

**Emerging need for nuclear security
Technical and scientific support**

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Abstract

An effective and efficient nuclear security culture is dependent on proper planning, training, awareness, operation and maintenance. A high level of safety and security culture should be consolidated in the handling of nuclear and radiation sources, so that — inter alia — human errors are minimized through good training; and the concept of safety and security culture was to make it clear that safety should be the highest priority in organization handling nuclear and radiation sources. Regulatory infrastructures for the control of radiation sources should also be supported by governments and be able to act independently.

Introduction

The world nuclear society is experiencing a period of vibrant change. Important global trends and issues, such as the ambitious introduction of new nuclear power plants, the rapid expansion of existing nuclear power programmes and the wider use of radioactive sources highlight the need for continued and improved international cooperation and coordination. Because the world population is growing in size and wealth, world's energy demand is rising from time to time. The increasing multinational nature of today's nuclear business underscores this need. The establishment of adequate nuclear safety capacity building and infrastructure is particularly important and cannot be ignored. The international nuclear community has continued its focus on capacity building for sustainable nuclear safety. Capacity building is much broader than traditional education and training. It includes not only human resource development, but also organizational, institutional and legal framework development, with a view to enhancing capacities [1]. Efficient and effective regulatory control system and safety and security culture need to be developed to comply with highest safety and security standards. Regulatory infrastructures must be supported by governments and be able to act independently [2].

Nuclear security technical and scientific support needed

The support of Nuclear energy world wide to meet increasing global demand for electricity with out spread of sensitive nuclear technologies and without increasing green house effects. Facilitating and supporting financing of nuclear power plant through public and national and multinational mechanism can be one of the key incentives to offer countries considering nuclear energy to create a viable acquisition of sensitive fuel cycle technologies [3]. Developing countries lack of technical information and expertise to evaluate advanced energy option such as nuclear energy and its required supporting

infrastructure milestone as available alternatives to polluting and unfriendly energy resources. Financing considerations can lead developing country to utilize the cheapest energy sources available even if these sources are the more polluting and unfriendly to climate change goals in lieu of cost effective clean nuclear power. Effective national regulatory authorities operating, within suitable national infrastructures can be considered. Government need to provide with regulatory Authority with sufficient backing and with sufficient human and financial resources to enable it to function effectively. The developing countries need to get technical and financial support from developed country.

Possible modes of establishing nuclear security technical and scientific support in Countries intending to launch or expand nuclear power programmes

Against the background of energy security and global warming concerns, the role of nuclear energy has been reappraised, and the promotion of nuclear energy has gained momentum across the world. A number of countries intend to introduce or expand nuclear power plants, which has been described as a "Nuclear Renaissance". In the meantime, due to the dual nature of nuclear energy, it is most indispensable that the use of nuclear energy be promoted in a manner that ensures nuclear non-proliferation, safety and security. Nuclear power is under serious consideration in over many countries which do not currently have it (in a few, not necessarily at government level) [5].

Despite the large number of these emerging countries, they are not expected to contribute very much to the expansion of nuclear capacity in the foreseeable future - the main growth will come in countries where the technology is already well established. In all countries governments need to create the environment for investment in nuclear power, including professional regulatory regime, policies on nuclear waste management and decommissioning, and involvement with international non-proliferation and insurance arrangements. In different countries, institutional arrangements vary. Usually governments are heavily involved in planning, and in developing countries also financing and operation. As emerging nuclear nations lack a strong cadre of nuclear engineers and scientists, construction is often on a turnkey basis, with the reactor vendor assuming all technical and commercial risks in delivering a functioning plant on time and at a particular price [5].

Experiences in providing nuclear security technical and scientific support

Nuclear security means prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear or other radioactive substances or their associated facilities. 'Nuclear security' includes 'physical protection' Threats to nuclear security involve criminals or terrorists acquiring and Using for malicious purposes: (a) nuclear weapons; (b) nuclear material to build improvised nuclear explosive devices; and/or (c) radioactive material to cause harm to individuals or the environment, including the construction of radio-logical dispersal devices (RDDs) and radiological exposure devices (REDs) [6]. Nuclear security culture plays an important role in ensuring that individuals, organizations and institutions remain vigilant and that sustained measures are taken to prevent and combat the threat of

sabotage or using radioactive material. The political and economic consequences, and the impact upon human health and the environment, of the malicious use of radioactive material could be devastating, particularly in the case of a nuclear explosive device, and could be unpredictably disruptive in the case of malicious acts resulting in the dispersal of radioactive material.

International co-operation Networking could enhance international co-operation in all aspects of infrastructure development directed towards increasing, through education and training, the number of radiation safety professionals, so that even in small countries there could be a self-sustaining critical mass of such professionals. The IAEA should continue to facilitate international co-operation in all areas important for radiation safety and security, including information exchange, networking, knowledge management, the provision of assistance by one country to another, the maintenance of international databases, border monitoring, and the disposal or long-term storage of disused sources. International technical cooperation in the area of the peaceful use of nuclear technology plays a key role in achieving the goal of the NPT. Nuclear non-proliferation, safety and security are the issues that the international community has to address thoroughly. The peaceful uses of nuclear energy also must be carried out with the confidence of the international community by faithfully fulfilling NPT obligations with a high level of transparency [5].

Development of human resources carrying out technical and scientific functions in the area of nuclear security.

Nuclear security constitutes an important building block that demands serious attention for ensuring peaceful use of nuclear energy. Events of September 11th incited the sense of urgency for the need of combating nuclear terrorism.

Nuclear technology is usually acquired from a more advanced country. For technology transfer to be successful, the recipient country must be capable of absorbing the technology, and the key to this is the availability of qualified manpower. In many developing countries the need for nuclear scientists and research-oriented personnel has often been over-estimated, while the need for highly qualified and experienced practically-oriented engineers, technicians and craftsmen has been very much underestimated. In most cases the major staffing problems have concerned engineers and technicians at all levels with practical experience for project execution and operation.

An organization must allocate sufficient financial, technical and human resources to implement the assigned security responsibilities. It must ensure that all security personnel have the necessary qualifications, with these qualifications maintained by an appropriate training and development programme. A human factor is generally a contributor to all nuclear security related incidents as well as malfunctions related to activities involving radioactive material. In this regard, leadership and management can be vital components. They include deliberate malicious acts, unintentional personnel errors as well as ergonomic issues related to the design and layout of software and hardware, inadequate organizational procedures and processes and management failures. Individual

understanding of and commitment to roles and responsibilities, commitment to continuous improvement, and management commitment are of great importance to nuclear security. While both nuclear safety and nuclear security consider the risk of inadvertent human error, nuclear security places additional emphasis on deliberate acts that are intended to cause harm. Because security deals with deliberate acts, security culture requires different attitudes and behavior, such as confidentiality of information and efforts to deter malicious acts, as compared with safety culture[6,7]. Due concern should be given for Education, training and staffing for nuclear energy and nuclear technologies to be sustainable for an active safety culture in both industry and regulation, a steady stream of trained and educated workers in both industry and regulation, effective international co-operation in regulation, industrial experience, and R&D. Unlike other power plants, nuclear plants must be carefully guarded against both attempted sabotage (generally with the goal considered to be causing a radiological accident, rather than just preventing the plant from operating) and possible theft of nuclear material.

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