First Training Course on Physical Protection – A Report

by W. Morawiecki

The comprehensive programme of IAEA activities to promote physical protection of nuclear material and facilities includes, among other items, the organization, within the framework of the Agency's technical assistance programme, of training courses for physical protection personnel from Member States A group of consultants convened by the IAEA in October 1977 developed the concept and drafted an outline for the first series of such courses. It was recommended that the courses should, first of all, focus on designing physical protection systems for light-water reactor power plants – the most likely type to be used by countries developing their programmes in nuclear energy. The main concern regarding such plants would therefore be that of protection against the threat of sabotage with possible radiological hazards, rather than protection against theft of nuclear material used and stored at the plants, since the latter is much less sensitive to such threats.

Soon after the October meeting, the US Government approached the IAEA suggesting that together they organize an international training course as outlined by the group of consultants. The conditions of co-operation between the US and the IAEA have been defined in an arrangement signed by both parties in June 1978 regarding such issues as co-direction of the course, selection of candidates, financing, etc.

In spite of rather short notice the number of candidates nominated by Member States was far in excess of the limited number of places.

The course was prepared and conducted by Sandia Laboratories in Albuquerque, New Mexico, on contract to the US Department of Energy (DOE). Course material specifically prepared for this purpose comprised 3 volumes (approx. 450 pages) in addition to 2 handbooks previously published by Sandia. Seventeen Sandia staff experts were involved in the preparation and conduct of the course. Six other US speakers (from DOE, the US Nuclear Regulatory Commission (NRC), the RAND Corporation and Stone & Webster) as well as 5 guest lecturers (IAEA, Iran, Canada, UK, France) also contributed to the course. The 25 participants who attended the course came from 22 Member States: Argentina, Brazil, Chile, Czechoslovakia, India, Indonesia, Iran, Iraq, Israel, Korea (Rep. of), Malaysia, Mexico, Pakistan, Philippines, Poland, Portugal, Romania, Spain, Thailand, Turkey, Venezuela, Yugoslavia.

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Many of them were high-level officials from national atomic energy authorities responsible for developing and implementing their own state systems of physical protection including such functions as setting physical protection standards for licencing and supervising the nuclear facilities and their operation.

The aim of this first course was to make participants aware of the need for physical protection of nuclear power plants against threats of industrial sabotage and theft of nuclear material and to assist them in designing and evaluating physical protection systems with specific reference to organizational aspects, technical instrumentation and methodology.

The information supplied was at the limits of what could still be considered as unclassified by the US security standards.

The first part of the programme was devoted to the state system of physical protection in general with lectures on its objectives, functions and organizational characteristics. The US experience was explained as well as other national approaches which were discussed by guest lecturers. These aspects of physical protection and the problems they presented were explored in a panel discussion that ended this first part of the programme.

The main part of the programme began with lectures on the vulnerability of the reactors, the consequences of sabotage and analysis of threats including the attributes of potential attackers.

Information on physical protection technology was given including barriers, locks, sensors, communications and transportation. Samples of such technology were on display or were shown in operation by way of slides and films. The role of the protective force was also analysed.

The programme then concentrated on other aspects of a physical protection system such as vital area identification using the methodology of generic logic trees and fault trees; scenarios of potential adversary action, and detailed design of a physical protection system for a hypothetical facility (PWR power plant).

During this part of the course half the time was devoted to workshop type activities in subgroups of 5 participants under the guidance of an instructor. In these workshops the participants themselves were expected to design the physical protection for a given part of a hypothetical facility and to evaluate its effectiveness using the EASI (Estimate of Adversary Sequence Interruption) technique.

According to the assessment made after the course by the organizers and the opinions expressed by the participants in their answers to a detailed questionnaire, the course, the first of this kind, was fully successful. The content of the course responded to the real interests of Member States developing nuclear power programmes. The information supplied reflected the most advanced state of the art of physical protection.

There seems to be a great need in the Member States for training of physical protection personnel at international courses under the auspices of the IAEA. It was also indicated that such courses may be of interest to developed countries and should be equally opened to them in the future.

Also, the US Department of Energy is planning to repeat similar training courses in co-operation with the IAEA, and it is hoped that they may be organized in the future on a more regular basis. The next course, based on the syllabus and material of this course, somewhat

improved in the light of experience gained, may be organized in co-operation with the IAEA again at Sandia in Albuquerque in Autumn, 1979.

This course however might profitably be extended to 3–4 weeks, with more time devoted to workshop activities in small groups. Participants in the first course indicated that the demonstration of a physical protection system in practical operation at a facility should also be considered.

It is expected that using the material prepared for the course and as an implementation of another item of the IAEA physical protection programme outlined by a group of consultants in Autumn 1977, a "Guide to Physical Protection System Design for Light-Water Nuclear Power Plants" will be prepared for publication by the IAEA.

Such a "Guide" would interpret and enlarge on the general recommendations on protection of nuclear facilities against sabotage contained in INFCIRC/225, Rev 1, Ref. [1]. In addition to its main purpose of assisting Member States in designing physical protection systems, the "Guide", envisaged as a book of 150–200 pages, may be also used as introductory reading material by participants of future courses thus enabling them to become familiar with basic notions and terminology and come better prepared to take full advantage of the future courses.

Reference

[1] The Physical Protection of Nuclear Material (INFCIRC/225/Rev 1), IAEA, Austria (June 1977)