SECURITY OF MATERIAL: PREVENTING CRIMINAL ACTIVITIES INVOLVING NUCLEAR AND OTHER RADIOACTIVE MATERIALS

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Abstract. The report emphasizes the need for national regulatory authorities to include in the regulatory systems, measures to control and protect nuclear materials from being used in illegal activities, as well as aspects of relevance for detecting and responding to illegal activities involving nuclear and other radioactive materials. The report will give an overview of the international treaties and agreements that underpin the establishment of a regulatory structure necessary for States to meet their non-proliferation policy and undertakings. Ongoing work to strengthen the protection of nuclear material and to detect and respond to illegal activities involving nuclear and other radioactive material will be included. The focus of the paper is on the need for standards and national regulation in the nuclear security area.

INTRODUCTION

During the past ten years, nuclear material and other radioactive materials, including radioactive sources, have been reported to be seized in illicit trafficking. The IAEA's Illicit Trafficking Database Programme, started in 1996, now contains a total of some 330 officially confirmed cases of illicit trafficking of radioactive materials; half of which involved nuclear material and the other half other radioactive materials. The circumstances of these cases vary from theft, unauthorized possession, or just "seizure" (without other reason stated). The international community has recognized that measures are needed, on the international level as well as on the national level, to prevent, detect and respond to illegal activities involving nuclear and other radioactive materials.

DEVELOPMENT OF THE IAEA PROGRAMME: SECURITY OF MATERIAL

In a resolution, the IAEA General Conference of 1994 invited the Director General to intensify the activities through which the IAEA is currently supporting Member States to combat illicit trafficking. In 1995, the IAEA Board of Governors approved a programme of activities that should assist States in their efforts to combat illicit trafficking, including *prevention, detection and response* to such activities should they occur.

In 1997, the IAEA intensified its activities further and established the programme *Security of Material* within its major programme *Nuclear Verification and Material Security.*

From 1997–2001, the programme had three subprogrammes: 1) The Illicit Trafficking Database Programme, 2) Assistance to States in their Management of Nuclear Material, 3) Protection of Radioactive Sources. During the operation of the programme, it has been gradually recognized that all activities related to the safety of radiation sources should be handled within the IAEA's programme for Nuclear Safety, and that the programme Security of Material should be focused on *illegal or criminal activities involving nuclear or other radioactive materials.*

Consequently, for the budget period 2002–3, the IAEA's programme Security of Material includes the following two subprogrammes: 1) Technical, Administrative and Regulatory Arrangements in Members States to Protect and Control Nuclear Material, and 2) Illegal Activities Involving Nuclear and Other Radioactive Materials.

INTERNATIONAL INSTRUMENTS CONTRIBUTING TO THE PREVENTION OF ILLEGAL ACTIVITIES INVOLVING NUCLEAR MATERIAL

There is a global recognition that nuclear material, due to its fissile properties and potential use in nuclear weapons programmes, should be subject to strict regulatory arrangements for control and protection. The technical and administrative requirements in a State to maintain such control and protection of nuclear material and its use rest on:

a) nuclear material accountancy and control;and
b) physical protection of nuclear material and nuclear facilities

Several treaties, conventions and agreements reflect the legally binding undertakings by States in these areas, including the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the Convention on the Physical Protection of Nuclear Material (CPPNM).

For other radioactive material, including radiation sources, the IAEA together with Member State expert, has developed a "Code of Conduct on the Safety and Security of Radioactive Sources", which has been discussed by the Board of Governors as part of the Action Plan for the Safety of Radiation Sources and Security of Radioactive Materials.

THE NON-PROLIFERATION TREATY

The NPT opened for signature in 1968 and entered into force in 1970. It is the central component of the nuclear non-proliferation regime. Non-nuclear-weapon States undertook not to develop nuclear weapons and to accept international verification that their nuclear programmes were being used only for peaceful purposes. The IAEA was assigned the responsibility for verifying, through safeguards agreements, that this undertaking was being met. A non-nuclear-weapon State, party to the NPT, undertakes to declare *all* its nuclear material to the IAEA, and the IAEA undertakes to verify that the State *has* declared all its nuclear material. This is established in a *safeguards agreement* between the IAEA and the State. The purpose is to verify that nuclear material in the State has not been diverted to the manufacture of nuclear weapons or other nuclear explosive devices. A nuclear-weapon State, party to the NPT, undertakes not to contribute, with nuclear material or technology, to the development of nuclear weapons in a non-nuclear weapon State. The technical objective is to be able to detect, "in a timely manner", the diversion of "significant quantities" of nuclear material from a State's peaceful nuclear activities to the manufacture of nuclear weapons or other nuclear devices.

Technical, Administrative and Regulatory Arrangements in the State

A State has the sole responsibility for fulfilling its non-proliferation undertakings, including those in safeguards agreements. For this purpose, the State undertakes to maintain a system of accounting and control for all nuclear material to provide information on a) quantities, chemical and physical form of nuclear material, b) where and in what activities the material is used, and c) all transactions of nuclear material. This *State System for Accountancy and*

Control (SSAC) is a set of technical and administrative objectives and functions that are to be applied by the State and by an operator of a nuclear facility or anyone else that uses nuclear material to facilitate the State in fulfilling its obligations.

The SSAC provides the technical basis for *early detection* of theft or removal of nuclear material from a nuclear facility, storage or transport. The SSAC also provides the information required to design and implement effective physical protection of the nuclear material, and also the necessary information of relevance for exports and imports of the material. For the State, the SSAC thereby obtains a multifunctional purpose.

To become fully effective, known by and implemented in a State, the requirements of the SSAC should be reflected in the national nuclear regulatory system.

THE CONVENTION ON THE PHYSICAL PROTECTION OF NUCLEAR MATERIALS

While the NPT addresses nuclear non-proliferation at the State level, the CPPNM addresses the concern that nuclear material may be subject to *theft or other unauthorized removal* by subnational actors such as terrorist groups, criminal and politically motivated groups, and even individuals. The greatest challenge in building a nuclear explosive device remains in acquiring the weapon-usable nuclear material. While subnational groups or individuals are unlikely to have the means to manufacture nuclear material themselves, theft from established national sources may be a possible route for them for acquiring nuclear material. This could be by direct action or indirectly, by illicit trafficking. The physical protection of nuclear material, facilities and technology against theft or unauthorized diversion is, therefore, a non-proliferation issue.

The physical protection of nuclear materials, whether in use, in storage, or in nuclear transport, is a national responsibility.

The Convention, which came into force in 1987, is the central international instrument to protect nuclear material from theft or unauthorized removal. It requires States parties to make unlawful possession, use, etc., of nuclear material a criminal offence under national law and promotes international co-operation in the exchange of physical protection information. The States parties undertake to protect nuclear material during international transport at a certain agreed level depending on quantity and physical form of the material.

The requirements for protection of nuclear material in the CPPNM are limited to international nuclear transport.The Director General of the IAEA convened an open-ended expert meeting to discuss whether there was a need to revise the CPPNM in November 1999. The Expert Meeting will report to the Director General in May 2001.

Technical, Administrative and regulatory arrangements in the State

In order to promote uniform high standards for the protection of nuclear material, the IAEA provides the international community with recommendations on the requirements for physical protection of nuclear material against unauthorized removal whilst in use, transit, and storage in INFCIRC/225/Rev. 4; *The Physical Protection of Nuclear Material and Nuclear Facilities.* States implement these recommendations on a voluntary basis. The national system of physical protection defines the responsibilities at the State level and the (more technical) responsibilities that are to be fulfilled at the facility level. An important basis for a national

physical protection system is the *threat assessment* which gives the basis for the measures to be implemented. INFCIRC/225/Rev. 4, underlines the need for a flexible approach in which the specific circumstances in a State may be taken into account.

The recommendations reflect a broad consensus among Member States on the requirements. The specific physical protection measures to be implemented at particular facilities are determined by the State taking into account factors specific to the State, including threat perception, economics, political infrastructure and culture. Most industrial and developing countries follow these recommendations in the establishment and operation of their physical protection systems.

In each State with nuclear activities, a national regulatory system for physical protection should be developed, which defines the appropriate physical, procedural and legislative measures for the protection of the material. The synergy between the physical protection system and the SSAC is recognized in that the SSAC provides the data on nuclear material that is needed for the design of the physical protection system. While the SSAC will enable early detection of theft or other unauthorized removal of nuclear material, the physical protection system will protect the material from such illicit activities.

DETECTING AND RESPONDING TO ILLEGAL ACTIVITIES INVOLVING NUCLEAR AND OTHER RADIOACTIVE MATERIALS

Detection of radioactive materials

The physical properties, the radiation, of radioactive materials make it possible to *detect* these materials when being used illegally, e.g. at borders. Most transports of radioactive materials emit some radiation at low levels. With radiation monitoring equipment, a customs officer may detect transports containing radioactive materials. The critical question for the officer on such an occasion is whether the transport is legitimate or not. Instructions on how to respond to the detection of radioactive materials should give clear guidance on measures to be performed when a signal has been received that a transport contains radioactive materials. In some cases, additional measurements will be needed, and the capability to perform such measurements should be available either at the border or on call.
In other cases, where radioactive material is seized in unauthorized possession, the characterization of the material is necessary in order to determine further actions. It is important that analytical capabilities are available, either domestically or regionally, for the characterization of the material seized.

Responding to the detection or seizure of radioactive materials

The seizure of nuclear or other radioactive materials e.g. in illicit trafficking, triggers a series of activities. Analysis of the material, arrangements for its safe and secure storage and investigative actions are to be undertaken. Different response activities are called for if nuclear material has been seized from those necessary if a radiation source has been seized or detected. Response manuals should give proper guidance for different cases.

Technical and administrative arrangements in the State

The national regulatory system should cover measures to detect and respond to illegal activities involving nuclear or other radioactive materials. The technical measures needed are

related to detection capability, e.g. availability of instruments and laboratories to perform analysis of seized material. Possible arrangements for the shipment of samples of seized material should be part of the technical arrangements.

IAEA PROGRAMMES TO ASSIST STATES IN DETECTING AND RESPONDING TO ILLEGAL ACTIVITIES INVOLVING NUCLEAR AND OTHER RADIOACTIVE MATERIALS

In its programme for 2002–3, the Agency emphasizes activities that will generate standards, guides and norms in the area of preventing, detecting and responding to illegal activities involving nuclear and other radioactive materials. In addition, it will, within available resources, assist States in establishing the technical, administrative and regulatory functions that are needed to implement the standards, norms and guides.

The assistance programmes also include research and development efforts to develop radiation monitoring instruments with adequate capability.

The fostering of information exchange will continue by maintaining the Illicit Trafficking Database Programme, and by improving the use of the data, including analysis of the content of the database annually.

Closer interaction with the World Customs Organization (WCO), Interpol and Europol are promoted through the Memorandum of Understanding already signed with the WCO and one presently being drawn up with Interpol.

CONCLUSION

Any unauthorized possession, use or handling of radioactive material pose risks: for nuclear material the main risk is that the material may be used for nuclear weapons purposes; for other radioactive material and radioactive sources the radiation risk is to individuals, the public and also to the environment. The responsibilities to counter such abuses require measures at the national and the international level.

Addressing these issues successfully requires a spectrum of measures and arrangements, ranging from internationally binding undertakings to technical, administrative and regulatory arrangements in States and the availability of assistance programmes aimed at helping States to establish the necessary systems.

Effective measures to act against the *illegal — terrorist or criminal — activities* involving nuclear and other radioactive materials require additional measures by law enforcement authorities. The co-operation between the international organizations concerned, the IAEA and the World Customs Organization, Interpol and Europol is thereby essential. Effective programmes to ensure exchange of information are necessary.