

Regulatory challenges of use of nuclear energy for electricity in Sudan,
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Abstract: Sudan – as it is the case for many of the developing countries - is considering introducing to the country nuclear power plants as well as nuclear research reactors. Preparation of introducing the first nuclear power plant in the country started in September, 2007 by forming a ministerial committee and a technical committee. The technical committee had been given the task of preparing a strategic report necessary for the execution of this project. The strategic report addressed a broad range of subject matter and issues that need to be considered in planning and preparing for a nuclear power programme for the sake of safe, secure and efficient use of nuclear energy. The report had been completed and sent in 2009 to IAEA for its comments. In this paper, the current status of regulatory infrastructure existing in the country as well as major future challenges is described.

1. Introduction:

Nuclear programs in Sudan are intended to support the nation's socio-economic development in various fields particularly in electricity generation, human health, and scientific research. Currently the major use of ionizing radiation in Sudan is for human health, oil exploration and production and scientific research. A study conducted with the IAEA support for assessing the forecasted Sudan demand for electrical energy production recommended that Sudan should consider introducing its first nuclear power plant (NPP) by the year 2015. For this reason Sudan got involved in a national project (SUD/0/011) with the support of the IAEA with the objectives to determine the optimal energy – generation mix up to the year 2030 and to help Sudan carry out all necessary preparations for developing a proper infrastructure for introducing the first nuclear power plant. A steering committee and a technical committee have been formed to pave the way towards introducing the first NPP to the country. The first task of the technical committee was to prepare a strategic report addressing all elements concerning this project e.g. energy plan, ownership, grid system, legislative & regulatory framework etc. the first draft of the strategic report had been concluded in 2009 and sent to the IAEA for their comments.

2. Current status of legislative and regulatory infrastructures:

2.1 Legislative Framework:

Two acts – one under the ministry of health (MOH) (in 1971) and another one under the Ministry of Science & Technology (MOST) (1996) are concerned with regulating the use of ionizing radiation; however both of these two acts are incomplete and overlapping. The Act of 1996 was qualified as the dominant act (over the 1971 Act) by a legal Opinion of the Ministry of Justice.

A number of radiation protection regulations and code of practice have been issued by the board of SAEC these are:

1. General procedures for radiation protection (1996)
2. Basic Requirement for Radiation protection and Dose limits (1996)
3. Licensing procedures for radiation practice (1996)
4. Control and management of radioactive waste (1998).
5. Safe transport of radioactive material (1998).
6. Code of practice for protection in nuclear medicine department (1998)
7. Code of practice for protection in industrial radiography (1998)

The codes of practice for protection in the following applications are still in draft form:

- ❖ Diagnostic and interventional radiography (2008).
- ❖ Well logging and gauges (2008).
- ❖ Teletherapy (2009).
- ❖ Education and scientific research (2009).

In 2007 SAEC formed a committee to draft a new act (The Nuclear Law). The draft had been completed and sent in 2008 to the legal department of the IAEA for comments. The draft has been revised and amended taking into consideration the IAEA comments.

On the other hand, the ministry of health managed in mid of 2009 to draft a new law for regulating the use of ionizing radiation for medical applications. That law was suppose to repeal the 1971 law, however the legislation department of the ministry of justice denounces the law as it is in contradiction of the SAEC 1996. The ministry of health has lately appealed against that decision.

2.2 Main features of the nuclear law proposed by SAEC:

- 2.2.1 The proposed law regulates the method of utilizing nuclear energy and ionizing radiation, and conditions for the performance of practices and activities related to nuclear energy utilization and radiation practices.
- 2.2.2 The law repeals all contradictory articles stated in any other national laws or regulations.
- 2.2.3 The law addresses both nuclear safety and nuclear security issues.
- 2.2.4 An Authority called the Nuclear Regulatory Authority for Radiation Protection shall be established by this law and it shall be the sole body in the country for regulating the safety/security of radiation activities and practices. The Authority shall also be the authorized focal point in Sudan concerning the implementation of treaties and agreements related to nuclear safety, security and radiological or nuclear accidents or radiological emergencies.
- 2.2.5 The Authority shall be composed of a Council and a Technical Office. The Council in turn shall be composed of a Chairperson

and 14 members drawn from different ministries and relevant organization in addition to the director of the technical office. On the other hand the technical office shall have a director who shall assume the responsibility for the technical, administrative and financial affairs of the Authority. The Offices of the Chairperson and the Director shall not be held by the same person.

- 2.2.6 The nuclear law details the work of the Authority e.g. Notification, registration, licensing, inspection and enforcement.
- 2.2.7 Details of the responsibilities of the Legal Person, Licensee, and Registrant are clearly described.
- 2.2.8 Other issues namely radiation protection, nuclear safety, transport of radioactive materials, radioactive waste management, emergency preparedness and response, application of safeguards, civil liability for nuclear damage, nuclear security, physical protection, mining and milling, import of radioactive materials and decommissioning are briefly mentioned in the law with the details to be described in regulations.
- 2.2.9 In the general provision section of the law, issues like the right to appeal, designation of a competent court to deal with the Authority legal actions, the authority to issue regulations and penalties are mentioned.

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2.3 International legal instruments:

Sudan has already ratified a limited number of conventions and treaties in connection to nuclear safety and security issues. In 2008 SAEC invited the International Team of Expert (ITE) mission in an effort to raise the awareness among decision makers of the Sudan government with respect to the importance of adherence to international legal instruments with regard to international cooperation in the field of safety and security in utilizing nuclear energy. Unfortunately the team could not make their visit due to weather problems that cancel their flight to Sudan.

3. Regulatory Body Establishment:

The two acts mentioned above did not establish an independent regulatory body, as the ministry of health is a major user of ionizing radiation and Sudan Atomic Energy Commission (SAEC) of Ministry of Science and Technology (MOST) is a promoter, a user and a consultant body regarding the peaceful use of nuclear technology in the country.

The SAEC Act of 1996 empowers the board of the corporation with some regulatory functions which are conducted by RPTC on behalf of SAEC. Currently members of the national RPTC are drawn from the following institutes:

- ❖ Sudan atomic energy commission
- ❖ Ministry of health
- ❖ Ministry of energy and mining
- ❖ Custom's administration board
- ❖ National security board
- ❖ Police of protection of strategic and governmental premises
- ❖ Criminal intelligence department
- ❖ Sudanese standards and metrology organization
- ❖ College of radiography and radiotherapy, university of Sudan
- ❖ Ministry of Justice
- ❖ Civil defense

4. Future Plan:

4.1. finalization of the nuclear law

The minister of science and technology is about to sign a decree by which a national committee will be established to discuss the nuclear law drafted by SAEC. The proposed committee comprises representatives from almost all ministries and national institutes that are suggested – in the proposed law – to be members of the Council. It is expected that the draft of the law be finalized by the end of the first quarter of 2010.

4.2. adherence to international legal instruments:

The SAEC is to prepare and present its technical reports concerning international legal instruments to the ministry of justice as a first step towards considering the ratification of such instruments by the government. More efforts are needed to motivate political decision makers to join international treaties and conventions especially those directly relevant to the introduction of nuclear power plants. In this respect it is planned to either invite an ITE mission again to Sudan or – as recommended by the legal department of the IAEA - to discuss those legal instruments in a meeting that involve the staff of the legal department of the IAEA with a group of national decision makers from relevant institutes. Other Regulatory Bodies - relevant to the NPP project - should also develop the necessary regulations to implement the relevant treaties conventions and agreements.

4.3. Establishment/upgrading of Regulatory Bodies:

As a result of the ongoing increase in radiation practices and sources in the country, the demand of human resources of the nuclear regulatory body continues to increase. Therefore more staff is to be recruited and trained both locally and abroad especially in the field of regulating new nuclear techniques particularly NPP.

The following government bodies have been identified – in addition to the nuclear regulatory body - as possible regulatory bodies relevant to the NPP project: The Electricity Regulatory Authority, The Environment and

Natural Resources Supreme Council (ENRSC), Industrial Safety Department, Ministry of Labor and Human Resources, Civil Defense Directorate, Ministry of Tourism and Wild Life, Ministry of Physical Planning and Public Utilities, Inland River Navigation Corporation, Sea Port Corporation, Civil Aviation Authority, Ministry of Irrigation and Water Resources, Ministry of Agriculture and Forests, The National Committee for Radiological Emergency Preparedness and Response and the Sudanese Standard and Meteorology Organization (SSMO). All of such bodies have to promote their regulations to deal with the NPP project. However in developing/amending acts and regulations, it is of prime importance to ensure that responsibilities of each regulatory body are clearly identified in such away so as to avoid any overlap or contradictions. Such task is to be overseeing by the Nuclear Energy Power Implementing Organization (NEPIO) which is to be formed by the end of first quarter of 2010.

The coordination between all relevant regulatory bodies for nuclear power plant licensing has to be stressed and assured. One proposal for this issue is to form a committee headed by the nuclear regulatory body with representative from all relevant regulatory bodies to deal with applications regarding all issues of introducing a nuclear power plant and to issue just one combined license for each activity in connection with the NPP project.

An action plan has been laid down with respect to preparatory work needed to establish regulatory infrastructure for the introduction of the first NPP. That plan started with activities to be taken to finalize and promulgate the nuclear law which is going to establish a single and independent nuclear regulatory authority. Other activities included in the action plan are structuring of the new nuclear regulatory body, recruiting staff, establishment of advisory committees for technical support, revision and amendment of regulations, developing new regulations, revising/establishing inspection program, enforcement policy and Licensing procedures, establishment and implementation of a sound quality management system and establishment of a NPP licensing team.

5. Conclusion

The current regulatory authority for the control of radiation sources in Sudan (RPTC) is faced with the challenge of establishing a new, single, independent and effective nuclear regulatory authority. An ambitious plan has been set – as part of the strategic report regarding the introduction of a nuclear power plant - to finalize and promulgate a nuclear law that is in line with the international recommendations, and to take specific activities within a specific time frame to upgrade/establish regulations of all regulatory bodies relevant to the NPP project. More national efforts as well as regional and international support are needed to accomplish such objective.

6. References:

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