activities for the time being are being "China walled or Fire walled" from the rest of K.A.CARE activities as well as from other important stakeholders in order to preserve independence, transparency and authority.
For future and through the Nuclear Law under study, the Saudi government, shall establish and maintain a regulatory body, and shall confer on it the legal authority and provide it with the competence and the resources necessary to fulfill its statutory obligation for the regulatory control of facilities and activities.

8.1.1 Legal foundations and statute of the regulatory body

The Royal Order creating K.A.CARE plus the previous existing Decrees and Regulations mentioned in 7.1.1 are the core of the legal foundations for regulating present nuclear related activities. The draft Nuclear Law being currently revised further establishes the Saudi atomic energy regulatory body to implement a comprehensive legislative and regulatory framework as a public organization with an independent balance sheet, an independent legal personality, full legal competence and financial and administrative independence. It states the aims of it as the assurance of safety, security and radiation protection within the KSA's nuclear energy program with the development of the nuclear sector towards only peaceful purposes.

8.1.2 Mandate, mission and tasks, authorities and responsibilities

The functions, responsibilities and authorities of the independent regulator, when established, will be concentrating in the following areas:

- Regulatory Activities: Issuing regulations, Notification, Authorization, Inspection, enforcement and Penalties
- Regulatory Control of Radiation Safety and Fundamental Principles of Radiation Protection
- Environmental Monitoring
- Regulatory Control of Radioactive Sources

- Operator Authorization (License, Registration, Permit or Certificate)
- Emergency Preparedness and Response Plans
- Regulation of the Transport of Radioactive Material
- Radioactive Waste
- Safeguards
- Export and Import Controls
- Nuclear Security, Physical Protection and Illicit Trafficking
- Regulation of Physical Protection
- International Cooperation and Assistance
- Protection of Confidential Information
- Public awareness

8.1.3 Organizational structure of the regulatory body

The KSA's independent nuclear regulatory body is initially structured around the areas of Radiation Protection and Environmental Monitoring, Licensing and Safeguards.
The future fully fledged regulatory body is to be provided with a different structure centered around two major areas: one dedicated to nuclear safety and the other one for radiation safety. Common support services will be also set up. Both areas will have three or four major departments.
In deriving an organizational structure for the Saudi regulatory body, the IAEA guidance on organization and staffing of the regulatory body for nuclear facilities (GS-G-1.1) would likely be followed.
For a fledgling organization to develop into a successful entity - in a practical and efficient way - experience has shown that it is best if the organization starts with an initially simple structure, one of fewer units or divisions/departments; and that as the size and competency of the organization grows, the organization can evolve into a more complex body, if need be.

8.1.4 Development and maintenance of human resources

KSA has a currently a regulatory staff of approximately 55 people, the expertise of whom is related primarily to regulating import/export, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.
However, efforts continue to complement the staff with recruitment of expatriates with nuclear experience from around the world, related particularly to nuclear reactors technologies and safety plus an active continuous formation program.

8.1.5 Measures to develop and maintain competence

K.A.CARE's human resource strategy for long-term sustainability concentrates on developing Saudi nationals to take positions in the regulatory body, while retaining an appropriate cadre of international experts. The regulatory body is right now complementing its in-house training programs through collaboration with a number of Saudi Universities, the IAEA and a partner regulator in a national program of capacity building which offers to citizens a range of education, training and development opportunities in the KSA and overseas.

8.1.6 Financial resources

The Saudi regulatory body (the Regulatory Division within K.A.CARE's Atomic Energy Sector) is provided with adequate authority and power, and it is being provided with sufficient financial resources through a yearly formulated budget in order to discharge its assigned responsibilities.
The level of funding of the regulatory division cover staff salaries, offices and office equipment, training, communications, transport, inspection equipment, research and development, consultancy services and international co-operation.
Further to above, the NTP and its report approved by the highest authorities, has outlined the basis for continuous financial support in order to build an independent Nuclear Regulator between 2016 and 2020.

8.1.7 Quality management system of the regulatory body

The regulatory division within K.A.CARE is operating with a very simple management system based on a limited set of processes and the associated procedures. Reformulation of this into a formalized and operational Integrated Management System is one of the most urgent goals.
The draft Nuclear Law authorizes the regulatory body to "apply the Quality Assurance principles on all procedures related to its functions." It is intended to early in its establishment, to implement an Integrated Management System (IMS) as recommended in the relevant IAEA publications on safety requirements and guidance.

8.1.8 Openness and transparency of regulatory activities

K.A.CARE is implementing a series of measures in order to be transparent and open to the Government and the Society.
To meet its obligations for transparency, K.A.CARE has created plans for a program of communication with stakeholders and the public comprising the following elements:

a) The regulatory body's web site is to list comprehensive information on the regulator's program, with a range of documents including:
   - All published regulations & guides with the exception of those containing sensitive information which are restricted for nuclear security reasons.
   - Resolutions of the Board of Management
   - Safety Evaluation Reports summaries
   - Summaries of inspection reports
   - Peer review reports
   - Regulatory body annual reports
   - KSA National Reports on the implementation of safety-related conventions (Convention on Nuclear Safety and Joint Convention on Spent Fuel and Radioactive Waste Management).

b) Providing opportunities for stakeholders and the public to comment on draft regulations and guides before approval.

c) Public forums to explain the regulatory body's role in the KSA's peaceful nuclear power program and its function in regulating and licensing radioactive materials and sources used in medicine, research, oil exploration and other industries.

d) Media releases.

8.1.9 External technical support

Use of Consultants and Technical Support Organizations

It is unlikely that the Kingdom will be able to initially resource an adequate number of qualified personnel or has an adequate diversity of technical skills to effectively perform its regulatory duties. This is not an uncommon problem for nations embarking nuclear power.
In a Case Study carried out by K.A.CARE, it was proposed that K.A.CARE urgently consider engagement of a contractor TSO to develop concepts and proposed operating documentation (Management Prospectus, HR Development Plan, prioritized Standards and Guides) until such time that the regulatory body is created and staffed suitably with sufficient Knowledge and competence to deliver Saudi Arabia's regulatory responsibilities. To such effects, K.A.CARE is engaging a strategic Regulatory partner.

8.2 Status of the Regulatory Body

K.A.CARE through a Regulatory Division within the AES is charged with the present regulatory authority related primarily to regulating import/export, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications. K.A.CARE authorities directly report to the Prime Minister of KSA (The King).
The draft Nuclear Law represents the legal instrument that would eventually establish a fully-fledged regulatory body as an independent government body. Presently, the proposed law is being revised and communicated to other stakeholders including the IAEA.

8.3 International and National Cooperation

To benefit from the experience of others and to help promote international confidence, the regulatory body already has the authority to liaise with regulatory bodies of other countries and with international organizations to promote co-operation and the exchange of regulatory information. To such effects within the frame of the nuclear cooperation agreements signed by KSA, specific subsidiary cooperation agreements with the Regulatory bodies of the corresponding countries are being negotiated.

8.4 International Regulatory Review Service (IRRS) mission to the KSA

Discussions are underway to conduct an Integrated Nuclear Infrastructure Review (INIR) mission by the IAEA, perhaps sometime in 2017. Normally, the INIR mission covers a great deal of nuclear safety infrastructure in the country subject to the review. Therefore, the foreseen INIR mission to KSA is sought to give an insight feedback and a readiness assessment of KSA's regulatory elements. Nevertheless, it is indeed KSA's intention to call for an IRRS mission planned for initially sometime in 2017/2018, after the final approval and promulgation of the KSA's Nuclear Law, and official launch of the Saudi regulatory body.

Article 9: Responsibility of the License Holder

9.1 Formulation in the legislation assigning the prime responsibility for safety to the license holder

Present existing Regulations mainly devoted to radiation safety assign prime responsibility to the License Holders. In preparing the future KSA's Nuclear Law, provisions were included to clearly and explicitly set out to assign responsibility for safety to license holders. Accordingly, each licensee shall be responsible for taking all steps necessary to reduce the risk of an accident to a level that is as low as reasonably achievable. Also, licensees are liable on all matters related to safety, security and radiation protection.

9.2 Description of the main means by which the license holder discharges the prime responsibility for safety

As KSA has no nuclear facilities as defined in CNS, the present official regulations are limited to regulating import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.
However, radioactive sources and radiation utilization licensees are required also to demonstrate discharges of the prime responsibility for safety.

9.3 Description of the mechanism by which the regulatory body ensures that the license holder discharges its prime responsibility for safety

As KSA has no nuclear facilities as defined in CNS, the present official regulations are limited to regulating import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.
Regulatory activities up to know ensure that licensees discharge their prime responsibility for safety through the implementation of (i) a simple set of existing regulations; (ii) authorization through licensing; (iii) inspection and monitoring of compliance; and (iv) enforcement.

Article 10: Priority to Safety

10.1 National safety policy and requirements

The general principles, that are indicative of such commitment in terms of policies and strategies toward nuclear safety, are based on 1) Establishing an independent and effective regulatory body, 2) Conforming to the IAEA's safety standards, and 3) Establishing firm bilateral and multilateral cooperation regimes with the objectives of applying international best practices in the nuclear energy sector and making extensive use of the operational safety experience worldwide. These principles are being applied today by the Regulatory Division within the AES of K.A.CARE.

10.2 Measures taken by the Operator

As KSA has no nuclear facilities as defined in CNS, present nuclear activities are limited to import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.

10.3 Regulatory processes for monitoring and oversight of arrangements used by the license holders to prioritize safety

Priority is being given to Safety Culture programs, the addressing of safety issues, and continuous improvement in safety and safety management within the existing regulatory unit in K.A.CARE. Such efforts and culture will be translated to the fully independent Regulatory Body when established.

The simplified regulatory processes being executed by the Regulator, are:

- Assessment,
- Licensing,
- Inspection, and
- Enforcement.

These processes are applied to the ongoing activities of import, utilization, transportation, and disposal of radioactive sources. Another group is dedicated to safeguards and to such effects works with its own simplified scheme for controlling and accounting of nuclear materials. Essentially KSA has nuclear materials in the form of depleted uranium used for shielding and some extremely low amounts of fissile materials as part of sealed sources used in laboratories and universities.

Article 11: Financial and Human Resources

11.1 Financial resources

Currently, the KSA's Government provides sufficient funding for K.A.CARE as being the main promoter for nuclear technologies programs in the country.
As KSA presently has no nuclear installations as defined in the CNS, K.A.CARE will continue to provide governmental funds to all related activities. However, power generation utility ventures with investment/lending arrangements may form at later stages for the construction and development of nuclear power projects as appropriate.

11.2 Human resources

11.2.1 Overview of the Contracting Party's arrangements and regulatory requirements concerning staffing, qualification, training and retraining of staff for nuclear installations

Importance of human resources is quite appreciated by KSA. In this regard, K.A.CARE has established a twofold strategy to strengthen the human resources for the KSA's nuclear program, including: 1) Recruitment of senior expatriate experts, and 2) Development of Saudi nationals'

human resources to fulfill long-term needs. In this regard, foreign nationals are assigned implicitly or explicitly with one or more Saudi “shadows” for the knowledge process to occur.

11.2.2 Methods used for the analysis of competence requirements and training needs for all safety related activities in nuclear installations;

This is under discussion and analysis for future implementation in line with the introduction of the nuclear program.

11.3 Regulatory review and control activities.

KSA’s regulatory body will outline requirements for adequate resourcing, training and qualification of staff for the future nuclear facilities.

Article 12: Human Factors

KSA has no nuclear facilities as defined in CNS, present official regulations are limited to regulating import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.

Article 13: Quality Assurance and Integrated Management Systems

13.1 Overview of the KSA’s arrangements and regulatory requirements for quality assurance programs, quality management systems, or management systems of the license holders

In preparation for the future, The KSA's draft Nuclear Law would oblige licensees to ensure that there is a Management System in place and adequate financial and human resources to ensure nuclear safety and as part of its Management System for safety, the licensee shall adopt policies and procedures to define and adhere to appropriate Quality Assurance requirements. This will be implemented top to bottom through the nuclear law and subsidiary regulations, guidelines and procedures.

13.2 Status with regard to the implementation of integrated management systems at nuclear installations *SNEC Management system for siting, design, procurement and construction*

KSA has no nuclear facilities as defined in CNS, and therefore this section cannot be addressed at this time.

13.3 Main elements of the quality assurance, programmer covering all aspects of safety throughout the lifetime of the nuclear installation, including delivery of safety related work by contractors

The current scope of K.A.CARE's Quality Assurance program addresses the governmental activities for furnishing the nuclear infrastructure elements.

13.4 Audit programs of the license holder

The KSA has no nuclear facilities as defined in CNS, and the present nuclear activities are limited to import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications. Audits are carried out on the License holders for safeguards purposes or for the verification of their compliance with radiation safety requirements.

13.5 Regulatory review and control activities

As noted in 13.4, audits are only performed for safeguards or to verify the fulfillment of radiation safety requirements.
As noted in Section 13.1 above, the Saudi regulatory body will be responsible for setting out general requirements for licensees' management systems.
Under the powers granted by the KSA draft Nuclear Law, the regulatory body would conduct inspections of the licensee and its suppliers following a systematic plan, focusing on the implementation of the management system and quality assurance program.

Article 14: Assessment and Verification of Safety

14.1 Assessment of Safety

14.1.1 Overview of the KSA's arrangements and regulatory requirements to perform comprehensive and systematic safety assessments

The KSA's draft Nuclear Law gives powers to the Saudi regulatory body to establish the requirements for systematic Safety Assessments and Periodic Safety Reviews. The proposed law makes it clear that detailed evidence of safety is required at all relevant licensing stages of any nuclear installation. The licensee will be required to perform safety assessments over the lifetime of the nuclear facility, address any deficiencies, and provide the regulator with any information relevant to the Authority's regulatory responsibilities. The law requires review and assessment of the licensee or applicant at every stage of the regulatory process, e.g. construction, operation, decommissioning, etc.

14.1.2 Assessment of safety through the licensing process

KSA's draft Nuclear Law requires that all nuclear facilities be licensed prior to construction, commissioning, or operation. The law has provisions for the regulatory body to conduct an

assessment of license applications to verify the safety of the facility. Nevertheless, the regulator would be empowered to refuse, condition, suspend, or revoke all licenses, based on outcomes of its own assessments, inspections, and/or enforcement measures.
Furthermore, the draft Nuclear Law entitles the KSA's regulatory body to establish and maintain its own management system, which most likely will be consistent with relevant IAEA safety requirements for assessments.

14.2 Verification and Management of Safety

14.2.1 Overview of the KSA's arrangements and regulatory requirements for the verification of safety

KSA's draft Nuclear Law empowers the regulatory body to formulate and conduct regulatory inspection programs to ensure operators' compliance with the law, and the applicable regulations.

14.2.2 Main elements of programs for continued verification of safety

The KSA has no nuclear facilities as defined in CNS, and therefore this section cannot be addressed at this time.

14.2.3 Regulatory review and control activities

The KSA has no nuclear facilities as defined in CNS, and the present nuclear activities are limited to import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.
However, the KSA draft Nuclear Law gives the Saudi regulatory body powers to inspect the activities of licensees and their contractors, and the regulatory body is to establish within its Integrated Management System (IMS) a process consistent with the requirements of the Nuclear Law and the relevant IAEA safety requirements for inspection of licensees' activities. Supporting procedures and instructions detail the methods that are to be applied by inspectors.

Article 15: Radiation Protection

The Regulatory Division within the AES of K.A.CARE has a Department tasked with the primary role of Radiological Protection (RP). This Department is charged with protecting people and the environment from unnecessary radiation exposure, which it achieves by regulating the introduction and conduct of any practice involving sources of radiation. Radiological Protection is a major function of present regulatory activities and will be a significant one within the Radiation Safety structure of the future fully fledged regulatory body.
KSA started a Radiological Protection capability within KACST several decades ago. The responsibility for Radiological Protection has been transferred to K.A.CARE and will ultimately reside with the Saudi regulatory body. This regulatory unit is responsible for specifying and regulating the protection needed to limit exposure to ionizing radiation or radioactive materials and the safety of radiation sources, including the means for achieving this.

It is imperative in these transfers that the experience and knowledge is retained, so that it can be built upon.

15.1 Overview of the KSA's arrangements and regulatory requirements concerning radiation protection at nuclear installations

Presently, KSA has no nuclear facilities as defined in the CNS. However, a number of regulations and regulatory guides pertinent to radiation protection do exist and are being applied to regulated different activities that utilize radioisotopes in KSA:

- Basic Regulation for Radiation Protection against Ionizing Radiation
- Regulations for Safe Transport of Radioactive Materials
- Regulations for Radioactive Waste Management
- Radiation Protection Regulations for Water Purification Plants
- Radiation Protection Program at Water Purification Plants
- Management and Transport of NORM Related Radioactive Wastes

The KSA's draft Nuclear Law gives the future Saudi regulatory body the authority to regulate radiation protection in the overall Nuclear Sector of the KSA which includes nuclear facilities and industrial and medical application of radiation.

15.2 Implementation of radiation protection programs by the license holders

As KSA has no nuclear facilities as defined in CNS, the present official regulations are limited to regulating import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.
However, radioactive sources and radiation utilizer licensees are showing satisfactory compliance with regulations.
On the other hand, as the KSA is planning to embark on having nuclear power in the country, K.A.CARE is laying out plans for a number of radiological safety related activities in this context, including enhancing and expanding the national environmental radiation monitoring network, and conduct a thorough radiological base-lining measurements at potential nuclear power plants sites.
Radiation protection training and development are currently in progress within K.A.CARE, and future training for radiation workers that will require access to areas of potential radiation or contamination will be conducted.

Article 16: Emergency Preparedness

16.1 Emergency plans and programs

KSA has formed its national Nuclear and Radiological Emergency Response Team since the year 2008 with the role of ensuring adequacy of arrangements for emergency preparedness. The Emergency Response Team is a relatively small specialist sector which draws on expertise of other sectors within the state, such as the civil defense, the health departments, etc. The Saudi National Nuclear and Radiological Emergency Response Team serves in an advisory function in the event of an emergency. The team serves to coordinating the development of emergency procedures, liaises

with other organizations for emergency preparedness, and conduct exercises, based mainly on the IAEA guidance on Preparedness and Response for a Nuclear or Radiological Emergency (GSR part 7).
KSA is currently developing and updating its Emergency Preparedness and Response (EPR) plans. The efforts, being led by K.A.CARE, include upgrading existing emergency preparedness and response plans to ensure coordination with all relevant emergency intervention or response organization, as well as formulate detail sub plans and procedures needed to address emergency preparedness in preparation for the future nuclear projects.

16.2 Information of the public and neighboring states

The arrangements for informing the general public in the event of a nuclear emergency within the KSA or external to the KSA is being coordinated between the Saudi National Nuclear and Radiological Emergency Response Team, the Ministry of the Interior, and the Ministry of Information.
KSA is working with the other GCC countries on the development of the GCC Radiological/Nuclear Emergency Response Plan. The arrangements for informing competent authorities in neighboring states are coordinated by the Ministry of Foreign Affairs in consultation with K.A.CARE.

Article 17: Siting

17.1 Overview of the KSA's arrangements and regulatory requirements relating to the siting and evaluation of sites of nuclear installations

Although the KSA has no nuclear facilities as defined in the CNS, there are plans for introducing a dedicated Regulation related to Siting of Nuclear Facilities. The draft Nuclear Law further empowers the regulatory body to regulate the selection of a site.

17.1.1 Evaluation of site related factors

Presently, K.A.CARE as the promoter is in the process of recruiting consultancy services aimed at a full site characterization and evaluation study for the first Saudi nuclear power plant, complemented with an Environmental Impact Assessment study and the preparation of the "site" related parts of the PSAR for a number of selected candidate sites that have been identified previously through a detailed Site Screening and Identification Study conducted in 2011.

17.1.2 External extreme events

The Regulation and associated guidelines related to the evaluation of external hazards are (at least) going to address earthquakes and surface faulting, meteorological events, sandstorms, flooding, and geotechnical occurrences. The regulation will require that human induced external events be evaluated, including aircraft crashes, chemical hazards, and impact of ships on the facility water intake structures.
The regulations also will require that the dispersion of radioactive material through the atmosphere and contamination of the surface and ground waters be evaluated for potential impact on the local

population. Information on the regional populations would be required to be collected and kept up-to-date for the life of the facility, and such data is to be analyzed for potential radiological impact of normal operational discharges and accidental releases.

17.4 Regulatory review and control

Regulations for Siting of Nuclear Facilities are to be drafted based upon the relevant IAEA safety requirements plus some other best world practices and experiences. The regulations will establish requirements for the evaluation of sites for nuclear facilities, including full characterization of site conditions, and evaluation of external hazards and environmental impact.
The KSA's regulatory strategy is expected to rely on the traditional deterministic methods, complemented with a risk-informed performance-based methodology, to address site characteristics and emergency planning issues.

Article 18: Design and Construction

18.1 Overview of the KSA's arrangements and regulatory requirements concerning the design and construction of nuclear installations

The KSA's draft Nuclear Law gives the regulator authority to regulate the Nuclear Sector of the KSA. There are plans for the drafting and enforcement of a specific Regulation covering the Design of Nuclear Power Plants. The regulation is to cover general requirements, the principal technical requirements including maintenance of fundamental safety functions, defense-in-depth, safety classification, the general design basis, and specific requirements for systems, and specific requirements for systems, structures and components. The regulation will also include requirements to include in the design measures to prevent and mitigate severe accidents.

18.2 Incorporation of proven technologies

It is KSA's strategy to seek nuclear technologies that are:

1. of proven design,
2. previously licensed,
3. based on internationally recognized standards, and
4. with a demonstrated history of safe operation.

The relevant regulations would require any applicant for a Construction License to identify any reference Nuclear Facility, evidence of approval of the reference Nuclear Facility by the authorized regulatory authority in the country of origin, a list of proposed departures or changes between the proposed design and the reference design, an Independent Safety Verification report on all proposed departures from or changes to the reference design, and a list of all country-of-origin safety information incorporated by reference in the application.

18.6 Safety assessment and design enhancements resulting from lessons learned from the accident at Fukushima Daiichi

As KSA has no nuclear facilities as defined in CNS, the present official regulations are limited to regulating import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications. Nonetheless, in due course KSA's regulatory body is to set out regulations that require consideration to lessons learned from the accident at Fukushima Daiichi and incorporation of the Vienna Declaration on Nuclear Safety.

Article 19: Operation

As KSA has no nuclear facilities as defined in CNS, the present official regulations are limited to regulating import, utilization, transportation, and disposal of radioactive sources as applied in medical, industrial, educational, and other applications.

Regarding the operations for future nuclear faculties, the future Regulations will take into consideration the following:

1. Regulatory requirements for operational limits and conditions (INFCIRC/572 19(2))
2. Procedures for operation, maintenance, inspection and testing (INFCIRC/572 19(3))
3. Procedures for responding to operational occurrences and accidents (INFCIRC/572 19(4))
4. Plans for engineering and technical support (INFCIRC/572 19(5)
5. Development of reporting system for incidents during plant construction and operation
6. Develop a system for operating experience feedback (INFCIRC/572 19(6) and 19(7)).

19.1 Initial authorization

The KSA nuclear power program is currently at the planning stage. Many of the provisions of CNS Article (19) will be implemented at a future date.
The operation license application would include the Final Safety Analysis Report (FSAR) and other supporting documents as required by the regulator for review. The FSAR will be the principal document upon which the regulator will base its review and assessment to support a future decision to issue an operation license.

IV. CONCLUSION

The objective of the present report is to express KSA's commitment to the intents and objectives of the provisions of the CNS aimed at a systematic global nuclear safety approach. The government of the KSA would like to confirm its utmost commitment to all possible efforts to fully comply with its obligations to the CNS. The government is committed to the establishment of the necessary legislative, regulatory, and organizational framework as structured in the CNS.

The KSA program is still in the early planning phases. Therefore, the report is intended to reflect the initial present day commitment to CNS obligations, without discarding the fact that further efforts and measures need to be put in place in due time as the program evolves.
As KSA has adopted a policy of transparency regarding its nuclear program, the KSA looks forward to receiving questions and comments of other CNS Contracting Parties on this National Report and is committed to clarifying any issues raised.