GUIDE TO THE
PROTECTION OF FISSIONABLE MATERIAL

Contents

1. Introduction
2. Scope
3. Definitions
4. The Security Plan
5. Guide to the Protection of Securable Materials
   5.1 Material in Use and Storage
   5.2 Material in Transit
   5.3 Recovery

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1. **INTRODUCTION**

The strategic value of certain nuclear materials make it imperative that these materials not be available to criminal or subversive elements of society. As awareness of this value increases throughout the world the probability of efforts to obtain this material for malicious purposes may increase. It is essential to both national and international security that precautions be taken to deny unauthorized persons the use of these materials. To ensure that materials in Canada are adequately protected, the Atomic Energy Control Board requires licensees to store and use securable materials in accordance with a security plan which has been reviewed and approved by the Board. This guide is intended to aid licensees in preparation of such a plan.

2. **SCOPE**

Licences authorizing the use, storage or transit of securable materials will be conditional upon provisions being made for the protection of the material in accordance with a plan approved by the Atomic Energy Control Board. This guide is intended to inform licensees of the considerations that should be made when preparing a physical protection plan. The guide defines those materials that are deemed securable and outlines the level of protection that will be considered adequate. Specific techniques used will necessarily depend on the nature of the operation to which they apply.
3. DEFINITIONS

Controlled Area - An area surrounded by an approved physical barrier with a limited number of controlled entry or access points.

Effective Kilogram -
   a) For plutonium and U-233, the weight in kilograms equals the number of effective kilograms.
   b) For uranium with an enrichment of 0.01 (1 percent) and above, the weight in kilograms multiplied by the square of the enrichment (as a fraction) equals the number of effective kilograms.

Securable Material - The following prescribed substances located at one site or contiguous sites or in one shipment in transit are securable materials except when contained in irradiated reactor fuel;
   a) Plutonium in quantities exceeding 2 kg or
   b) U-233 in quantities exceeding 2 kg or
   c) Uranium enriched in the U-235 isotope to 20% or more in quantities exceeding 5 effective kilograms or
   d) Any combination of the above in a quantity exceeding 5 kg as computed by the...
formula \( kg = (\text{effective kg U}) + \)
\( 2.5 \, (\text{kg U-233 + kg Plutonium}) \).

**Secured Area**

An area within a controlled area, surrounded by a solid physical barrier and under human, electronic, or other surveillance, either continuously or at intervals less than the minimum barrier penetration time such that unauthorized entry is immediately detected. Access to a secured area is on the basis of need only.

**Security Plan**

A document that outlines the principles and provides the procedures for the protection of securable material.

### 4. THE SECURITY PLAN

Licensees authorized to possess securable materials at any site will be required to obtain approval from the Atomic Energy Control Board of a security plan providing for the physical protection of securable materials in use and storage.

Licensees authorized to ship nuclear material will be required, prior to each shipment or series of shipments of securable material, to obtain approval from the Atomic Energy Control Board of a plan providing for the physical protection of the material in transit.
Arrangements for the physical security of all shipments of securable material are the responsibility of the consignor except for imports or as otherwise agreed between the licensees and provided for in a transit security plan. For imports the consignee is responsible for making security arrangements for securable material in transit in Canada. The security plan should specify policies, procedures or other arrangements to provide for the following:

a) The protection of securable material in use, storage, or transit (See section 5).

b) A description of the organization, duties, training, and the responsibilities of personnel for protection of securable material.

c) Special procedures such as response to attempts to steal material, the recovery of stolen material, communications with police, or testing the security system.

d) The protection of information, the dissemination of which would compromise the security of the material.

5. GUIDE TO THE PROTECTION OF SECURABLE MATERIALS

5.1 Material in Use or Storage

Consideration should be given to the following:

5.1.1 Material Disposition

a) Securable material should remain in a secured area except when in process or transit.
b) Material outside a secured area, the total quantity of which exceeds that defined as securable, should remain under continuous surveillance by personnel except while contained entirely within the process equipment in a form not easily removable.

c) Securable material should not leave a controlled area except in transit.

d) Personnel employed within a controlled area should be familiar with all security procedures essential to the performance of their duties.

5.1.2 Secured Areas

a) Secured areas should be within a substantial physical barrier, such as buildings, storage blocks, or vaults.

b) Access to the secured area should be restricted by suitable locking devices and controlled by an access-authorization procedure. There should be entry records and key control procedures. Entry should be authorized only on the basis of need.

c) Unauthorized entry to a secured area should be immediately detectable by procedures or devices such as suitable tamper resistant alarms, T.V. surveillance, tamper indicating barriers or seals patrolled at intervals less than the barrier penetration time, or other means.
5.1.3 Controlled Areas

Controlled areas should be enclosed by a suitable barrier such as a fence. The entry points to the area should be controlled and the authorization of those within should be readily verifiable. A record should be kept of names, affiliation, or nature of business, of all personnel receiving entry authority.

5.1.4 Communications

The plan should provide for a secure method of communication with off-site authorities. The means of requesting outside assistance in the event of a security breach should be carefully devised so as to ensure a timely response by police or other authorities. Assistance should be sought from the local, provincial or federal police officials as appropriate in the development of these procedures.

5.2 Material in Transit

Consideration should be given to the following:

a) Securable materials should not be shipped without the knowledge and consent of the consignee;

b) The consignor and consignee should communicate at the expected arrival time to confirm arrival of the shipment. Contents should be verified immediately upon arrival at the destination;

c) Routing, scheduled stops, and the transport mode should be planned to minimize the time in transit and the number of transfer points;
d) Shipments should be arranged and executed so as not to attract undue attention to the presence of securable materials;

e) Arrangements should be made with common carriers to provide security measures commensurate with the routes and transport mode concerned. Consideration should be given to current threats to security (potential aircraft hijacking for example), the time required to mount a successful recovery operation, the probable diversion points, communications, escort vehicles and other procedures that may be dictated by special circumstances.

f) Provisions should be made to detect misrouting or diversion of the shipment in the minimum possible time but in any case within two hours of the event.

5.3 Recovery Action

A security plan should set out procedures to be followed in the event of an attempted or successful diversion of securable material. Local police forces should be made aware of the hazards associated with the loss of securable material. The security plan should provide assurances that the police will be immediately informed of losses and involved in recovery activities. The Atomic Energy Control Board should be informed of any diversions of nuclear material as soon as possible without delaying recovery action but the licensee shall, in any event, report theft or loss in accordance with Section 20 of the Atomic Energy Control Regulations.