Handbook on Nuclear Law

Implementing Legislation

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IAEA
International Atomic Energy Agency

HANDBOOK ON NUCLEAR LAW: IMPLEMENTING LEGISLATION

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The Agency's Statute was approved on 23 October 1956 by the Conference on the Statute of the IAEA held at United Nations Headquarters, New York; it entered into force on 29 July 1957. The Headquarters of the Agency are situated in Vienna. Its principal objective is "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world".

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FOREWORD

by Yukiya Amano
Director General

In 2003, the IAEA published the Handbook on Nuclear Law (the 2003 Handbook), which emphasized that the safe and peaceful uses of nuclear energy in any State can only be ensured with the promulgation and implementation of an effective national legal framework to govern this technology. The IAEA has long been involved in providing assistance to its Member States in developing these frameworks, and demand for such assistance has increased dramatically.

Since publication of the 2003 Handbook, requests for IAEA legislative assistance have — if anything — been even more numerous, in large part due to the fact that over sixty Member States that currently do not utilize nuclear energy for the production of electrical power have recently expressed interest in pursuing this option. The current nuclear laws in many of these States are limited to non-power uses of ionizing radiation, such as those utilizing radiation sources for medical, agricultural and industrial purposes. If these States move toward nuclear power development, they will need to adopt legislation consistent with the various relevant international legal instruments covering the field (such as the Convention on Nuclear Safety and the Convention on the Physical Protection of Nuclear Material, among others) and with relevant voluntary guidance documents developed under the aegis of the IAEA.

The 2003 Handbook has already made an important contribution to enhancing national capabilities to develop the necessary legal frameworks by setting out the general scheme of nuclear law. However, a number of important developments in nuclear law have occurred since its publication. These developments are discussed in the present volume.

Also, over the past six years, representatives of many Member States receiving IAEA legislative assistance have suggested that it would be valuable to develop model texts of legislative provisions covering the key elements needed in a national nuclear law. The present volume provides such model texts, recognizing that they provide only a starting point and basic outline of necessary provisions that will need to be shaped to be consistent with each State's national approach to legislative drafting, cultural and social norms, economic structure, and the nature of its nuclear programme.

I thank those who have been involved in the preparation of this publication. It contains the most up to date and comprehensive guidance for Member States in enhancing their legal and regulatory frameworks for nuclear energy development, and I trust that it will once again provide a valuable resource for them.

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INTRODUCTION

BACKGROUND

In 2003 the IAEA published the Handbook on Nuclear Law (the 2003 Handbook) [1] to accomplish several objectives:

— To explain the overall character of nuclear law and the processes by which it is developed and applied;
— To examine a number of areas involving the peaceful uses of nuclear material and other radioactive material that should be covered by national legislation;
— To identify the key principles and concepts that are important for the regulation of activities in these areas;
— To provide a checklist of issues that drafters need to consider for inclusion in national nuclear legislation, with references to relevant international instruments and guidance documents.

After some years of experience with the 2003 Handbook, it became apparent that it could be usefully supplemented with additional material of a more detailed character for use as a practical aid to legislative drafting. Since publication of the 2003 Handbook, interest in launching new or expanding existing nuclear power programmes has been expressed by a growing number of States. It is recognized that States considering such programmes will need to put into place a wide range of legislation as a basis for the safe, secure and peaceful use of nuclear technology (see Ref. [2]). Also since that time, a number of additional relevant legal instruments and guidance documents have been developed that should be reflected in the guidance on nuclear law. In particular, as discussed further in Chapter 14 of this book, the field of nuclear security has seen significant developments. Therefore, the present volume has been developed to amplify and expand material in the 2003 Handbook. For the most complete understanding of issues and approaches, the two volumes should be read in conjunction with one another.

SCOPE

Like the 2003 Handbook, this volume focuses on the key elements of a national legislative framework for regulation of the peaceful uses of nuclear and other radioactive material and related technology. It does not provide guidance on

legislation relating to the promotion or development of nuclear energy or ionizing radiation. Such arrangements, typically involving commercial and energy policy considerations, must reflect a State's particular economic system, institutional arrangements and programme for exploiting nuclear technology. With the exception of liability, both of these volumes concentrate on issues of safety, security and environmental protection that may result from the use of nuclear material and ionizing radiation. As discussed in greater detail below, the guiding approach of the present volume is the '3S' concept. This concept emphasizes the interrelations between the fields of safety, security and safeguards, including the need for legislation to reflect such interrelations in a comprehensive and synergetic manner.

OBJECTIVE

Although the 2003 Handbook provides a basic understanding of key elements of nuclear legislation, translating those principles into specific statutory language can be a complex and difficult task, particularly for legislative drafters who lack a detailed background in either nuclear technology or nuclear law. This task is complicated by differences among States in legislative drafting practices and in the levels of development in the uses of nuclear and radioactive material and related technology.

The present volume proceeds from two basic considerations. First, there cannot be a 'one size fits all' approach to drafting nuclear legislation. To be efficient and effective, nuclear legislation must fit into a State's overall legal and regulatory structure and reflect the level and direction of its nuclear programme. Second, notwithstanding the individual requirements of national legal systems, there would be substantial benefits in achieving the greatest degree of harmonization and consistency among the legislative frameworks of States in the nuclear field. This is particularly desirable in a field that may involve particular risks to public safety and security, including those of a transboundary character, and in which materials and technology are widely transferred between and among States.

In an attempt to achieve a reasonable balance between these considerations, the present volume seeks to provide access to a well organized body of resource materials for helping States in drafting nuclear legislation.

ORGANIZATION AND APPROACH

For reasons of both consistency and practicality, the present volume has been structured along the lines of the 2003 Handbook. With two exceptions, the

chapters in this volume therefore cover the same subject matter as those in the 2003 Handbook. One exception is Chapter 1. In the 2003 Handbook, that chapter discusses nuclear law and the legislative process, a discussion that need not be repeated or supplemented here. Rather, Chapter 1 of this volume covers the important initial provisions of nuclear legislation, including title, preamble, objectives, scope and definitions. The parallel chapters begin with Chapter 2, concerning the establishment and structuring of the regulatory body, proceeding to Chapter 3 on key regulatory functions, and then to Chapters 4–14, which discuss specific subject areas (e.g. radiation protection, sources of radiation, nuclear safety), as in the 2003 Handbook. The second exception is the expansion of Chapter 14 to cover major developments in the area of nuclear security.

Each chapter of this volume has been divided into the following two parts:

(1) *Narrative summary.* Each chapter begins with a brief narrative summary of key issues and approaches in the area of nuclear legislation being considered. For convenience, this summary references relevant information in the 2003 Handbook, with an updating of materials and instruments, as appropriate.
(2) *Model provisions.* Each chapter then sets forth possible model provisions covering the subject area under consideration. The language of these model provisions is not offered as a definitive text. Rather, it is an example of language developed by persons experienced in nuclear law and technology that reflects relevant international legal instruments and IAEA guidance documents in a clear, consistent and succinct manner. It is expected that this text, even if used as a basis for further drafting by a State, will be adjusted to reflect domestic legislative practice and the needs of the particular State.

Links to examples of national legislation for each of the subject areas complementing the model provisions can be found on the following web site: http://ola.iaea.org/

In making these links available, the IAEA neither endorses their content nor suggests that any specific text represents a sufficient or comprehensive model for implementing legislation in the particular field of nuclear law being considered. The links are provided for information and background only. For practical reasons, only a limited number of examples can be offered. The examples presented have been selected because they are of relatively recent adoption, are reasonably succinct and clear, and are available in either a formal or an informal English version. The omission of any State's law from these examples conveys no implication that it is somehow inadequate or less successful than any of the included examples — and vice versa.

THE THREE-S (3S) CONCEPT

A matter mentioned briefly above that may warrant further comment is the relevance of an emerging concept in nuclear law that has come to be referred to as the 3S concept. The term reflects the three technical areas which need to be addressed in establishing an adequate legislative and regulatory framework to ensure the peaceful uses and prevent the non-peaceful uses of nuclear energy and ionizing radiation; namely, safety, security and safeguards. As is increasingly recognized, measures taken to address one of these key areas can contribute to addressing the others as well. A good example is the adoption of measures for physical protection of nuclear material. Such measures obviously help to ensure the safe uses of this material, while also protecting against diversion for malicious purposes. A well developed regulatory safety infrastructure in a State can help ensure the security of radioactive material. Similarly, an effective safeguards system, including a well designed and implemented State system of accounting for and control of nuclear material (SSAC) can help enhance security measures, such as the prevention of illicit trafficking or the deterrence and detection of unauthorized acts involving nuclear or other radioactive material. Throughout this volume, the 3S concept is used to provide guidance for legislative drafting. Its major contribution will be to help legislative drafters to avoid gaps, overlaps and inconsistencies in the law as well as unduly complex or poorly organized laws that can create problems of interpretation or application.

BASIC STRUCTURE OF A NUCLEAR LAW OR LAWS

A threshold issue arising from any initiative to draft nuclear legislation is the basic structure and level of detail to be adopted. State practice in this regard can differ widely among countries with differing legal systems. As discussed in section 1.5.4 of the 2003 Handbook, a fundamental issue is whether a State decides to adopt its nuclear legislation as a single, unified or comprehensive law, or to adopt separate laws for different subjects. Historical factors and legislative practicalities are the usual bases for determining the overall structure of a State's nuclear law. For example, a State may find it convenient to add separate laws as its nuclear programme expands into new areas, rather than to revise an existing law. Also, if a State's legislative process is lengthy and complex, it may be more convenient to introduce minor amendments to an existing statute than to embark on a major legislative revision of the entire law. However, based on the 3S concept, a comprehensive approach has distinct advantages for any State that has decided to utilize nuclear or radioactive material and related technology. Therefore, this volume is organized along the lines of a unified or comprehensive

law. However, if an approach based on separate laws is preferred, individual chapters can be used to develop provisions dealing with only one or a few subjects. Whether the unified or the separate approach is adopted, it is important to review all relevant legal instruments and provisions to avoid inconsistency, confusion and problems of interpretation and application. One possible structure for a comprehensive nuclear law (based on the structure of this book) is the following:

Title of the law

I. Objectives of the law
II. Scope of the law
III. Definitions of key terms
IV. The regulatory body
V. Authorizations (licences, permits, etc.)
VI. Inspection
VII. Enforcement
VIII. Responsibilities of licensees, operators, users
IX. Specific chapters or sections for relevant subject areas, such as:
- —Radiation protection
- —Radioactive sources and radioactive material
- —Safety of nuclear facilities and decommissioning
- —Emergency preparedness and response
- —Mining and processing of radioactive material
- —Transport of radioactive material
- —Radioactive waste and spent fuel
- —Nuclear liability and coverage
- —Safeguards
- —Export and import control
- —Nuclear security and physical protection
- —Final clauses (entry into force, amendments, repeals, etc.)

RELATION OF LAWS AND REGULATIONS

The 2003 Handbook discusses the legal hierarchy that exists in most States. This hierarchy consists of three basic levels, with *constitutional* instruments at the top, followed by enactments by a parliament or legislature at the *statutory* level, and *regulations* promulgated by expert governmental bodies as a subsidiary set of detailed and often highly technical rules. A fundamental issue in drafting nuclear legislation is the question of what needs to be included in a national law,

as opposed to what can be handled in regulations or so-called subsidiary legislation. Answering this question can be complex, involving many considerations such as national practice in legislative drafting, the level of nuclear development and institutional arrangements. In some States it is usual to frame legislation in broadly general terms, leaving detailed technical and administrative matters to be handled in regulations. Other States prefer to include greater detail in the legislation itself. Some States utilize governmental or ministerial decrees as part of their legal framework. Depending on the level of detail in such decrees, they could be considered to have the character of either laws or regulations. This volume has tried to strike a reasonable balance between the various approaches. Because of the very technical nature of nuclear regulation, it has seemed reasonable to frame legislation in more general terms and to leave more technical requirements to subsidiary legislation. Legislation needs to indicate general policy objectives and assign basic institutional roles and responsibilities to relevant actors, including the regulatory body, other governmental bodies, and the users of nuclear and radioactive material and related technology. With such functions assigned, it is the role of the regulatory body to prepare detailed technical and administrative rules in the areas of its responsibility. Such an approach allows for a more efficient and timely adjustment to changes in circumstances, including technological developments or new directions in a national programme for the use of nuclear energy and ionizing radiation.

ARTICLES, SECTIONS, CHAPTERS AND NUMBERING

State practice varies widely as to how legislative instruments are divided and numbered. Some States designate individual provisions as ‘articles’; some call them ‘sections’. Some States divide enactments into subject matter ‘chapters’, ‘titles’ or ‘divisions’; some do not. Although State practice will largely determine the approach to such issues, consideration should be given to the following means of enhancing the clarity and usefulness of a text:

— A broad comprehensive law should be divided by subject matter category to enable stakeholders to efficiently reference those parts of the law applicable to a specific topic or issue.
— Each section or article should be sequentially numbered, with subsections or subarticles also numbered. This practice avoids the difficulty of requiring stakeholders to review lengthy statutory language to find an applicable provision.

— It is useful for each section or article to be given a short title to indicate the subject matter being covered. A title has no legal effect beyond providing guidance on its content.

INTERNATIONAL INSTRUMENTS AND NATIONAL LEGISLATION

One objective of this volume is to enable States to adopt national legislation that implements their obligations under relevant international instruments (conventions, treaties, agreements, United Nations Security Council resolutions) to which they have become a Party or are otherwise bound under international law. This objective also serves the overall aim of harmonizing laws in the field covered by an international instrument. Generally speaking, there are two main approaches to bringing national law into conformity with an international instrument: the 'transformation' approach and the 'incorporation' approach.

The transformation approach consists of adopting, through national legislation or otherwise (e.g. in regulations), specific rules to implement the provisions of an international instrument. The rules in the instrument are, in effect, transformed into national (or domestic) rules which will be applied directly by national officials and courts and will become mandatory for all relevant organizations and individuals. Under this approach, the provisions of the international instrument cannot be directly applied within the State but may be used as a guide to interpretation. This approach is based on the presumption in most countries that when adopting national legislation, legislators intend that the State's international obligations be faithfully implemented by all relevant national bodies and legal and natural persons, including foreign companies operating in the country.

There are two variants of the incorporation approach. In some States, international instruments are automatically made a part of the national legislative framework by virtue of a constitutional or legislative provision. In other States, ad hoc legislation is required for each international instrument. However, this approach usually does not reproduce the international text, but places the provisions of the instrument within the national legal framework. Both variants allow the provisions of international instruments to be directly applied by public officials and the courts.

The transformation and incorporation approaches are sometimes combined. In some States the direct application of an international instrument within the national legal framework can only occur to the extent that the instrument's provisions are deemed 'self-executing' (i.e. they can be enforced in the courts without implementing national legislation). The application of the 'self-executing' concept varies considerably from State to State. Sometimes even a

State applying the incorporation approach will have to adopt specific legislation or regulations to implement an instrument or provision that is not considered self-executing.

Also, certain international instruments contain provisions that identify a need for a State to enact national legislation. Examples of such instruments include the Vienna Convention on Civil Liability for Nuclear Damage [3], the Convention on the Physical Protection of Nuclear Material (CPPNM) [4] and the International Convention for the Suppression of Acts of Nuclear Terrorism [5].

Legislative drafters will need to be conscious of the approach used in their States when considering how to best use the model texts set forth in this volume.

Chapter 1

INITIAL PROVISIONS: TITLE, PREAMBLE, OBJECTIVES, SCOPE, DEFINITIONS

1.1. BACKGROUND

Before setting forth legal obligations pertaining to the subject matter of an enactment, national legislation typically includes a number of initial provisions which establish the context for the rest of the law. These may include a preamble or statement of considerations, and articles or sections dealing with objectives, scope and definitions. The structure and content of such provisions are very much determined by national legislative practice and are far from uniform among States utilizing nuclear energy.

1.2. TITLE OF THE LAW

The name or title to be given to a legal instrument will obviously be determined by the legislative practice of the particular State. What is important is that the title succinctly and accurately reflects the subject matter of the law; namely, what the law contains. It can also signal the purpose of the enactment (e.g. to establish a comprehensive regulatory framework for nuclear energy, to regulate the management of nuclear waste, to control nuclear exports and imports). Following the 3S concept, a comprehensive law should not be given an unduly narrow title (e.g. 'Radiation Protection Act'), but should reflect the broader scope of the law (e.g. 'Law on the Safe, Secure and Peaceful Uses of Nuclear Energy', or simply 'Atomic Energy Act'). Of course, for separate laws, more specific titles would be appropriate.

A question of terminology sometimes arises; namely, whether it is better or more contemporary practice to use the term 'nuclear' rather than 'atomic' in the title of a legislative enactment. This question has both technical and historical dimensions. From a scientific perspective, ionizing radiation involves reactions occurring in the 'nucleus' of atomic particles. Therefore, the term 'nuclear' would seem to be more accurate and up to date. However, on historical or public perception grounds, many instruments, including the Statute of the International Atomic Energy Agency [6], find the term 'atomic' more appropriate. The simple answer is that this terminology is a matter of national preference.

1.3. PREAMBLE, STATEMENT OF CONSIDERATIONS, PRINCIPLES

In many national legal systems, a legislative enactment begins with a recitation of the underlying considerations that have motivated its adoption. Sometimes such statements are designated as a 'preamble', sometimes as a statement of or article on 'objectives', and sometimes as a 'statement of considerations'. Some States identify a set of guiding 'principles'. Sometimes such statements have no designation. Although these provisions may take different forms, they are based on a common rationale and have a similar legal effect. Although they are not usually considered legal obligations, they are intended to provide a general statement of relevant circumstances or policies that should be considered in interpreting and applying the law. Thus, they may be referred to in situations where operative provisions are unclear, ambiguous or contradictory. They may also provide guidance in situations unforeseen by the legislative drafters or in circumstances where a literal interpretation would lead to an absurd or injurious result.

Like the title, the preamble should reflect the basic content of the law. If the law is framed as a comprehensive unified law covering a broad range of subjects, the preamble will need to be correspondingly encompassing. If the law is a separate enactment covering only one subject, the preamble will focus more narrowly on considerations arising from that subject. The model and examples set forth below would be appropriate for a comprehensive nuclear law.

State practice varies as to whether individual portions of a preamble are numbered. Since these provisions are not considered substantive obligations, they are typically not stated as articles or sections.

Also, in some legal systems it is legislative practice to include a 'statement of considerations' (or 'exposé des motifs') in the text of a law. In some systems, this is published in the official gazette or announcement. Where such statements are used, the law should contain references to all other laws which are related to the nuclear law (e.g. environmental law, penal code, administrative law). Depending on national practice, such statements of consideration may or may not be considered a part of the law itself. However, such statements can be an important means of interpreting and applying the law.

1.3.1. Model preamble

(1) Recognizing that the uses of ionizing radiation can provide important benefits in many fields, including health and medicine, energy production, scientific research, agriculture, industry, and education;

(2) Recognizing the need to protect individuals, society and the environment from the potentially harmful effects of ionizing radiation, including those that could result from improper use, accidents or malicious acts;
(3) Recognizing the need to manage radioactive waste in a manner that protects current and future generations from undue impacts;
(4) Recognizing the need to establish and maintain a legal and regulatory framework to implement relevant international instruments and commitments entered into by [name of State], in particular [name of relevant non-proliferation instrument] and [name of safeguards agreement and additional protocols thereto] with the International Atomic Energy Agency;
(5) Recognizing the need to establish and maintain a legal and regulatory framework for implementing effective measures to prevent, detect and respond to unauthorized acts involving nuclear material, other radioactive substances or associated facilities that may cause injury to persons, property or the environment or otherwise jeopardize national security.

1.4. OBJECTIVES OR PURPOSES OF THE LAW

Like a preamble, an objectives section at the beginning of a legislative enactment is meant to state the basic reasons for adopting the law, framing these considerations as goals or objectives to be achieved. And like a preamble, these provisions typically do not have a specific binding effect, but may be used as an aid to interpretation. In the nuclear field, typical objectives involve protecting individuals, society and the environment from the harmful effects of ionizing radiation, as well as ensuring nuclear security. It is also important to include objectives related to ensuring the peaceful uses of nuclear energy and ionizing radiation, including the implementation of a State's commitments under relevant international instruments, such as the Treaty on the Non-Proliferation of Nuclear Weapons [7] or other equivalent commitments. Like a preamble, an objectives article or section should reflect the subject matter of the particular law, whether comprehensive or devoted to a separate topic.

1.4.1. Model provision on objectives

Article ##. Objectives

The objectives of this Law are:

(a) To allow for the beneficial and peaceful uses of nuclear energy and its applications;
(b) To provide for the adequate protection of people and the environment, now and in the future, against the harmful effects of ionizing radiation and for the safety and security of radiation sources [nuclear facilities] [reference to other relevant activities];
(c) To establish the [name of regulatory body] with the functions and responsibilities set forth in this [Act] [Law] for the purpose of exercising regulatory control over the peaceful uses of ionizing radiation;
(d) To enable [name of State] to meet its obligations under relevant international instruments entered into by [name of State], in particular, [the Treaty on the Non-Proliferation of Nuclear Weapons]; [include references to any other relevant non-proliferation instruments]; the Agreement between [name of State] and the International Atomic Energy Agency (IAEA) for the application of safeguards in connection with the NPT (the safeguards agreement), and any protocols thereto.

1.5. SCOPE

One of the most important provisions in any law is the one that establishes the subject matter intended to be covered, typically called the 'scope' provision. A clear and concise scope provision is especially important in the nuclear field to ensure that all material, technology or activities are included (or, where relevant, excluded). For a unified or comprehensive law it is probably better practice to draft the scope article in general terms instead of attempting to include a very detailed list of all subjects to be covered. Such an approach can avoid problems of interpretation concerning whether a subject inadvertently omitted from the list is subject to the law. Also, a scope article must clearly identify excluded topics (e.g. many laws exclude coverage of activities or practices involving radiation exposures that are not amenable to regulatory control).

For separate laws, a scope provision needs to be as precise as possible to avoid confusion about its interpretation or application with regard to other laws. Also, close attention must be paid to definitions used in separate laws,

particularly in relation to other laws that may have an impact on the interpretation or application of such laws.

It is legislative practice in some States to include a separate 'prohibition' article that indicates not only what activities are not covered, but also what activities are specifically prohibited. Examples of such prohibited activities can include: development or acquisition of nuclear weapons or other nuclear explosive devices; import of nuclear waste not originating in the State; and import or fabrication of toys, cosmetics, jewellery or other household items containing radioactive material. Other States record such prohibitions in the scope article.

It should be noted that the scope provision is typically quite closely related to the definitions adopted in the legislation, a subject discussed later in this chapter. What is important is that legislative drafters are aware of the need to ensure that the language in the scope article accurately reflects the terminology used elsewhere in the legislation, particularly in the chapter or article on definitions.

1.5.1. Model provisions on scope for a comprehensive nuclear law

Article ##. Scope

(1) This Law shall apply to all activities and practices involving the peaceful uses of nuclear energy and ionizing radiation conducted in the territory or under the jurisdiction or control of [name of State].
(2) This Law shall not apply to activities or practices involving exposures that have been excluded from regulatory control through regulations established by the [name of regulatory body].
(3) This Law shall not apply to the regulation of sources of non-ionizing radiation.

Article ##. Prohibited Activities

The uses of nuclear energy and ionizing radiation in [name of State] shall be for peaceful purposes only. Any activities or practices related to the acquisition or development of nuclear explosives, radiological dispersal devices, or other non-peaceful uses of nuclear or other radioactive materials and related technology or assisting others in such activities are strictly prohibited.

1.5.2. Model provisions on objectives and scope for separate laws

1.5.2.1. Law on radioactive waste and spent fuel

Article ##. Objective

The objective of this Law is to provide for the regulatory control of radioactive waste within [name of State] to protect current and future generations and the environment from damage resulting from exposure to ionizing radiation associated with such waste.

Article ##. Scope

This Law shall apply to:

(a) All activities and practices involving radioactive waste, including disused sealed sources;
(b) The management of spent fuel resulting from the operation of civilian nuclear reactors, except where the spent fuel is held at reprocessing facilities as part of a reprocessing activity;
(c) Effluent discharges;
(d) Material and waste that contain naturally occurring radioactive material, whatever their origin.

1.5.2.2. Law on export and import control

Article ##. Objectives

The objectives of this Law are to:

(a) Establish a regulatory framework for the control of transfers of nuclear and other radioactive material and associated technology for peaceful purposes into and out of the territorial jurisdiction of [name of State];
(b) Establish standards and means for the implementation of regulatory controls over transfers covered in (a) above in a manner that protects individuals, society and the environment, ensures national security and prevents the proliferation of nuclear explosives or radiological dispersal devices.

Article ##. Scope

This Law shall apply to the export, import, transit or transfer of nuclear or other radioactive material and related equipment, information and technology from, to or through the territory of [name of State].

1.5.2.3. Law on safeguards

Article ##. Objective

The objective of this Law is to provide for the efficient and effective implementation of the Agreement between [name of State] and the International Atomic Energy Agency for the application of safeguards in [name of State].

Article ##. Scope

This Law implements the obligation of [name of State] under the Agreement between [name of State] and the International Atomic Energy Agency [pursuant to the Treaty on the Non-Proliferation of Nuclear Weapons].

1.5.2.4. Law on nuclear security

Article ##. Objective

The objective of this Law is to establish and maintain a legal and regulatory framework for implementing effective measures to prevent, detect and respond to unauthorized acts involving nuclear material, other radioactive substances or their associated facilities that may cause injury to persons, property or the environment in [name of State] or otherwise jeopardize national security.

Article ##. Scope

This Law sets out measures required to prevent, detect and respond to the theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.

1.5.2.5. Law on civil liability for nuclear damage

Article ##. Objective

The objective of this Law is to establish a system for adequate and predictable compensation for loss of life, injury to persons or damage to property or the environment resulting from nuclear incidents within [name of State].

Article ##. Scope

This Law shall apply to liability for nuclear damage to persons, property or the environment resulting from nuclear accidents within [name of State].

1.6. DEFINITIONS

As stated in the 2003 Handbook, defining the terms to be used in a legislative enactment is an important task that is often best left until the final stages of drafting. At that stage it may be easier to identify terms used throughout the law that may be confusing or ambiguous, that require a special technical meaning, or that are relevant for determining the scope of the law. For purposes of accuracy and harmonization in the nuclear field, it is also desirable that legislative drafters consider adopting definitions contained in IAEA publications that reflect a consensus of worldwide expert opinion. In this regard, the various IAEA glossaries on safety, safeguards and radioactive waste management [8–10] are important resources because they represent the most up to date consensus of technical expertise in the nuclear field on appropriate terminology. Another valuable general resource for definitions is the recently issued Fundamental Safety Principles [11], which is intended to cover the "totality of safety measures taken to ensure the protection of human life and health and the environment against exposure to radiation". It uses terminology that would ordinarily not be appropriate for merely copying into a legislative text. However, these fundamental safety principles would be valuable in framing national policies on nuclear safety and in interpreting and applying specific legal requirements.

For a number of reasons, legislative drafters (particularly those with a limited background in the nuclear field) often experience difficulties with definitions to be included in a nuclear law. First, and most obviously, some definitions in nuclear law deal with highly technical subjects for which plain language seems difficult to find. This is practically unavoidable in legislation covering technical subjects. Second, it may be difficult to find terms in a national

language that correspond to those used in a guidance document written in one of the IAEA's official languages.

Third, over several decades the terms used both in international legal instruments and in IAEA guidance documents have evolved, sometimes giving different meanings to the same or similar subjects. These changes or revisions in definitions, meant to increase clarity, have sometimes produced the opposite effect — especially for legislative drafters seeking definitions that will be used to implement a number of different international instruments adopted by the State. It is important that the terminology in national legislation be as consistent as possible with the terminology used in international instruments to which the State has or is expected to become a Party. However, drafters should be cautious about incorporating, verbatim, specific definitions set forth in any single international instrument into national law. Definitions in an international instrument are adopted for the specific purpose of implementing that particular instrument under international law. Other international instruments may define similar or related subjects or activities using different terminology. An example of such differing definitions is the use of the term 'nuclear installation' in the Convention on Nuclear Safety [12] and the Vienna Convention on Civil Liability for Nuclear Damage [3]. In other instruments, such as the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management [13], the term 'nuclear facility' is used. A national nuclear law will need to adopt definitions that will be clear to those domestic stakeholders (operators, regulators) who must interpret and apply the law. Merely copying the language of a definition in an international instrument may not be adequate for this purpose. In some specific areas, such as safeguards and nuclear liability, national law may need to include identical definitions taken from the relevant international instrument. This is because an outside body (i.e. the IAEA in the case of safeguards or another State in the case of nuclear liability) will be directly engaged in the application of the law under the international instrument.

Fourth, various instruments sometimes use definitions that categorize the subjects in somewhat general or artificial terms. For example, recent IAEA guidance documents speak of 'activities' and 'practices', terms that have acquired a special meaning in the field of nuclear law. However, these terms do not immediately tell an interested legislator or member of the public what they are intended to cover. The most basic objective of nuclear legislation is to establish regulatory control over subjects that can pose a risk to safety, security or the environment. These subjects are of four types: (1) the actions of persons or organizations utilizing ionizing radiation; (2) the persons themselves; (3) facilities in which ionizing radiation is used; and (4) nuclear or radiological material. As a general matter, in the model text set forth in this volume the terms 'activities' and 'practices' are used throughout to define the basic scope of

coverage. However, in certain provisions, in the light of past practice and for clarity regarding the application of specific instruments (e.g. in safeguards), other terms have been used (such as 'facility', 'authorized person' or 'nuclear material'). Although consistency in definitions is highly desirable, practical application in some circumstances may warrant the inclusion of separate or special definitions to cover different subjects. What is important is that the connection between whatever definition is used and the operative effect of the legislative provision is clear.

The 'model' definitions section set forth in this volume covers the most common terms used in nuclear legislation, but is by no means intended to be comprehensive. For example, some of the terms used in international conventions on civil liability for nuclear damage (e.g. 'nuclear damage') are very specific to the regime established by the convention. Inclusion of such definitions will depend on whether a State is a Party to a specific international instrument. It may also be necessary to specify in the law that a definition only applies to a specific subject (e.g. the application of IAEA safeguards). For these reasons, legislative drafters should have available relevant guidance documents issued by the IAEA and other international bodies (see also the documents listed in the bibliographies and the list of references in the 2003 Handbook and in the current volume).

Article ##. Definitions

For the purposes of this Law:

'*Activities'* means the production, use, import and export of radiation sources for industrial, research and medical purposes; the transport of radioactive material; the siting, construction, commissioning, operation and decommissioning of facilities; radioactive waste management activities and site rehabilitation.

'Activity', for purposes of the application of International Atomic Energy Agency safeguards, means any activity as defined in the relevant Safeguards Agreement between [name of State] and the International Atomic Energy Agency.

'Authorization' means the granting by a regulatory body or other governmental body of a written permission for an operator to perform a specified activity and may include — for example — a licence or registration.

'Clearance' means the removal of radioactive material or radioactive objects within authorized practices from any further control by the regulatory body.

'Decommissioning' means all steps leading to the release of a facility, other than a disposal facility, from regulatory control other than confirming the decommissioned status of a facility. These steps include the processes of decontamination and dismantling.

'Discharges' means planned and controlled releases into the environment, as a legitimate practice, within limits authorized by the regulatory body, of liquid or gaseous radioactive material that originates from regulated nuclear facilities during normal operation.

'Disposal' means the emplacement of spent fuel or radioactive waste in an appropriate facility without the intention of retrieval.

'Exclusion' means the deliberate exclusion of a particular category of exposure from the scope of the present [Law] [Act] on the grounds that it is not considered amenable to regulatory control.

'Exemption' means the determination by the [name of regulatory body] that a source or practice need not be subject to some or all aspects of regulatory control on the basis that the exposure (including potential exposure) due to the source or practice is too small to warrant the application of those aspects or that this is the optimum option for protection irrespective of the actual level of the doses or risks.

'Export' means the physical transfer, originating from an exporting State, into an importing State, of nuclear or other radioactive material, including sources.

'Facilities' means nuclear facilities, irradiation installations, some mining and raw material processing facilities such as uranium mines; radioactive waste management facilities; and any other places where radioactive material is produced, processed, used, handled, stored or disposed of, on such a scale that consideration of protection and safety is required.

'Import' means the physical transfer, into an importing State or to a recipient in an importing State, originating from an exporting State, of nuclear or other radioactive material, including sources.

'Intervention' means any action intended to reduce or avert exposure or the likelihood of exposure to sources which are not part of a controlled practice or which are out of control as a consequence of an accident.

'Ionizing radiation', for the purposes of radiation protection, means radiation capable of producing ion pairs in biological materials.

'Licence' means a legal document issued by the regulatory body granting authorization to perform specified activities related to a facility or activity.

'Licensee' means the holder of a current licence granted for an activity or practice who has recognized rights and duties for the activity or practice, particularly in relation to safety and security.

'Notification' means a document submitted to the regulatory body by a legal person to notify an intention to carry out a practice or other use of a source.

'*Nuclear facility'* means any facility where activities or practices utilizing nuclear material are conducted, including a nuclear power plant, research reactor, fuel fabrication plant, spent fuel storage facility, enrichment plant, reprocessing facility or any other facility determined by the [name of regulatory body].

'Nuclear facility', for purposes of the application of International Atomic Energy Agency safeguards, means a facility as defined in the relevant Safeguards Agreement between [name of State] and the International Atomic Energy Agency.

'Nuclear material' means plutonium, uranium-233, or uranium enriched in the isotopes uranium-233 or uranium-235, or any other material the [name of regulatory body] determines should be classified as nuclear material.

'Nuclear material', for purposes of the application of International Atomic Energy Agency safeguards, means any special fissionable material or source material as defined in the relevant Safeguards Agreement between [name of State] and the International Atomic Energy Agency; it shall not be interpreted as applying to ore or ore residue.

'*Nuclear or radiological emergency'* means an emergency in which there is, or is perceived to be, a hazard due to: (a) the energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or (b) radiation exposure.

'Operator' means any organization or person applying for an authorization, or that is authorized or responsible for nuclear, radiation, radioactive waste or transport safety when undertaking activities or in relation to any nuclear facility

or source. This includes private individuals, governmental bodies, consignors or carriers, licensees, hospitals or self-employed persons.

'Orphan source' means a radioactive source which is not under regulatory control, either because it has never been under regulatory control or because it has been abandoned, lost, misplaced, stolen or transferred without proper authorization.

'Practice' means any human activity that introduces additional sources of exposure or exposure pathways or extends exposure to additional people or modifies the network of exposure pathways from existing sources in a way that increases the exposure or the likelihood of exposure of people or the number of people exposed.

'Radiation source' means a radiation generator, or a radioactive source or other radioactive material outside the nuclear fuel cycles of research and power reactors.

'Radioactive material' means material designated in the law of [name of State] or by the [name of regulatory body] as being subject to regulatory control.

'Radioactive source' means radioactive material that is permanently sealed in a capsule or closely bonded in a solid form and that is not exempt from regulatory control; it also includes any radioactive material released if the radioactive source is leaking or broken, but does not mean material encapsulated for disposal, or nuclear material within the nuclear fuel cycles of research and power reactors.

'*Radioactive waste'* means material, in whatever physical form, remaining from practices or interventions and for which no further use is foreseen (i) that contains or is contaminated with radioactive substances and has an activity or activity concentration higher than the level set for clearance from regulatory requirements, and (ii) exposure to which is not excluded under applicable regulations.

'Registration' means a form of authorization for practices of low or moderate risk whereby the legal person responsible for the practice has, as appropriate, prepared and submitted a safety assessment of the facility or equipment to the regulatory body.

'Regulatory body' means any body or bodies designated by the laws of [name of State] as having the legal authority to conduct the regulatory process under this Law, including issuing authorizations.

'Research and development activities related to the nuclear fuel cycle' means those activities which are specifically related to any process or system development aspect as defined in the safeguards agreement or any protocols thereto.

'Safety' means the protection of people and the environment against radiation risks, and the safety of facilities and activities that give rise to radiation risks.

'Security' means the prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear or other radioactive material, or their associated facilities.

'Source' means anything that may cause radiation exposure — such as by emitting ionizing radiation or by releasing radioactive substances or material — and can be treated as a single entity for protection and safety purposes.

'Spent fuel' means nuclear fuel that has been irradiated in and permanently removed from a reactor core.

'Transport' means all operations and conditions associated with and involved in the movement of nuclear or other radioactive material. This includes the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of such material and packages.

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Chapter 2

THE REGULATORY BODY

2.1. BACKGROUND: ESTABLISHMENT OF THE REGULATORY BODY

As discussed in chapter 2 of the 2003 Handbook [1], an essential element of the national legal framework for ensuring the safe and secure utilization of nuclear energy and radiation sources is the establishment and maintenance of a governmental body to exercise regulatory control over the users of ionizing radiation and other persons or entities involved in related activities. This regulatory body must possess clear legal authority, a high level of technical competence and adequate financial and human resources to conduct its responsibilities. No particular model for such an authority will be appropriate for all States. As discussed in Section 2.3, there are a number of key functions that all regulatory bodies need to be able to conduct effectively and efficiently. However, effective regulatory bodies can differ considerably in terms of management structure, decision making, organizational relationships, staffing and financial arrangements. What is important is that whatever model is adopted establishes a rigorous, evidence based oversight process covering all activities in a State that may pose significant risks of radiological harm.

Given the wide differences in institutional arrangements from State to State, this volume does not offer a model structure for a regulatory body. However, as mentioned in the Introduction, links to examples of national legislation are available on the IAEA web site (http://ola.iaea.org/) that show how such bodies have been structured in several States. Also, a very useful publication in this regard is Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety [14] (currently being revised).

As discussed in the Introduction to this volume, the 3S concept applies to the structuring of the regulatory body. Having a single organization exercise regulatory control over nuclear safety, security and safeguards can have advantages with respect to both the effectiveness and the efficiency of the system.

A fundamental requisite for an effective regulatory body is that it possesses an adequate measure of independence or functional separation from entities having interests or responsibilities that could unduly influence regulatory decision making. Such entities include not only the regulated industry and medical users of radioactive material and technology, but also other governmental bodies charged with the development or promotion of the technology, as well as political bodies and non-governmental bodies. It is important to recognize that regulatory independence cannot be absolute. Rather,

what is required has been called ‘effective independence’. Effective regulatory independence does not require that a regulatory body be completely isolated from other governmental bodies. Responsible regulatory decision making requires the appropriate involvement of legitimate, recognized interests, both governmental and non-governmental. However, the regulatory body must be able to exercise its key regulatory functions (standard setting, authorization, inspection and enforcement) without improper pressure or constraint. Recognized means of achieving such effective regulatory independence include:

— Institutional separation of regulatory and non-regulatory functions;
— Fixed terms for regulatory officials;
— Constraints on removal of regulatory officials on political grounds;
— Separate budgetary and employment authority for the regulatory body;
— Reporting to an official or organization without conflicting responsibilities;
— Unrestricted access to press, media and the public.

Institutional separation of the regulatory body from bodies responsible for the promotion or development of nuclear energy and nuclear applications is often seen as particularly important for achieving effective independence. Direct reporting by the regulatory body to an official with the broadest political responsibilities (e.g. the prime minister or president) is often seen as advantageous. However, this arrangement may not be possible in many States for constitutional reasons. Where complete institutional separation is not possible, legislation needs to incorporate other measures of independence, such as ensuring that key regulatory functions are not subject to interference or undue influence by non-regulatory entities. A well developed discussion of the various aspects of regulatory independence is set forth in Ref. [15].

Regulatory bodies, in common with other governmental bodies in a State, are typically required to comply with requirements and procedures contained in generally applicable laws. Examples include: legislation for administrative procedures, civil service or public employment, occupational safety, environmental protection and protection of confidential information. Nuclear legislation need not specify all other laws that may govern certain aspects of the regulatory body’s work. However, if there is doubt about whether or how another law may apply, a specific reference may be needed. This is particularly the case if the regulatory body is not to be subject to a generally applicable law.

Legislation establishing the regulatory body can also usefully define that body’s relationship to other governmental bodies having roles and responsibilities that may be relevant to the regulator’s responsibilities. For example, most States have established national emergency planning and response agencies to deal with catastrophic events of all kinds. Obviously, the nuclear

regulatory body's role in preparing for and responding to a radiological emergency should be carried out in a coordinated manner, consistent with the roles of other agencies. Legislation needs to make clear the division of institutional responsibilities, not only to avoid confusion and disputes, but also to use limited human and financial resources in the most efficient manner. In developing national legislation, it may be useful to look at how regulatory bodies in various States fit into the overall structure of government. Typically, the web sites of regulatory bodies include charts that indicate these organizational relationships. However, it should be kept in mind that organizational relationships alone will not provide sufficient information to assess whether a regulatory body is 'effectively independent'. These charts also typically show how the regulatory body itself is structured. Since governmental relationships in all States are subject to change, it was not thought useful to include any organizational charts in this volume; interested persons should consult the web sites of governments and regulatory bodies for the most up to date information.

In some States it is a practice to establish interagency bodies (variously termed 'councils' or 'commissions') to address certain areas of national policy, such as a national security council, national energy policy council, emergency management council or foreign policy council. Such bodies, having an advisory role for the government, should not be confused with advisory bodies that may need to be set up by the regulatory body to provide technical or other expert advice (see Section 2.4). The relationship of such councils or interagency bodies to the work of the regulatory body (including participation by the regulatory body in such councils) should be clearly defined in legislation. In particular, legislation should ensure that the regulatory body is not put in a position to improperly influence or be influenced by decision making outside its proper sphere of responsibility.

2.1.1. Model provisions on the establishment of a regulatory body

Article ##. Establishment of the Regulatory Body

(1) The [name of regulatory body] is hereby established as an effectively independent authority for the control of activities and practices identified in this Law. The [name of regulatory body] shall exercise the functions set forth in this Law under the supervision of [title or name of responsible governmental official or body — e.g. President, Prime Minister, Cabinet of Ministers, Minister or Ministry of [identify a minister or ministry not responsible for promotional activities] or other].

(2) The [title of regulatory official — e.g. Chairman, Director, Commissioner(s), other members of the regulatory body's highest body — e.g. Authority, Board, Commission(s), other] of the [name of regulatory body] shall be appointed by the [title of responsible governmental official — e.g. President, Prime Minister], subject to approval of [name of relevant body — e.g. the National Assembly, Parliament, Senate, other].

(3) The [title of regulatory official or officials — e.g. Chairman, Director, Commissioner(s)] shall be appointed for a term of [number] years [and may be reappointed for [a second] [additional] term(s)].

(4) The [title of regulatory official — e.g. Chairman, Director, Commissioner(s)] may be removed by the [title of responsible governmental official — e.g. President, Prime Minister] only in the case of malfeasance, abuse of office or a criminal act as determined under the laws of [name of State].

2.2. HUMAN AND FINANCIAL RESOURCES

As previously stated, adequate human and financial resources are essential for enabling a regulatory body to fulfil its responsibilities. Also, a regulatory body's control over its resources, through separate budgetary and staffing authority, has an important bearing on its independence. Arrangements for funding a regulatory body can differ from State to State. Most States fund the regulatory body through an allocation from the national budget. Some regulatory bodies fund part or all of their activities through fees collected from licensees, grants from other governmental bodies or portions of civil monetary penalties assessed for regulatory violations. Typically such outside funds are deposited in a national government account, with an allocation made in the regular annual government budget process. In some States the regulatory body is authorized to accept donations to support its activities. In such cases it is important that the law or implementing regulations contain strict rules for accepting such contributions to prevent any conflict of interest. It is obviously difficult to draft a statutory provision that ensures adequate financial resources, since a regulatory body's budget is always subject to review through the national budget and legislative process. However, an article setting out a requirement for adequate funding can provide desirable leverage for a regulatory body during budget deliberations.

2.2.1. Model provisions on human and financial resources

Article ##. Human and Financial Resources

(1) The [name of regulatory body] shall be provided with adequate financial and human resources, through the national budget, to fulfil its responsibilities under this Law and applicable regulations.
(2) The [name of regulatory body] shall be responsible for developing its own budget and for presenting it to the [name of responsible governmental body — e.g. Government, Cabinet of Ministers] for approval.
(3) Persons employed by the [name of regulatory body] shall be under the management control of [name of the relevant governmental body], pursuant to regulations promulgated by it and any generally applicable national [civil service] [administrative] laws and regulations.

2.3. REGULATORY FUNCTIONS

The statutory provision setting forth regulatory functions should be kept as simple, clear and succinct as possible and should be consistent with national practice. In some States it is accepted legislative practice to provide a lengthy and detailed listing of functions to be exercised by the designated regulatory body. In other legal systems such a lengthy and detailed listing may be interpreted as excluding any functions not specifically listed. Drafters need to be careful not to inadvertently cast doubt on the regulatory body's ability to exercise an important function, either through inadvertent omission or through language that inaccurately defines the scope of functions. A more general authorization to conduct certain functions has the advantage that it can be supplemented with more detailed regulations containing administrative and technical requirements. Also, regulatory arrangements can evolve in response to developments such as a change in a State's nuclear programme or scientific or technological innovations. A number of fundamental regulatory functions (e.g. standard setting, authorization, inspection, enforcement) are sufficiently important that more detailed statutory provisions may be needed to establish how they are to be conducted (see Chapter 3).

2.3.1. Model provisions on regulatory functions

Article ##. Regulatory Functions and Responsibilities

The [name of regulatory body] shall exercise the following functions:

(a) To assist the Government of [name of State] in the development of national policies and measures for the regulatory control of activities and practices governed by this Law;
(b) To issue rules, regulations and guidance necessary for the implementation of this Law;
(c) To establish standards for the protection of individuals, society and the environment from potential adverse effects of ionizing radiation;
(d) To issue, amend, suspend or revoke authorizations (licences) and set conditions for practices and activities involving ionizing radiation;
(e) To define exemptions from regulatory control;
(f) To inspect, monitor and assess activities and practices for the purpose of verifying compliance with this Law, applicable regulations and the terms and conditions of authorizations (licences);
(g) To take enforcement measures in the event of non-compliance with (violation of) this Law, applicable regulations or the terms and conditions of authorizations (licences);
(h) To define the obligations, including financial ones, of persons or entities authorized to conduct activities or practices;
(i) To ensure that corrective actions are taken if unsafe or potentially unsafe conditions are detected at any location where authorized activities are conducted;
(j) To confirm the competence of personnel responsible for the safe operation of a [facility or activity or practice];
(k) To establish a schedule of fees or charges for authorizations in accordance with the State's financial rules and procedures;
(l) To obtain the advice or views of experts necessary for the performance of its functions, through, inter alia, the hiring of consultants, the contracting of specific projects, or the establishment of permanent or ad hoc advisory bodies;
(m) To define the exposures of persons to ionizing radiation that are excluded from the scope of application of this Law because they are not amenable to regulatory control;
(n) To establish and maintain a national register of radiation sources;
(o) To establish and maintain a national register of persons authorized to carry out activities or practices under this Law;

(p) To cooperate with the International Atomic Energy Agency in the application of safeguards in accordance with the Safeguards Agreement, and any protocols thereto, between [name of State] and the International Atomic Energy Agency, including conducting inspections and visits, carrying out complementary access and providing any assistance or information required by designated IAEA inspectors in the fulfilment of their responsibilities;

(q) To establish and maintain a State system of accounting for and control of nuclear material and a national system for the registration of licences for nuclear material, and to establish the necessary reporting and record keeping and requirements pursuant to the Safeguards Agreement, and any protocols thereto, between [name of State] and the International Atomic Energy Agency;

(r) To establish and implement, in cooperation with [names of other governmental bodies], a system of control for the export and import of nuclear and other radioactive material, sources, equipment, information and technology determined to be necessary to implement relevant international commitments of [name of State];

(s) To establish regulatory measures for the security of nuclear and other radioactive material, and their associated facilities, including measures for the detection, prevention and response to unauthorized or malicious acts involving such material, or facilities;

(t) To participate in the definition of the design basis threat for the implementation of security provisions;

(u) To cooperate with other relevant agencies of [name of State] in establishing and maintaining a plan for preparedness for and response to emergencies involving nuclear or other radioactive material [in accordance with the national emergency response plan];

(v) To communicate directly with other governmental bodies in all circumstances it considers necessary for the effective exercise of its functions;

(w) To carry out or arrange for the conduct of research on radiation safety and security necessary to implement its functions;

(x) To cooperate with other governmental or non-governmental bodies having competence in such areas as health and safety, environmental protection, security and transportation of dangerous goods;

(y) To exchange information and cooperate with regulatory bodies in other States and with relevant international organizations concerning matters arising from the exercise of its functions;

(z) To establish appropriate mechanisms and procedures for informing and consulting the public and other stakeholders about the regulatory process

and the safety, health and environmental aspects of regulated activities and practices, including incidents, accidents and abnormal occurrences;

(aa) To obtain information, documents and opinions from private and public organizations or persons as may be necessary and appropriate for the conduct of its functions;

(bb) To conduct any other functions that are necessary in its judgement to protect people and the environment of [name of State].

2.4. ADVISORY BODIES AND CONSULTANTS

Although regulatory bodies should be provided with adequate human and financial resources to fulfil their responsibilities, in some circumstances the expertise necessary to address a specific issue or programme may not be available within the regulatory body itself. Also, in certain circumstances it may be considered useful to obtain another, separate professional opinion on an issue as a means of confirming the accuracy or completeness of analysis performed by a regulatory body's own experts. In such circumstances, the regulatory body should have the authority to seek assistance from outside experts. This is typically accomplished in two ways. First, the regulatory body may establish a continuing institutional body composed of outside experts that is charged with reviewing regulatory proposals, documents or decisions on a regular basis. Second, the regulatory body may hire outside experts as consultants for a specific task or period. In both cases, care must be taken to ensure the expertise and independence of these outside advisers. Recent years have seen the emergence of specialized bodies to provide support to both regulators and users. These bodies, known as technical support organizations (TSOs), are sometimes associated with regulatory bodies and sometimes have a 'hybrid' character (with both private and governmental aspects). The increasing reliance on TSOs by both regulators and users raises issues concerning their proper roles and institutional relationships. In particular, regulatory independence could be an issue in situations where a TSO performs services for both the regulatory body and a regulated user.

2.4.1. Model provisions on advisory bodies and consultants

Article ##. Advisory Bodies and Consultants

(1) The [name of regulatory body] is authorized to establish such advisory bodies (committees) as may be useful and appropriate for the conduct of its regulatory responsibilities.

(2) The [name of regulatory body] is authorized to engage experts from outside its permanent staff as advisers, consultants or reviewers to assist in the conduct of its regulatory responsibilities.

(3) The use of advisory bodies or outside experts shall not relieve the [name of regulatory body] of its responsibilities under this Law, other relevant laws and applicable regulations of [name of State].

(4) The [name of regulatory body] shall ensure that technical support received from outside bodies or experts is provided in a manner that avoids any conflicts of interest or improper influence on its regulatory decision making.

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Chapter 3

REGULATORY ACTIVITIES: NOTIFICATION, AUTHORIZATION, INSPECTION, ENFORCEMENT AND PENALTIES

3.1. BACKGROUND

As discussed in the 2003 Handbook [1], several key regulatory functions should be reflected in national legislation. Chapter 2 of this volume identifies some of these for inclusion in a general article containing a list of functions assigned to the regulatory body. However, a few functions and activities are so important to an effective regulatory system that they warrant more detailed treatment in separate sections of a national law. These include notification, authorization (or licensing), inspection and enforcement. Furthermore, since these provisions also regulate the conduct of private persons and organizations using radioactive material, the law needs to provide information on basic requirements and procedures to facilitate compliance. In addition, the law should mirror the graded approach, to keep regulatory control commensurate with the nature and level of the hazard. Finally, it should be noted that public confidence in the regulatory process requires a basic understanding of its structure and content.

3.2. NOTIFICATION

It is a requirement that any person intending to undertake practices or activities involving ionizing radiation must notify the regulatory body of such an intention. The notification requirement applies to all radiation sources, unless an exemption has been granted. In practice, the application for an authorization (see Section 3.3) is also considered as a notification. For those sources for which normal exposures are expected to be very small and the likelihood and expected amount of potential exposures are negligible, but which are not suitable for exemption (e.g. because of a need to prevent uncontrolled waste disposal), the regulatory body may only require notification. Notification is also a useful means of maintaining the accuracy of a national register of sources. Legislation should require notification for the purpose of providing prompt information to the regulatory body in other areas as well, such as in the case of:

— An intention to dispose of radioactive sources;

— An intention to modify any practice or activity that could have consequences for radiation protection;
— Any incident or accident occurring during the conduct of the practice or activity.

3.2.1. Model provision on notification

Article ##. Notification

Any person who intends to engage in an activity or practice shall submit a notification to the [name of regulatory body] of its intention to carry out such activity or practice in the form and within the time limits required by the [name of regulatory body].

3.3. AUTHORIZATION OR LICENSING[1]

As discussed in the Introduction to this volume, it is not necessary to reflect detailed substantive or procedural matters regarding authorization (licensing) in the text of the law. Such matters are more efficiently handled in regulations or implementing decrees. However, it can be useful to set forth basic legal requirements for the most significant aspects of the authorization process. It should be noted that the actions of suspension, modification and revocation of authorizations (licences) can have an enforcement aspect. Indeed, these actions also relate to inspection, given the need to provide inspectors with the ability to suspend a licence in cases where an imminent safety or security threat may be present, even without formal action by the regulatory body. Of course, in such situations the inspector is acting under the authority of the regulatory body, which bears the ultimate responsibility for enforcement decisions. If suspension, modification and revocation are included in both the authorization and the enforcement sections of a law, care must be taken to ensure that such provisions are fully consistent.

[1] Although strictly speaking in IAEA documents the term ‘authorization’ includes ‘licence’, the terms ‘authorization’, ‘licensing’, ‘licence’, ‘authorized person’ and ‘licensee’ are used throughout the text and the model provisions in this volume to accommodate different terminologies used in different national legal systems.

3.3.1. Model provisions on authorization (licensing)

Article ##. Requirement for an Authorization (Licence)

No person shall carry out an activity or practice unless specifically authorized (licensed) by the [name of regulatory body], or unless the practice has been exempted from regulatory control.

Article ##. Justification for Authorized (Licensed) Activities or Practices

The [name of regulatory body] shall only issue an authorization (licence) for activities or practices that:

(a) Can be conducted in a manner that adequately ensures the protection of people and the environment;
(b) Will be conducted only for peaceful purposes consistent with the obligations of [name of State] under relevant international instruments [include reference to instruments, as appropriate].

Article ##. Authorization (Licensing) Process

The [name of regulatory body] shall make publicly available information on the authorization (licensing) process, including, inter alia:

(a) The identification of activities or practices requiring an authorization (licence);
(b) Procedures and schedules for application, consideration and issuance of authorizations (licences);
(c) Criteria to be considered in authorization (licensing) decisions and their legal basis, including a requirement that an explanation of the reasons for rejection of a submission shall be provided to the applicant;
(d) Conditions or qualifications that must be met by the applicant for an authorization (licence);
(e) Procedures and requirements for public participation in the authorization (licensing) process;
(f) Procedures and requirements for the release of information concerning authorization (licensing) proceedings, including measures for the protection of classified and proprietary information;
(g) A description of any fees required for authorizations (licences).

Article ##. Suspension, Modification, Renewal, Revocation or Relinquishment of Authorizations (Licences)

(1) Any authorization (licence) issued pursuant to this Law may be suspended, modified or revoked by the [name of regulatory body] in the event of a violation of its conditions, when the conditions under which it was issued are no longer met, or in any circumstance where the [name of regulatory body] determines that continued activity under the authorization (licence) would pose an unacceptable risk to people or the environment.
(2) The [name of regulatory body] shall make publicly available a statement providing information on the procedures and requirements for suspension, modification, renewal, revocation or relinquishment of authorizations (licences).
(3) An authorization (licence) shall not be transferred.
(4) An authorization (licence) shall cease to be valid when any time limit established by regulation or condition of the authorization (licence) has expired.
(5) An authorization (licence) may be relinquished by the holder of the authorization (licence) upon notice to the [name of regulatory body] and upon a determination by the [name of regulatory body] that relinquishment will not jeopardize the protection of people or the environment.

Article ##. Responsibilities of the Authorized Person or Entity

(1) Any person or entity authorized (licensed) to conduct an activity or practice shall have the primary responsibility for the safe and secure conduct of that activity or practice and for ensuring compliance with this Law and all applicable regulatory requirements and conditions of the authorization (licence) related to that activity or practice.
(2) Any person or entity authorized (licensed) to conduct an activity or practice shall provide the [name of regulatory body] with any requested assistance in the performance of its regulatory functions.
(3) Any person or entity ceasing an authorized (licensed) activity or practice shall inform the [name of regulatory body] prior to the cessation of that activity or practice.

3.4. INSPECTION

Inspection or verification of the performance of authorized (licensed) persons is a central element of an effective regulatory system. The regulatory

body needs to establish a planned and systematic inspection programme. The programme of inspections needs to be conducted in a manner and on a schedule that reflects the nature and potential magnitude of hazards associated with an activity or practice. It is particularly important that the inspection programme be provided with adequate financial, technical and human resources to meet its objectives. The regulatory body should be authorized to conduct inspection activities in a flexible manner, including both announced and unannounced inspections. Also, the regulatory body needs to be able to carry out short notice inspections if a situation requires immediate attention. It is useful to codify in legislation the right of the regulatory body to exercise continuous regulatory supervision over authorized (licensed) activities and practices. Continuous regulatory supervision should involve a programme of inspection and monitoring that is designed to ensure that the activity is conducted at all times in a manner that adequately protects people and the environment. In this regard, the regulatory body should be provided with the authority to enter a site or facility at any time to carry out an inspection. Legislation can also usefully indicate that reporting of inspection activity is an important activity that should be used not only to determine compliance with regulations and authorization (licence) conditions, but also to improve the regulatory process for enhancing safety and security.

3.4.1. Model provisions on inspection

Article ##. Appointment [Designation] of Inspectors

The [name of regulatory body] shall formally appoint (designate) inspectors possessing required qualifications and training and shall issue them with appropriate credentials indicating their legal status under the laws of [name of State].

Article ##. Inspection Programme

(1) The [name of regulatory body] shall establish an inspection programme to monitor compliance with the requirements of this Law, any applicable regulations, and the terms and conditions of authorizations (licences) issued under its authority.
(2) The [name of regulatory body] shall establish qualifications for inspectors and a training programme to ensure a high level of competence for inspectors.
(3) The [name of regulatory body] shall have the authority to station inspectors at the site of an activity or practice where this is determined to be necessary.

(4) The [name of regulatory body] shall ensure that the inspection programme is supported by adequate financial, technical and human resources to meet its objectives.

Article ##. Conduct of Inspections

(1) The [name of regulatory body] shall have the authority to conduct inspections and to carry out any other such examination as may be necessary to verify compliance with the provisions of this Law, applicable regulations and any applicable conditions of authorizations (licences).
(2) Inspectors shall have access at any time to all parts of the premises or facilities where activities or practices are carried out, with a view to:
    (a) Obtaining information about the status of their radiation safety and security;
    (b) Verifying compliance with the provisions of this Law, any applicable regulations, and the terms and conditions of authorizations (licences);
    (c) Investigating any incident or accident involving nuclear material or radiation sources;
    (d) Questioning any person who has duties which in the view of the authorized representatives of the [name of regulatory body] may be pertinent to the inspection being carried out.
(3) Whenever practicable, reasonable notice that an inspection is to be carried out should be provided to the authorized person (licensee) by the [name of regulatory body]. However, in the event of emergencies or unusual occurrences, or where unauthorized activities or criminal violations may have occurred, inspections may be conducted immediately or upon short notice.
(4) Inspection results shall be documented and recorded, and be made available to relevant officials and authorized (licensed) persons and other entities as a basis for corrective or enforcement action in particular cases or for development of the regulatory process.

3.5. ENFORCEMENT, OFFENCES AND PENALTIES

As discussed in the 2003 Handbook, the functions of regulatory inspection and enforcement are closely related and are often codified in the same chapter or part of the law. Immediate enforcement measures may need to be taken directly by inspectors, particularly in cases which may pose an imminent risk of radiological injury to persons or substantial damage to property or the environment. In this regard, inspectors should have the authority to suspend activities and to require corrective actions by the authorized person (licensee) to

prevent injury or damage. Enforcement measures include procedures for determining and acting upon situations that do not comply with applicable laws, regulations and conditions of authorizations (licences). These enforcement measures have the objective of achieving compliance with and avoiding recurrence of infringements of the law or applicable regulations.

Enforcement relies on a range of sanctions or penalties to deter non-compliance (violation), to terminate unauthorized (unlicensed) activities and to punish wilful violations. Penalties should be commensurate with the seriousness of the non-compliance (violation). Such penalties can range from suspension of an authorization (licence) for a period of time until the violation is remedied to civil monetary fines or even criminal penalties for particularly serious acts of non-compliance (violation).

In some States, the regulatory body is authorized to levy civil monetary fines directly. In other States, the regulatory body is required to refer the case to another governmental body, either administrative or judicial. Also, in many States regulatory inspectors are authorized to impose certain enforcement measures directly upon detection of a potential violation of the law or of the terms and conditions of the authorization (licence) that could jeopardize the protection of people or the environment. Examples of such measures could include an order to suspend activities under an authorization (licence) or to prohibit an unqualified person from conducting activities involving ionizing radiation. Suspension or revocation of an authorization can have a serious impact on an authorized person or entity by precluding the conduct of business. Suspension and revocation can therefore be even more significant than a monetary fine. Criminal prosecutions are typically not conducted directly by the regulatory body, but are assigned to the governmental department or ministry responsible for such actions. However, the regulatory body is typically given the authority to refer serious violations to the proper organization for criminal prosecution.

National legislation should include provision for the appeal of decisions of the regulatory body. However, an appeal should not result in the suspension of enforcement action, especially in cases where an alleged non-compliance (violation) could pose safety or security risks. In some States, it is traditional to place penalty or sanction provisions near the end of a law. For the purposes of this volume, however, it has seemed more logical to insert a penalties article immediately after other articles dealing with enforcement.

3.5.1. Model provisions on enforcement, offences and penalties

Article ##. Enforcement

(1) Where an authorized (licensed) person or entity is found to be in non-compliance with (violation of) this Law, applicable regulations or the terms and conditions of the authorization (licence), the [name of regulatory body] shall take the necessary enforcement actions commensurate with the seriousness of the non-compliance (violation).

(2) In all cases, the person or entity subject to enforcement action shall take the necessary measures to remedy the non-compliance (violation) as soon as possible, as required by the [name of regulatory body], and take the necessary measures to prevent a recurrence.

(3) For cases involving non-compliance (a violation) that is of minor safety or security significance, the [name of regulatory body] may issue a warning in writing and determine the period of time during which remedial action must be taken.

(4) For cases representing an immediate safety or security hazard to people or the environment, the [name of regulatory body] may require the person or entity subject to enforcement action to suspend its activities until the situation has been corrected. In such cases, the [name of regulatory body] may also suspend, revoke or modify the terms and conditions of the authorization (licence).

(5) In cases of persistent or extremely serious non-compliance with (violation of) the terms and conditions of an authorization (a licence) or in cases of significant release of radioactive waste into the environment, the [name of regulatory body] may revoke the authorization (licence) and require the authorized person (licensee) to remedy any unsafe condition.

Article ##. Enforcement by Inspectors

(1) In any case where an inspector of the [name of regulatory body] has determined that an activity or practice is being conducted in violation of this Law, implementing regulations or the terms and conditions of an authorization (a licence) [and poses an immediate risk of injury to persons or substantial damage to property or the environment], the inspector may:
   (a) Immediately order the temporary (or permanent) suspension of the activity or practice; or
   (b) Order the authorized person or entity to prohibit workers who do not meet applicable requirements from engaging in the activity or practice;

(c) Order that nuclear or radioactive material originating from a suspended activity or practice be safely and securely stored.

(2) Decisions taken by inspectors under para. (1) shall continue to be in force unless and until:
   (a) Withdrawn by the inspector;
   (b) Reversed or modified by action of the [name of regulatory body]; or
   (c) Altered through an administrative appeal or judicial review.

(3) In cases of enforcement by inspectors, a report (protocol, dossier) shall be issued containing relevant findings and identifying the evidentiary basis for the findings, including measurements, test results, explanations or other information. This report shall be made available to the authorized person (licensee), who shall have the right to submit explanations or objections within [specify time period] of the issuance of the report.

Article ##. Offences and Penalties

Any person who fails to comply with (violates) the terms of this Law, applicable regulations or the terms of any authorization (licence) is guilty of an offence and may be subject to the penalties established by this Law and any applicable regulations.

Article ##. Administrative Penalties

Administrative penalties imposed by the [name of regulatory body] may include suspension, modification or revocation of an authorization (licence).

Article ##. Civil (Monetary) Penalties

(1) Where the [name of regulatory body] has determined that a person or entity has failed to comply with the provisions of this Law, implementing regulations or terms and conditions of an authorization (a licence), it may impose a monetary penalty (civil fine) in an amount not to exceed [amount in national currency] for any single violation.

(2) In cases of repeated, especially serious or intentional, acts of non-compliance (violation), an additional penalty not to exceed [amount in national currency] may be imposed.

Article ##. Authority of Regulatory Body to Determine Penalties
(where permitted under national law)

The [name of regulatory body] shall establish a range of penalties, both administrative and civil (monetary), to be imposed in cases of non-compliance with (violation of) the provisions of this Law, applicable regulatory requirements or the terms and conditions of an authorization (a licence).

Article ##. Criminal Penalties

Any person who intentionally and with a criminal motive violates the terms of this Law, applicable regulations or the terms and conditions of an authorization (a licence) is guilty of an offence and may, upon conviction in a court of law, be subject to a fine not exceeding [amount in national currency] or imprisonment for a period not exceeding [number of] years, or to both a fine and such imprisonment.

Article ##. Criminal Process

The [name of regulatory body] may recommend (refer) to [name of governmental body responsible for criminal prosecutions] the prosecution of any person under this Law or other applicable statutes and codes who is believed to have committed a criminal violation.

3.6. APPEALS

Although it is expected that the regulatory body will exercise its authorization (licensing), inspection and enforcement functions in a responsible manner, it is always possible that regulatory decisions will be made that do not reflect an accurate understanding of the facts of a situation or that are based on an incorrect interpretation of the law or applicable regulations. In such cases, the national legislative framework should provide an opportunity for persons concerned to seek a review of the regulatory body's decision through the State's normal appellate procedure. The grounds on which such appeals may be brought are often set forth in the general administrative laws of the State. In some cases, the administrative procedure is set forth in regulations issued by the regulatory body or other governmental body. The law should also provide both the person seeking an authorization or subject to enforcement measures and the regulatory body with an opportunity to seek further review of an appellate decision (usually before a court or judicial body).

3.6.1. Model provisions on appeals of regulatory decisions

Article ##. Appeals of Regulatory Decisions

(1) Any applicant, authorized person or other person substantially impacted by a decision of the [name of regulatory body] shall have the right to file an appeal against this decision consistent with [regulations promulgated by name of appropriate governmental body] [name of general administrative law of name of State].
(2) Any appeal shall be filed with the [name of appellate body] within [specify time period] of the issuance of the decision and shall state the factual, legal and procedural grounds on which it is based.
(3) Any such appeal shall not have the effect of suspending the decision by the [name of regulatory body].
(4) Upon a finding by the [name of appellate body] that the decision of the [name of regulatory body] does not comply with the applicable law or is based on an erroneous determination of fact, the [name of appellate body] may grant such relief as it judges appropriate, including remanding the matter to the [name of regulatory body] for a further decision consistent with the decision of the [name of appellate body].
(5) Consistent with the relevant laws and procedures of [name of State], the appellant in an administrative proceeding and the [name of regulatory body] may appeal decisions of the [name of appellate body] to [name of judicial or other governmental body] within [specify time period] after issuance of a decision by the [name of appellate body].

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Chapter 4

RADIATION PROTECTION

4.1. BACKGROUND

As discussed in chapter 2 of the 2003 Handbook [1], the safe management of all sources and types of ionizing radiation is applicable to all aspects of nuclear technology. In protecting people and the environment from radiological hazards, a large body of regulatory standards and guidance documents relating to specific activities and practices has been produced. National legislation cannot meaningfully incorporate this extensive body of material. Rather, such material provides the basis for detailed regulations to be adopted by the national regulatory bodies.

However, it is desirable that legislation set forth the basic elements of radiation protection activities in the State. The model provisions set out in Section 4.2 cover the following elements.

First, some important general principles of radiation protection can be usefully referenced in national legislation as a guide to regulators and for the information of stakeholders, including the public, the media, legislators and interest groups. Three such fundamental principles, discussed in the 2003 Handbook, are justification, optimization and dose limitation. Whether and how to codify these principles into national legislation is a matter to be determined by national legal practice. In some States these principles are placed in an overall objectives or principles article at the beginning of the law. However, in this volume the principles are included in a specific chapter relating to radiation protection. It is important to recognize that even where these principles are stated as standards and drafted to be consistent with recognized international practice, their effective implementation will depend on the actions and decisions of the regulatory body and authorized persons.

Second, the legislation should specifically identify the body responsible for exercising regulatory control in areas related to radiation protection. The basic features of the regulatory body are discussed in Chapter 2 of this volume. Legislative drafters should ensure that provisions on the regulator's role in radiation protection are consistent with general provisions establishing the regulatory body set forth in other parts of the law. It may be useful, however, to provide some further guidance on the regulatory body's role in various subject areas, including radiation protection. The regulatory body should be not only identified, but also provided with a clear assignment of basic responsibilities. This is particularly important in the area of radiation protection, where several

governmental bodies may be involved, either as users or as regulators of activities and practices associated with ionizing radiation. For example, a department or ministry of health may operate or regulate hospitals and clinics utilizing radiation sources. Overlapping or conflicting responsibilities for radiation protection should be resolved in legislation by clearly defining the roles of different bodies. In this regard, the issue of regulatory independence may arise, particularly if a user of ionizing radiation also serves as a self-regulator.

Third, in terms of regulatory functions, most of these functions will have been set out in the general grant of authority to the regulatory body. However, there are several functions specific to radiation protection that might be usefully codified in a provision on radiation protection. These are the regulatory body's responsibilities to establish radiation protection requirements, including dose limits, and to identify exemptions and clearances from regulatory control. These functions are discussed in chapter 4 of the 2003 Handbook.

Fourth, it may be useful to provide some detail on the basic radiation protection requirements for authorizations. The listing of these requirements in legislation is not meant to be exclusive, since detailed technical requirements will need to be set forth in regulations adopted by the regulatory body.

Fifth, it is important in the area of radiation protection, as in other areas, to confirm the primary responsibility of the authorized person, licensee or operator for ensuring radiation safety. Specifically, the authorized person must ensure that a high standard of safety is achieved by fostering and maintaining a safety culture, by establishing an integrated management system, by ensuring that staff possess the necessary qualifications to perform their duties and by having qualified experts available to provide advice on the observance of safety standards. Also, the authorized person is responsible for verification of safety by performing safety assessments, establishing a monitoring programme and maintaining records as specified by the regulatory body.

Finally, since for most States issues of radiation protection will arise in conjunction with the use of radiation sources, legislative drafters will also need to review Chapter 5 of both this volume and the 2003 Handbook, which provide more specific guidance on legislative provisions related to sources.

4.2. MODEL PROVISIONS ON RADIATION PROTECTION

Article ##. Fundamental Principles of Radiation Protection

The following fundamental principles of radiation protection shall apply to all activities and practices conducted in [name of State]:

(a) *Justification.* No activity or practice shall be authorized unless it produces sufficient benefit to exposed persons or to society in a manner that offsets the radiation harm that it may cause, taking into account social, economic and other relevant factors.
(b) *Optimization.* In relation to radiation exposures from any particular activity or practice, radiation protection measures should ensure that doses, the number of persons exposed and the likelihood of incurring exposure are at all times kept as low as reasonably achievable, taking into account social and economic factors.
(c) *Dose limitation.* Activities and practices should be conducted in a manner that ensures that the total dose that a person may experience does not exceed the dose limit established by the [name of regulatory body], so that no person is subject to an unacceptable risk attributable to radiation exposure.

Article ##. Regulatory Control of Radiation Safety

(1) The [name of regulatory body] shall adopt requirements for the protection of persons from injury due to exposure to ionizing radiation.
(2) The [name of regulatory body] shall establish dose limits for persons that may not be exceeded in conducting activities under regulatory control. Such dose limits will take into account the recommendations of recognized international bodies, including the International Atomic Energy Agency.
(3) The [name of regulatory body] shall identify sources or practices to be exempted from regulatory control based on the following criteria:
    (a) That the radiation risk for persons is sufficiently low to be of no regulatory concern;
    (b) That the collective radiological impact is sufficiently low that regulatory control is not warranted;
    (c) That the source or practice is considered to be inherently safe, with no likelihood of creating situations that could result in a failure to meet the criteria in (a) or (b).
(4) The [name of regulatory body] shall establish clearance levels (or values) below which radioactive material or radioactive objects within authorized activities and practices can be released from regulatory control.

Article ##. Radiation Protection Requirements for Authorizations (Licences)

The [name of regulatory body] shall adopt requirements for radiation protection that must be met before any activity or practice can be authorized (licensed). These requirements shall include, inter alia, the following:

(a) That the authorized person (licensee) possesses an adequate understanding of the fundamental principles of radiation protection;
(b) That the authorized person (licensee) will take all steps necessary for the protection and safety of workers and the public by keeping doses below the relevant threshold and ensuring that all reasonable steps are taken to minimize adverse effects on the population, at present and in the future;
(c) That the authorized person (licensee) will plan and implement the technical and organizational measures necessary to ensure adequate safety, including effective defences against radiological hazards;
(d) That the authorized person (licensee) will prepare and implement an appropriate emergency plan;
(e) That the authorized person (licensee) will ensure compliance with the dose limits established by the [name of regulatory body] and will monitor the radiation exposure of workers;
(f) That the authorized person (licensee) possesses adequate human and financial resources to conduct the proposed activity or practice in a manner that ensures safety and security;
(g) That the authorized person (licensee) has made adequate financial arrangements for waste disposal, decommissioning and potential liability for radiological or nuclear damage;
(h) That the authorized person (licensee) will provide access by inspectors of the [name of regulatory body] to locations necessary for the performance of their duties;
(i) That the authorized person (licensee) will not modify its conduct of any authorized activity or practice in a manner that could affect the protection of workers, the public or the environment without seeking the approval of the [name of regulatory body];
(j) That the authorized person (licensee) will provide, upon request or pursuant to the requirements in relevant regulations, all information considered to be necessary by the [name of regulatory body].

Article ##. Responsibilities of Authorized (Licensed) Persons and Entities in Radiation Protection

(1) The primary responsibility for ensuring safety rests with the person(s) or entities authorized (licensed) to engage in activities involving ionizing radiation or nuclear energy.
(2) Authorized persons (licensees) and entities shall ensure compliance with the requirements and dose limits established by the [name of regulatory body] and shall ensure that radiation doses to workers and the public,

including doses from releases into the environment, are as low as reasonably achievable, taking into account social and economic factors.

Article ##. Medical Practices

With regard to medical practices, the [name of regulatory body] shall prescribe, in addition to the requirements set forth in Article ## [cite appropriate article on general radiation protection requirements], the following:

(a) The qualifications and training of users;
(b) Measures for the protection of persons using radiation producing equipment and radionuclides;
(c) Measures to protect patients, including the justification of practices and optimization of exposures;
(d) Design and performance criteria for radiation producing equipment and devices containing radionuclides;
(e) Measures for the safety and security of radioactive sources.

Article ##. Protection of Patients

The person authorized (licensed) to conduct medical practices shall ensure that no patient will be administered a diagnostic or therapeutic exposure unless the exposure is prescribed by a medical practitioner who is assigned the primary task of and obligations for ensuring overall patient protection and safety in the prescription of, and during the delivery of, medical exposures.

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Chapter 5

RADIOACTIVE SOURCES

5.1. BACKGROUND

In many States, the use of radioactive sources in medicine, agriculture or industry is the sole or primary activity involving ionizing radiation. In view of the extremely large numbers of portable sealed sources used around the world, the task of ensuring their safety and security can pose significant challenges. For many decades and with very few exceptions, such sources have been safely and securely managed to convey significant benefits to individuals and society. However, accidents involving radioactive sources have had serious consequences in a few cases. Growing concern has also focused on a number of radioactive sources in some States that were not subject to adequate regulatory control, either because such control had not been initially established or because it had somehow been lost. This latter situation has become known as the 'orphan source' problem. As a result of these concerns, a number of initiatives at the IAEA and elsewhere have produced new instruments that were not available when the 2003 Handbook [1] was published. Nonetheless, chapter 5 of that volume, on Sources of Radiation and Radioactive Material, continues to provide a useful overview of the field.

A particularly relevant document is the Code of Conduct on the Safety and Security of Radioactive Sources [16], adopted by the IAEA Board of Governors in September 2003 and endorsed by the General Conference in 2004. The introductory part of the Code records the decision of IAEA Member States "that the following Code of Conduct should serve as guidance to States for — *inter alia* — the development and harmonization of policies, laws and regulations on the safety and security of radioactive sources." The Code's preamble lists numerous factors that led to its promulgation. As discussed in the 2003 Handbook, management of radioactive sources involves a careful balancing of their benefits and risks. The Code is based on the recognition of the value of radioactive sources, but also the need to protect people and the environment from the harmful effects of possible accidents and malicious acts involving such sources. It also affirms the value of effective and continuous regulatory control, especially during movement of such sources. It should also be emphasized that the Code addresses both the safety and the security aspects of radioactive sources, affirming the need for States to foster a safety and security culture in all organizations and among all persons engaged in the regulatory control or the management of such sources.

One significant feature of the Code is its identification, in part III, of 11 basic principles that should be applied by States. Although the specific language of these principles should be reviewed, in summary they cover the following:

(1) That appropriate measures should be taken to protect people and the environment so that radioactive sources are safely managed and securely protected during and at the end of their useful lives and that safety culture and security culture are promoted;
(2) That States should have in place an effective national legislative and regulatory system of control over radioactive sources, with prime responsibility for safety and security placed on the authorized person, national strategies for gaining or regaining control over orphan sources, and measures to reduce the likelihood and to mitigate the consequences of malicious acts, including sabotage;
(3) That appropriate facilities and services for radiation protection, safety and security should be available to authorized persons;
(4) That adequate arrangements should be in place for training of staff of the regulatory body, law enforcement agencies and emergency services organizations;
(5) That States should establish a national register of radioactive sources;
(6) That information concerning any loss of control over radioactive sources or any incidents with potential transboundary effects should be provided to potentially affected States through established IAEA or other mechanisms;
(7) That States should promote awareness of the safety and security hazards associated with orphan sources to relevant persons and organizations, and should encourage persons or entities likely to encounter such sources to implement appropriate monitoring and detection programmes;
(8) That States should encourage the reuse or recycling of radioactive sources when practicable;
(9) That the safety and security responsibilities of designers, manufacturers, suppliers and users of radioactive sources and devices in which they are used should be emphasized;
(10) That States should define their domestic threats and assess vulnerabilities based on the potential for loss of control and malicious acts;
(11) That appropriate measures should be taken to protect confidential information consistent with national laws.

Another significant feature of the Code is its categorization of sources, set forth in annex I. This categorization is based on an assessment of the likelihood of injury to persons who might come into contact with such sources and is supplemented by a table listing 26 of the radionuclides commonly used in

sources, with values indicated in both becquerels and curies. This categorization is useful not only for developing and applying safety and security measures, but also for implementing export and import controls for radioactive sources. It is also useful to the regulatory body in designing and implementing a regulatory programme, including authorization and inspection activities.

A companion publication to the Code of Conduct, entitled Guidance on the Import and Export of Radioactive Sources [17], was approved by the IAEA Board of Governors and endorsed by the General Conference in September 2004. The basic purpose of this guidance is to provide a common framework that States may apply to the export and import of radioactive sources to ensure their safety and security. In brief, the guidance basically emphasizes two processes that should be applied to exports and imports of radioactive sources, depending on their categorization. The first involves how requests for export and import of sources should be evaluated. The second concerns notifications that should be made prior to shipment of sources. In general terms, a request should be evaluated to make sure that the recipient is authorized to receive and possess the source. Also, a determination should be made that the importing State has the appropriate technical and administrative capabilities, resources and regulatory infrastructure to manage the source in a manner consistent with the Code of Conduct.

Although national legislation need not incorporate all the terms of the Code of Conduct on the Safety and Security of Radioactive Sources [16] and the Guidance on the Import and Export of Radioactive Sources [17], these publications provide valuable guidance on drafting national legislation. Five general subjects should be considered for inclusion in legislation:

(1) As in other areas, the law should contain a clear assignment of responsibility for regulatory control of radioactive sources. The assigned regulatory body should have the requisite functions, resources and regulatory independence discussed in Chapter 2.
(2) As in other areas, the law should place prime responsibility for ensuring the safety and security of radioactive sources with the authorized person or licensee.
(3) The law should mandate the establishment of a national register of radioactive sources, including a clear assignment of responsibility for creating and maintaining the register.
(4) The law should provide for a system of export and import controls over radioactive sources.
(5) The law should identify a duty on the part of authorized persons or licensees to provide prompt notification of an orphan source or other incident involving a source that may pose safety or security risks. It would also be

desirable to mandate the development of a national programme for the recovery of orphan sources.

5.2. MODEL PROVISIONS ON RADIOACTIVE SOURCES

Article ##. Regulatory Control of Radioactive Sources

(1) The [name of regulatory body] shall establish a system of control over radioactive sources and devices in which such sources are incorporated to ensure that they are safely managed and securely protected during their useful lives and at the end of their useful lives.
(2) Based on internationally recognized guidance, the [name of regulatory body] shall adopt a categorization of sources based on the potential injury to people and the environment that could result if such sources are not safely managed or securely protected.

Article ##. Responsibility for Safety and Security of Radioactive Sources

The primary responsibility for ensuring the safe and secure use of radioactive sources rests with the person(s) or entity possessing an authorization (licence) relating to such sources.

Article ##. National Register of Radioactive Sources

(1) The [name of regulatory body] shall establish and maintain a national register of radioactive sources.
(2) The [name of regulatory body] shall establish the categories of radioactive sources required to be included in the national register.
(3) The [name of regulatory body] shall adopt measures to protect information contained in the national register to ensure the safety and security of these sources.

Article ##. Export and Import of Radioactive Sources

(1) Based on internationally recognized guidance, the [name of regulatory body or other responsible governmental body] shall develop regulatory requirements and procedures for the authorization (licensing) of the export, import and transit of radioactive sources from, to or through the territory of [name of State].

(2) The procedures established under para. (1) shall provide for an evaluation of information to ensure that a recipient is authorized to receive the requested source and has the capacity to ensure its safety and security.
(3) For requests to export [specify source and category], the [name of responsible governmental body] shall satisfy itself, insofar as practicable, that the importing State has the appropriate technical and administrative capability, resources and regulatory structure for the safe and secure management of the requested source(s).

Article ##. Recovery of Orphan Sources

(1) The [name of regulatory body] shall require authorized persons to promptly report any loss of control over radioactive sources, or any other situation or incident in connection with a radioactive source that may pose a significant risk of radiological injury to persons or substantial damage to property or the environment.
(2) The [name of regulatory body] shall coordinate the development of a national strategy for promptly gaining or regaining control over orphan sources. The national strategy shall be coordinated with [names of participating governmental bodies] and approved by [name of official or body — e.g. President, Cabinet of Ministers, National Security Council].

BIBLIOGRAPHY FOR CHAPTER 5

INTERNATIONAL ATOMIC ENERGY AGENCY, Code of Conduct on the Safety and Security of Radioactive Sources, IAEA/CODEOC/2004, IAEA, Vienna (2004).

— Guidance on the Import and Export of Radioactive Sources, IAEA/CODEOC/IMP-EXP/2005, IAEA, Vienna (2005).

Chapter 6

SAFETY OF NUCLEAR FACILITIES AND DECOMMISSIONING

6.1. BACKGROUND

As discussed in chapter 6 of the 2003 Handbook [1], nuclear facilities can include a wide range of industrial activities associated with the nuclear fuel cycle. They typically include nuclear power reactors, research and test reactors, nuclear fuel fabrication plants, enrichment and reprocessing plants and spent fuel storage facilities. Uranium and thorium mines and mills and radioactive waste management installations are also nuclear facilities (they are discussed separately in Chapters 8 and 10 of both this volume and Ref. [1]). Because of the large inventories of fissionable material and the complexity of their operations, major nuclear facilities can pose significant health, safety, security and environmental risks. This has resulted in the active development of a range of international legal instruments and guidance documents to ensure the effective and efficient regulation of such facilities and the associated radioactive material. These instruments are discussed in chapter 6 of the 2003 Handbook. Since the publication of that book, additional guidance documents have been prepared. One particularly relevant instrument in this regard is the Code of Conduct on the Safety of Research Reactors [18], adopted in 2006.

The guidance offered in this chapter should also be seen in the light of what has been referred to as a 'nuclear renaissance' or revival of nuclear energy production. At the time of this writing, some 60 States have expressed interest in launching a nuclear power programme. The IAEA has responded to this development in particular by issuing two publications, Considerations to Launch a Nuclear Power Programme [2] and Milestones in the Development of a National Infrastructure for Nuclear Power [19]. Further guidance on this subject is currently being prepared by the IAEA.

6.2. POWER REACTORS

As indicated in the 2003 Handbook [1], legislation dealing with issues arising from the siting, design, construction, commissioning, operation and decommissioning of nuclear power plants can be extremely complex and detailed. Some of the key elements of a legislative framework for such facilities are identified in Chapters 2–4 of both this volume and Ref. [1] (e.g. regulatory

functions, radiation protection). Chapter 6 of the 2003 Handbook discusses several important general matters related to power reactors. The present chapter will be limited to a few additional provisions that may complement those already covered.

One provision that drafters may wish to consider involves the fundamental policy decision of whether a State is prepared to authorize the construction of nuclear power reactors in its territory. An ancillary decision (or decisions) with significant policy implications involves the selection of a site (or sites) for such reactors. As has been discussed elsewhere, the focus of the present volume is on what legislative provisions are necessary for the regulatory control of activities and practices conducted in a State. Establishment of a legislative and regulatory framework may be taken to reflect a policy determination that an activity or practice is permitted. Otherwise, the legislation would merely contain a prohibition on such activities or practices. However, as discussed further below, it may be relevant to include in legislation on nuclear facilities a specific provision indicating the manner in which a policy decision to select a site for regulatory review is to be made.

The model text in Section 6.2.1 contains 11 articles based on the step by step process discussed in chapter 6 of the 2003 Handbook. First, as in other areas, the law makes explicit the requirement that a legal entity seeking to construct and operate a nuclear power reactor must first obtain an authorization (licence) from the regulatory body. Also, the responsibility of the authorized person (or licensee) or operator for ensuring safety and security is again affirmed.

Second, a two part provision on the siting of facilities is included. The siting process for a nuclear facility generally consists of an investigation of a large region (possibly even the entire territory of a State) to select one or more candidate sites, a so-called site survey, which is followed by a more detailed evaluation of those candidate sites. In many States this site survey is conducted on a national basis by the government under a special procedure to ensure that all relevant bodies are involved. In addition to national governmental bodies, consideration should be given to providing an appropriate role in the process for regional and local government officials and other stakeholders. Such a process typically leads to the selection of one or more sites with approval at the political level, sometimes with ratification by the national legislature. Following the site survey process, a detailed evaluation of a candidate site or sites is conducted by the applicant, with assessment and review by the regulatory body.

The next six provisions follow the typical step by step review and assessment process, from pre-construction to construction, pre-commissioning, initial operation, commencement of full power operation and operation. A final provision mandates a procedure for public participation in the authorization process.

Nuclear power development involves very large capital investments and licensing procedures that typically extend over many months or even years. In an effort to introduce greater efficiency and certainty into the licensing process, some States have adopted legislative provisions specifying time limits for action by the regulatory body at various stages of review. In this regard, a balance must be struck between ensuring timeliness and predictability for applicants and investors and providing the time necessary for a thorough and independent review by the regulatory body. Time limits have not been included in the model text set forth in this volume. However, drafters may wish to consider measures contained in several of the national examples available from the IAEA web site (http://ola.iaea.org/).

It should also be noted that established management systems (including quality assurance and quality management) and the safety culture of an organization are essential factors for the safety and effectiveness of any organization, whether the regulator or operator. Management systems should be designed to fulfil all the requirements that integrate safety, health, environmental, security, quality and economic elements, whereby safety is a fundamental principle upon which the management system is based. All of those requirements must be met to ensure the protection of people and the environment, and they must be governed by internationally recognized objectives, concepts and principles. Integrating the management systems into the activities of the organization leads to a coherent and optimal way of delivering the vision of top management and the goals and objectives of the organization.

Also, legislation needs to enable licence applicants to challenge unfavourable licensing decisions or undue delay in regulatory reviews. In many States such appeals are authorized in a general administrative procedures act covering all relevant agencies. In such cases, the nuclear law may only need to cross-reference the general law. However, if the general law is unclear, it may be desirable to include a specific provision in the nuclear law. This might be the case where appeals of nuclear regulatory decisions are to be referred to a different tribunal or where different standards of review for such appeals are to be applied.

6.2.1. Model provisions on power reactors

Article ##. Authorization (Licensing) Requirement

Any person who intends to construct or operate a nuclear facility or to conduct related activities shall obtain an authorization (licence) from the [name of regulatory body] consistent with the terms of this Law and applicable regulations.

Article ##. Responsibility of the Authorized Person (Licensee)

The authorized person (licensee) shall bear the prime responsibility for ensuring the safety and security of the facility and of all activities and practices associated with it.

Article ##. National Site Evaluation Process for Nuclear Power Reactors

(1) A process for the evaluation of candidate sites for nuclear power reactors in [name of State] shall be established by [name of governmental official or body — e.g. Prime Minister, President, Cabinet, Department of Economic Development] and shall be consistent with procedures contained in the national nuclear development plan (or other national planning process).

(2) A decision by [name of governmental official or body] designating a location as available for development of a nuclear power reactor and associated facilities shall be required prior to commencement of the detailed evaluation of a particular site and pre-construction review and assessment of a proposal for such a facility under articles [insert numbers of relevant articles] below.

(3) The national site evaluation process shall include, inter alia, an assessment of the following aspects:
   (a) The effects of external events occurring in the region, either of natural origin or human induced;
   (b) The characteristics of the site and its environment that could influence the transfer to persons and the environment of radioactive material that has been released;
   (c) The population density and population distribution and other characteristics of the external zone in so far as they may affect the possibility of implementing emergency measures and the need to evaluate the risks to the population and the environment.

Article ##. Detailed Site Evaluation for Nuclear Power Reactors

(1) Before authorizing construction of a nuclear power reactor, approval of the site by the [name of regulatory body] based upon requirements of this Law and any applicable regulations is required.

(2) An applicant shall prepare for assessment and review by the [name of regulatory body] a site evaluation report that shall consider, inter alia, the following aspects of a specific site for construction of a nuclear power reactor:
   (a) The frequency and severity of external natural and human induced events and the phenomena that could affect the safety of the facility;

(b) The foreseeable evolution of natural and human made factors in the region that may have a bearing on safety for a time period that encompasses the projected lifetime of the facility;
(c) The hazards associated with external events that are to be considered in the design of the facility, including the potential combined effects of these hazards with ambient conditions (e.g. hydrological, hydrogeological and meteorological conditions);
(d) Additional matters relating to safety, such as the storage and transport of nuclear and other radioactive material, fresh and spent fuel and radioactive waste;
(e) The possible non-radiological impact of the facility, due to chemical or thermal releases, and the potential for explosion and for dispersion of chemical products;
(f) The potential for interactions between nuclear and non-nuclear effluents;
(g) The potential radiological impacts in operational states and conditions on people in the region, including impacts that could lead to emergency measures or potential impacts outside the territory of [name of State];
(h) In so far as possible, the total nuclear capacity to be installed on the site (with provision for re-evaluation of the site if the installed capacity is to be significantly increased beyond the level assessed in a previous site evaluation).

Article ##. Preconstruction Review and Assessment of Nuclear Power Reactors

Before authorizing (licensing) the construction of a nuclear power reactor, the [name of regulatory body] shall review and assess:

(a) The competence and capability of the applicant or authorized person (licensee) to meet relevant authorization (licence) requirements during construction and operation;
(b) The site evaluation, prepared pursuant to Article [insert number of relevant article] above, to confirm its acceptability, and related information needed for the design of the proposed facility;
(c) The potential environmental impact of the proposed facility;
(d) The basic design of the proposed facility, to confirm that it can meet relevant safety, security and physical protection requirements;
(e) The management system of the applicant or authorized person (licensee) and vendors;

(f) Research and development plans related to demonstration of the acceptability of the design;
(g) Arrangements for decommissioning and management of radioactive waste including financial mechanisms therefor.

Article ##. Construction Review and Assessment of Nuclear Power Reactors

During construction, the [name of regulatory body] shall review and assess:

(a) The development of the facility design through documentation submitted by the applicant or authorized person (licensee) to determine its continued acceptability;
(b) The progress of research and development activities related to demonstration of the acceptability of the design.

Article ##. Pre-commissioning Review and Assessment of Nuclear Power Reactors

Before beginning commissioning of a nuclear power reactor, the [name of regulatory body] shall review and assess the commissioning programme and, if needed, establish a schedule for further review and assessment prior to operation.

Article ##. Review and Assessment Prior to Initial Operation of Nuclear Power Reactors

Before authorizing the loading of nuclear fuel or initial criticality, the [name of regulatory body] shall complete the review and assessment of, inter alia, the following:

(a) The as-built design and construction and manufacturing quality of the facility;
(b) The results of non-nuclear commissioning tests;
(c) The limits and conditions for operation during commissioning, with a staged approach, if necessary;
(d) The provisions for radiation protection;
(e) The adequacy of operating instructions and procedures, especially the main administrative procedures, general operating procedures and emergency operating procedures;
(f) The recording and reporting systems;
(g) The arrangements for training and qualification of facility personnel, including staffing levels and fitness for duty requirements;

(h) The management systems for operation;
(i) The emergency preparedness programme;
(j) The accounting measures for nuclear and radioactive material;
(k) The adequacy of physical protection measures;
(l) The arrangements for periodic testing, maintenance, inspection and control of modifications and surveillance;
(m) The arrangements for decommissioning and management of radioactive waste.

Article ##. Review and Assessment Prior to Full Power Operation of Nuclear Power Reactors

Before authorizing (licensing) routine operation of a nuclear power reactor at full power, the [name of regulatory body] shall complete the review and assessment of the following:

(a) Results of commissioning tests;
(b) Limits and conditions for operation.

Article ##. Review and Assessment during Operation of Nuclear Power Reactors

During operation of a nuclear power reactor, the [name of regulatory body] may require the following:

(a) Review and assessment of changes in operational limits and conditions or of significant safety related modifications, to be conducted prior to their authorization.
(b) Periodic reviews of the operator's compliance with relevant terms and conditions related to the facility's safety and physical protection. The interval between such reviews shall not exceed [number of years; ten years is a typical interval].

Article ##. Public Information

The [name of regulatory body] shall establish procedures for informing and consulting members of the public, including persons residing in the vicinity of a proposed nuclear facility, at appropriate steps during the review and assessment and authorization (licensing) processes.

6.3. RESEARCH REACTORS

Except for very large reactors, nuclear research and test reactors typically pose a less significant risk of radiological damage than do power reactors. However, some research reactors are fuelled with highly enriched uranium that can pose security risks. Some research reactors are located in or near centres of population, a situation requiring them to be carefully regulated.

As stated, the Code of Conduct on the Safety of Research Reactors [18] provides useful guidance on establishing efficient and effective regulatory controls over such facilities. Legislative drafters should review the specific language of the Code to determine which elements may be appropriate for inclusion in national legislation. As for other areas, the basic elements of a regulatory control system (such as radiation protection, authorization (licensing), inspection and enforcement) will typically have been covered in other parts of a State's nuclear law. The Code addresses the roles of the State, the regulatory body and the operating organization in ensuring the safety of research reactors, with many elements substantially similar to those applicable to other facilities, including:

— Assessment and verification of safety;
— Financial and human resources;
— Management systems;
— Human factors;
— Radiation protection;
— Emergency preparedness;
— Siting;
— Design, construction and commissioning;
— Operation, maintenance, modification and utilization;
— Extended shutdown;
— Decommissioning, including financial mechanisms therefor.

A large number of research reactors worldwide have been on extended shutdown for lengthy time periods, with decommissioning of such facilities being a matter of priority for a number of States. For this reason, the Code gives more detailed consideration to the last two subjects. Of course, concerns about extended shutdown may also be relevant for nuclear power reactors. Therefore, if there is a possibility that nuclear power reactors in a State may be placed in a state of extended shutdown, legislative drafters should consider extending relevant provisions to those facilities as well.

As the foregoing list of basic elements suggests, a number of the legislative provisions suggested for nuclear power reactors — in particular those concerning

siting, design, construction, commissioning, operation and decommissioning — would be relevant for the authorization (or licensing) of research reactors, particularly larger ones. Legislative drafters should consider which of these provisions might be included in a law or chapter dealing with research reactors.

In Section 6.3.1, four model provisions are set forth as specifically applicable to research reactors. The first is the typical general provision authorizing regulatory control of such facilities and identifying the regulatory body and its basic functions. The second is the usual requirement that an applicant obtain the appropriate authorization (or licence) to construct or operate a research reactor. The third is the typical provision assigning primary responsibility for safety and security to the authorized person (or licensee) or operator. The fourth is a provision identifying basic elements for facilities in extended shutdown. This provision also reflects the Code of Conduct's [18] guidance that the State must arrange for safe management of a research reactor in extended shutdown where there is no longer an effective operating organization.

6.3.1. Model provisions on research reactors

Article ##. Regulation of Research Reactors

The [name of regulatory body] shall establish requirements for the regulatory control of research reactors to include, inter alia, the following:

(a) Criteria for the siting, design, construction, commissioning, operation, maintenance and decommissioning of research reactors;
(b) Assessment and verification of safety and security by the operating organization and by the [name of regulatory body];
(c) Financial and human resources necessary to ensure safety and security;
(d) Management systems to be put into place by the operating organization at the different stages of the lifetime of the facility;
(e) Human factors to be taken into account by the operating organization during the lifetime of the facility;
(f) Radiation protection programmes to ensure that radiation doses to workers and the public are within prescribed dose limits and are as low as reasonably achievable, social and economic factors being taken into account;
(g) Emergency preparedness and response plans and programmes;
(h) Criteria for a technical preservation programme to maintain the safety and security of research reactors in extended shutdown;
(i) Funding arrangements for decommissioning and radioactive waste management.

Article ##. Authorization (Licensing) Requirement

Any person who intends to construct or operate a nuclear research reactor and related facilities shall obtain an authorization (licence) from the [name of regulatory body] consistent with the terms of this Law and applicable regulations.

Article ##. Responsibility of the Authorized Person (Licensee)

The authorized person (licensee) shall bear the prime responsibility for ensuring the safety and security of the reactor and of all activities and procedures associated with it.

Article ##. Extended Shutdown

(1) For research reactors that enter into or continue in a state of extended shutdown, a technical preservation programme shall be prepared by the operating organization consistent with criteria established by the [name of regulatory body]. This programme shall include:
   (a) Arrangements for ensuring that the reactor core remains subcritical;
   (b) Procedures and measures to disconnect, dismantle and preserve the systems that are to be taken out of operation or temporarily dismantled;
   (c) Modifications of the safety analysis report and the operational limits and conditions;
   (d) Arrangements for dealing with the fuel and radioactive waste;
   (e) Regular surveillance and periodic inspection, testing and maintenance activities to ensure that the safety performance of structures, systems and components does not degrade;
   (f) Revised emergency planning arrangements;
   (g) Staffing requirements to undertake the tasks necessary to keep the reactor in a safe condition and to maintain knowledge about the research reactor;
   (h) Arrangements for the security of the reactor and the facility.

(2) In circumstances where a research reactor is in extended shutdown and there is no longer any effective operating organization, the safe management of the research reactor will be implemented by [name of responsible government organization].

6.4. NUCLEAR FUEL CYCLE FACILITIES

Although facilities associated with the manufacture and processing of fuel for nuclear reactors are covered by the definition of 'nuclear facilities' set out in the definitions of the model provisions, this volume does not offer specific guidance on legislation for them. Such facilities are typically considered to include:

— Uranium fuel fabrication facilities;
— Mixed oxide fuel fabrication facilities;
— Conversion facilities;
— Enrichment facilities;
— Reprocessing facilities.

These nuclear fuel cycle facilities can pose particularly significant risks to the safety of workers and the public related to the danger of a criticality accident and to the large quantities of toxic chemicals used in such facilities. The design and operation of fuel cycle facilities typically requires a very thorough hazard analysis of all phases of siting, design, construction, operation and decommissioning. Also, fuel cycle facilities pose particularly sensitive issues involving nuclear non-proliferation and security because of the presence of significant quantities of materials that could be used to develop a nuclear explosive or radiological dispersal device.

To address the security concerns posed by these technologies, the IAEA Director General and other international leaders have called for multilateral approaches to the nuclear fuel cycle with special control arrangements to prevent diversion of material from peaceful uses. In 2005, an expert group issued a report to the IAEA Director General entitled Multilateral Approaches to the Nuclear Fuel Cycle [20] that considered various options for uranium enrichment, spent fuel reprocessing, spent fuel repositories and spent fuel storage. Five suggested approaches to such multilateral nuclear approaches (MNAs) were outlined:

— Reinforcing existing commercial market mechanisms (e.g. in areas such as fuel leasing, final fuel take-back);
— Developing and implementing international supply guarantees;
— Promoting voluntary conversion of existing facilities to MNAs;
— Creating multinational, and in particular regional, MNAs for new facilities;
— Developing a nuclear fuel cycle with stronger multilateral arrangements.

The expert group noted that the "present legal framework does not oblige countries to participate in MNAs, as the political environment makes it unlikely that such a norm can be established any time soon." However, at the time of this writing, a number of proposals and expressions of interest in MNAs are being discussed at the international level. Additional information on the evolution of proposals concerning assurances of nuclear supply and international fuel cycle centres is available in the report by the Director General to the IAEA Board of Governors entitled Possible New Framework for the Utilization of Nuclear Energy: Options for Assurance of Supply of Nuclear Fuel [21]. Legislative drafters may wish to inform themselves of the latest status of MNA initiatives when developing provisions in their legislation dealing with fuel cycle facilities.

IAEA safety standards relating to radiation protection, physical protection and other general safety and security aspects of nuclear facilities are relevant to the regulatory control of fuel cycle facilities. Legislation to address the regulatory control of fuel cycle facilities should basically follow the elements established for nuclear power plants (see Section 6.2). These basic provisions need not be repeated here.

Legislative drafters should review the provisions of the IAEA requirements concerning the Safety of Nuclear Fuel Cycle Facilities [22]. Of particular relevance is section 3 of that publication, on the Legal Framework and Regulatory Supervision. Also, depending on the type(s) of facility to be covered by national legislation, relevant material can be found in the three appendices included in Ref. [22], which set forth requirements specific to uranium fuel fabrication facilities (appendix I), mixed oxide fuel fabrication facilities (appendix II), and conversion and enrichment facilities (appendix III).

6.5. DECOMMISSIONING

As discussed in chapter 6 of the 2003 Handbook, decommissioning refers to the administrative and technical measures taken to allow removal of a facility (except for a disposal facility) from some or all of the regulatory requirements. Decommissioning typically proceeds through several phases, including:

— Development of a decommissioning strategy;
— Submission of a decommissioning plan for authorization;
— Characterization of the site;
— Management of the decommissioning project;
— Implementation of the decommissioning plan;
— Management of resulting waste, including transportation;
— Demonstration that the site meets the end state requirements of the plan.

It is important that arrangements for ensuring the safety and security of a facility at the end of its operating life be made early in the authorization process for that facility. In fact, new features that may facilitate the eventual decommissioning of a facility should already be given consideration at the design stage of a nuclear facility and when the regulatory body reviews the application for authorization of that facility for the first time. A further key document in this process is the decommissioning plan, which should be developed as early as possible and revised and updated as needed. Because the operating organization may be different from the organization responsible for decommissioning, the authorization process must be carefully coordinated to involve all responsible parties. Consideration of financial arrangements early in the process is also important to ensure that the necessary funding is assigned to decommissioning during the economic life of the facility. The means of providing financial assurance for decommissioning may differ among States, with some States requiring a special fund to which the operator contributes and others utilizing insurance or some other form of financial guarantee. It is also important for legislation to include provisions that clearly indicate institutional responsibilities for monitoring compliance with site restrictions or requirements following decommissioning of a facility. In some States the regulatory body will be given those responsibilities. However, if another organization responsible for decommissioning has been designated, the continuing functions should be clarified in the legislation.

Legislation for decommissioning should include four basic elements. First, the role of the regulatory body should be clearly delineated, including the need to develop regulatory requirements and procedures for all stages of the decommissioning process. This is particularly important since decommissioning can extend over lengthy periods of time during which there should be no gaps in regulatory supervision and control. Second, the basic structure and contents of the decommissioning plan should be codified. In view of the importance of the decommissioning plan, legislation can usefully identify key elements, although specific technical requirements can be left for implementing regulations. Third, as elsewhere, the basic responsibilities of the operator should be outlined, including provisions for approval by the regulatory body of changes in ownership of and responsibility for a facility being decommissioned. Fourth, and finally, the law should make clear how financial arrangements for decommissioning are to be handled. In some States the funding of decommissioning activities is divided among several parties, with the operator bearing some costs and the government bearing others. The law must obviously reflect whatever national decisions have been made on how such costs are to be assessed.

The aforementioned principles, and in particular the principle of continuous regulatory control, apply not only to nuclear facilities but also to other facilities

where radioactive material and sources are produced, used or stored (e.g. radiotherapy facilities). However, with respect to these other facilities, not all the provisions below will be relevant, and legislative drafters should consider which of these provisions might be included in a law dealing with such facilities.

6.5.1. Model provisions on decommissioning

Article ##. Decommissioning of Nuclear Facilities

(1) The [name of regulatory body] shall establish requirements for the decommissioning of nuclear facilities, including:
   (a) Safety and environmental criteria, including conditions on the end state of decommissioning;
   (b) Limits and conditions for the removal of regulatory controls for facilities containing radionuclides;
   (c) Criteria for the clearance of radioactive material during and following decommissioning.

(2) The [name of regulatory body] shall require the applicant for an authorization (licence) to construct and operate a nuclear facility to perform a baseline survey of the site, including radiological conditions, prior to construction, to develop information for comparison with the end state after decommissioning.

(3) The [name of regulatory body] shall ensure that relevant documents and records prepared by the authorized person (licensee) are maintained for a specified period of time before, during and after decommissioning.

(4) The [name of regulatory body] shall establish criteria for determining when a nuclear facility or part of a facility must be permanently shut down.

(5) The [name of regulatory body] shall evaluate the end state of the facility after decommissioning activities have been completed to ensure that relevant regulatory requirements have been met.

(6) The facility shall not be released by the [name of regulatory body] from regulatory control until the authorized person (licensee) has demonstrated that the end state in the decommissioning plan has been reached and that any other additional regulatory requirements have been met.

Article ##. Decommissioning Plan

(1) At the design stage of a nuclear facility, the applicant for an authorization (licence) to construct and operate a nuclear facility shall prepare an initial decommissioning plan for approval by the [name of regulatory body]. The

plan should be commensurate with the type and status of the facility and the hazards that may be associated with its decommissioning.

(2) The [name of regulatory body] shall ensure that interested parties are provided an opportunity to review and comment upon the decommissioning plan prior to its approval.

(3) The [name of regulatory body] shall require the authorized person (licensee) to provide periodic reviews and updates of the decommissioning plan and shall specify the maximum time interval between such reviews and updates.

(4) If specific circumstances could result in significant changes to the initial decommissioning plan, the authorized person (licensee) shall, at the request of the [name of regulatory body], revise and update the plan to reflect these changed circumstances and submit it to the [name of regulatory body] for approval.

(5) The [name of regulatory body] shall require that a final decommissioning plan be prepared and submitted for approval prior to the implementation phase of decommissioning activities.

(6) The [name of regulatory body] shall ensure that a programme to implement and monitor compliance with remaining regulatory requirements has been established for sites where decommissioning has been completed but where authorizations or restrictions on future use of the site remain.

(7) On completion of decommissioning, the [name of regulatory body] shall ensure that appropriate records for confirmation of the completion of decommissioning activities in accordance with the approved decommissioning plan are maintained. These should include records of the premises and of the disposal of radioactive waste and material and all documentation that is necessary for responding to possible liability claims.

Article ##. Responsibilities of the Authorized Person (Licensee) in Decommissioning

In implementing decommissioning activities at a facility, the authorized person (licensee) shall be responsible for the following:

(1) Ensuring safety, security and environmental protection, including any activities conducted by contractors or subcontractors;

(2) Preparing the safety and environmental impact assessments necessary for implementation of the decommissioning plan;

(3) Establishing a record keeping system of the key issues and modifications during the lifetime of the facility that may have an impact on decommissioning;

(4) Ensuring that the baseline survey of the site is performed in an effective and timely manner;
(5) Ensuring that new or untried methods for decommissioning are justified, addressed and submitted for approval to the [name of regulatory body];
(6) Informing the [name of regulatory body] within two months of a decision to permanently shut down a facility and submitting an application to decommission the facility, together with a proposed final decommissioning plan, within two years of permanent cessation of operation;
(7) In the case of deferred dismantling, ensuring that the facility has been placed and will be maintained in a safe configuration and will be adequately decommissioned in the future;
(8) Establishing and maintaining a management organization and personnel resources to ensure that decommissioning can be completed safely, including ensuring that responsible persons possess the necessary skills, expertise and training for safe decommissioning;
(9) Establishing and maintaining emergency planning arrangements commensurate with the associated hazards and reporting significant incidents to the [name of regulatory body];
(10) Ensuring that adequate financial arrangements are made for all stages of the decommissioning process.

Article ##. Financing of Decommissioning

(1) An applicant for an authorization (licence) to construct and operate a nuclear facility shall ensure that adequate financial resources will be available when needed to cover the costs associated with safe decommissioning, including management of the resulting waste.
(2) The authorized person (licensee) shall provide financial resources to cover the costs associated with safe decommissioning, including management of the resulting waste.
(3) The amount of the financial resources to be made available for decommissioning activities shall be commensurate with a facility specific cost estimate and shall be changed if the cost estimate increases or decreases. The cost estimate shall be reviewed as part of the periodic review of the decommissioning plan.
(4) The [competent agency for finance — e.g. Ministry of Finance, Treasury] and the [name of regulatory body] shall establish the necessary mechanisms to ensure implementation of the Law in this regard.
(5) For existing facilities for which financial resources for decommissioning are not available, provisions for future financial assistance for decommissioning shall be required prior to licence renewal or extension.

6.6. AUTHORIZATION (LICENSING) OF FACILITY OPERATORS

In addition to authorizing (licensing) specific facilities, it is common practice in most States to require persons operating such facilities to obtain an authorization (licence, permit or certificate) demonstrating their professional competence and suitability for such work. Various categories of such authorizations for individuals employing different skills may also be adopted. States differ on how training is to be provided to nuclear professionals. In some States training is conducted by the regulatory body; in others, by the operating organization, academic institutions or a separate technical support organization. This is a matter for national decision. Three basic provisions in this area can be useful for national legislation. The first is a general requirement that persons conducting certain specified activities or practices possess the relevant authorization. The second is a provision establishing the specific training and authorization processes the particular State wishes to adopt. The third is a basic statement of qualifications for operator authorizations (licences) that should include both technical or professional competence and personal honesty and integrity.

It should be noted that in most States the authorizations (licences) of facility operators are also needed for certain radiation practices (e.g. irradiators, industrial radiography). However, in these cases the regulatory body will traditionally issue regulations rather than including specific provisions, such as those set out below, in a national law.

6.6.1. Model provisions on authorization (licensing) of facility operators

Article ##. Operator Authorization (Licence, Permit or Certificate) Required

No person shall conduct activities specified by the [name of regulatory body] or practices associated with operation of a nuclear facility unless that person possesses the relevant authorization (licence, permit or certificate) for such activity or practice issued by the [name of regulatory body].

Article ##. System for Operator Authorizations (Licences, Permits or Certificates)

The [name of regulatory body] shall establish a system for the authorization of persons to conduct activities or practices associated with the operation of nuclear facilities. This system shall include:

(a) A categorization of authorizations (licences, permits or certificates) for relevant types of work to be conducted;
(b) An identification of the training necessary for such authorizations (licences, permits or certificates), including the responsibilities of the operating organization in this area;
(c) Criteria for the issuance of relevant authorizations (licences, permits or certificates);
(d) A programme for the examination of applicants for operator authorizations (licences, permits or certificates);
(e) A system for recording authorizations (licences, permits or certificates) issued;
(f) The terms of validity of relevant authorizations (licences, permits or certificates) and the requirements for any periodic re-authorization.

Article ##. Qualifications of Facility Operators

(1) The procedure for granting authorizations (licences, permits or certificates) pursuant to Article [insert number of relevant article] shall include, inter alia:
    (a) Review of information to determine that an applicant possesses the professional competence necessary to conduct relevant work covered by the relevant authorization;
    (b) Review of information demonstrating that an applicant possesses the personal integrity and character for relevant employment.
(2) For the purposes of the review prescribed in Article [insert number of relevant article], evidence that a person has been convicted of a criminal offense involving negligence or moral turpitude shall be deemed a disqualification for issuance of an authorization (licence, permit or certificate).

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Chapter 7

EMERGENCY PREPAREDNESS AND RESPONSE

7.1. BACKGROUND

As discussed in chapter 7 of the 2003 Handbook [1], preparing for and responding to nuclear and radiological emergencies is an extremely complex undertaking, typically involving a broad range of governmental bodies at several levels (national, regional and local). Also, for incidents having potential transboundary impacts, international measures (bilateral, regional or multinational) may be required. Although regulatory bodies have a special role to play in responding to accidents or incidents involving radioactive material, that role must be exercised within the overall national framework for dealing with emergencies of any kind. Therefore, it is particularly important that provisions in nuclear law addressing emergency preparedness and response be carefully drafted to be consistent with other laws and arrangements for addressing emergency situations. It should also be noted that nuclear and radiological emergencies can result from malicious acts. Therefore, national law will need to include provisions dealing with these aspects, as reflected in relevant international instruments (e.g. those dealing with nuclear terrorism). Issues concerning the response to a nuclear security incident are discussed in Chapter 14 of this volume.

Four aspects of emergency planning would seem to warrant specific inclusion in national nuclear legislation. The first is the obligation of users of nuclear and other radioactive material to prepare and put into place an appropriate plan for dealing with accidents or emergencies that could result in damage to persons, property or the environment. The plan should include provisions for exercises to ensure its adequacy, including participation by all relevant persons and organizations. The second aspect is the role of the regulatory body in approving emergency response plans for facilities utilizing nuclear material or radiation sources. The third is the role of the regulatory body in providing expert information and assistance to other governmental bodies and the public in the case of emergencies involving radioactive material. The fourth is the role of the regulatory body in implementing certain international legal commitments such as those under the Convention on Early Notification of a Nuclear Accident [23] and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency [24].

7.2. MODEL PROVISIONS ON EMERGENCY PREPAREDNESS AND RESPONSE

Article ##. Emergency Plans

(1) No authorization (licence) to conduct an activity or practice, operate a facility, or possess or use a source may be granted unless and until an appropriate emergency preparedness and response plan has been developed by the applicant and approved by the [name of regulatory body].

(2) The [name of regulatory body] shall establish, by regulation or conditions in an authorization (licence), a requirement that on-site and off-site emergency plans be prepared and approved for any facility, activity, practice or source that could give rise to a need for emergency intervention.

(3) In the preparation of emergency plans the following shall be taken into account, inter alia:
   (a) An assessment of the nature, likelihood and potential magnitude of resulting damage, including the population and territory at risk from an accident, malicious act or incident;
   (b) The results of any accident analyses and any lessons learned from experience and/or incidents and accidents that have occurred in connection with similar activities or practices.

(4) Emergency plans shall include the following:
   (a) A requirement that an authorized person (licensee) shall immediately notify [name of point of contact or governmental bodies] of any situation or incident that could pose a risk of radiological injury requiring an emergency intervention;
   (b) An allocation of responsibilities for notifying relevant emergency intervention and response organizations and for initiating intervention;
   (c) An identification of conditions that could create a need for emergency intervention;
   (d) Intervention levels for protective actions and the scope of their application, taking into account the possible severity of emergencies that could occur;
   (e) Procedures, including communications arrangements, for contacting and obtaining assistance from emergency intervention organizations;
   (f) A description of the methodology and instrumentation for assessing an emergency situation and its consequences;
   (g) Criteria for terminating each protective action;
   (h) Provisions for training of emergency responders and for conducting practical exercises, as appropriate, to test the adequacy of the plan and

to ensure that all parties that may be involved in emergency interventions are adequately informed and prepared for possible emergencies;

(i) Provisions for providing prior information to members of the public who could reasonably be expected to be affected by an emergency.

(5) Preparation of emergency plans for facilities, activities, practices or sources that could involve significant nuclear or radiological damage shall be coordinated with all relevant emergency intervention or response organizations, including [list of authorities — e.g. local, state, provincial, regional].

(6) Emergency plans shall be periodically reviewed, updated and tested.

Article ##. Compliance with the Emergency Plan

In the event of a nuclear or radiological emergency, the authorized person (licensee) shall implement the emergency plan as approved by the [name of regulatory body].

Article ##. National Plan for Nuclear or Radiological Emergencies

(1) A national emergency plan for responding to potential nuclear or radiological emergencies shall be developed and maintained by [name of responsible governmental body] and approved by [title of official or approving body — e.g. President, Prime Minister, Cabinet].

(2) Review and approval of the emergency plan mandated under para. 1 shall be coordinated with [list relevant governmental or other bodies].

(3) The national emergency plan for nuclear or radiological emergencies will take into account the provisions of [name of any other national emergency response plan or programme].

(4) The national emergency plan for nuclear or radiological emergencies shall include an allocation of responsibilities and actions among relevant governmental and non-governmental bodies, including arrangements for communications and public information.

Article ##. Transboundary Emergencies

(1) In the event of a nuclear or radiological emergency that poses a risk that radioactive contamination could spread beyond the boundaries of [name of State], the Government of [name of State] shall immediately notify the International Atomic Energy Agency and the relevant authorities of any

State which is or may be physically affected by a release that could be of radiological significance for that State.

(2) The [name of regulatory body] shall serve as the point of contact for providing any information or assistance regarding nuclear or radiological emergencies under the terms of relevant international instruments, including the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

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Chapter 8

MINING AND PROCESSING OF RADIOACTIVE MATERIAL

8.1. BACKGROUND

As stated in chapter 8 of the 2003 Handbook [1], most States that conduct mining or milling of uranium or thorium ores have a general legislative framework for the mining of a variety of minerals. Also, in most States with significant mining activities, responsibility for the regulation of mining and milling is typically assigned to the department or ministry responsible for mining operations involving non-radiological materials. Therefore, any specific provisions dealing with radiological aspects must take into account this existing legal framework. However, it may be desirable to introduce provisions to ensure that workers, the public and the environment are adequately protected from radiation hazards that may arise in various phases of mining operations. Such operations can include: exploration, excavation and removal of ore; siting, construction and operation of a mine or a facility for physical and chemical processing of ore; and decommissioning or closure of a mine or processing facility. Also of concern could be secondary processing facilities where concentrations of uranium or thorium and their progeny in the ore, products or residues are considered likely to produce occupational exposures that should be controlled. The fundamental elements of a radiation protection system are discussed in Chapter 4 of both the 2003 Handbook and the present volume. It is not necessary to repeat these elements in a legislative provision on mining, unless the law is a separate one that does not cover radiation protection. Similarly, legislative provisions on the decommissioning of nuclear facilities, discussed in Chapter 6 of both the 2003 Handbook and this volume, may be relevant for the decommissioning of mines or processing facilities.

Relevant IAEA guidance documents divide the mining and processing of radioactive material into four categories based on the radiological hazard posed, and thus the stringency of control required. These categories are:

(1) Uranium ore and thorium ore;
(2) Other raw materials containing elevated levels of natural radionuclides (e.g. mineral sands and phosphatic materials) or materials in which the activity concentration of natural radionuclides has been increased by processing, for which measures for occupational radiation protection are required to protect against exposures to external gamma radiation, dust and/or radon;

(3) Raw materials that do not contain elevated levels of natural radionuclides but for which measures for occupational radiation protection are required to protect against exposures to radon arising in the workplace environment;
(4) Other raw materials.

In general, operations in category (1) should be subject to a licensing requirement. Operations in categories (2) and (3) should be subject to regulatory control based on their hazards. Operations in category (4) normally require no special requirement or authorization. The regulatory body, whether a ministry or department of mining or a nuclear regulator, should specify (through regulations) which mining and processing operations are subject to regulatory control and the nature of that control (whether licensing or some other procedure).

In addition to the standard provisions on the regulatory body and regulatory functions set forth in nuclear legislation (including radiation protection and decommissioning, as appropriate), legislation for mining and processing could usefully include three provisions. The first is an identification of the specific areas of mining and processing activities that are covered by the law. The second is a listing of the information required of an applicant to engage in mining or milling activities. This listing should be keyed to licensing criteria to be implemented by the regulatory body. The third is a summary of major licensee responsibilities, including the duty to provide prompt information and seek authorization for any changed activities that could pose radiation hazards.

8.2. MODEL PROVISIONS ON MINING AND PROCESSING

Article ##. Regulation of Mining and Processing

(1) In addition to the requirements set forth in Article ## [Applications for Authorizations (Licences)] below, the [name of regulatory body] shall establish requirements for authorizations (licences) to conduct activities related to mining and processing operations involving materials that could pose health and safety risks from exposure to ionizing radiation, including the following:
    (a) Any exploration activity involving possible exposure to radiation;
    (b) Removal of uranium or thorium from a site for testing or evaluation (unless exempted);
    (c) Excavation activities at a site, including a test mine, for evaluation or delineation of the ore body;
    (d) Siting, construction or operation of a mine or processing facility;
    (e) Transport of the product of mining or milling activities;

(f) Decommissioning or closure of a mine or processing facility;
(g) Radioactive waste management.

(2) Requirements established for the activities listed in para. (1) shall comply with all radiation protection standards and requirements adopted by the [name of regulatory body] *(if the regulatory body for mining and processing is different from the nuclear regulatory body)*.

(3) The [name of regulatory body] shall establish a system of monitoring and inspection to verify compliance with any applicable regulations and any authorizations issued pursuant to this Article.

Article ##. Applications for Authorizations (Licences)

Applicants for an authorization (licence) to conduct mining or processing activities involving uranium or thorium ore from a site shall provide information on the following (as appropriate):

(a) Mining leases;
(b) Site characteristics, including geology and mineralogy;
(c) Siting or construction plans;
(d) Conceptual design of the mining or processing facility;
(e) Proposed work activities, extraction techniques and types of equipment involved;
(f) Quantities of uranium and/or thorium to be removed with the ore;
(g) Transport of the ore;
(h) Estimates of exposures and doses to workers;
(i) Measures to be taken for radiation protection;
(j) Procedures for accident prevention;
(k) Plans for effluent management systems and procedures;
(l) Procedures for dealing with accidental releases of radioactive or non-radioactive contaminants into the environment, including mitigation of hazards;
(m) Impacts on public health and safety and the environment;
(n) Siting of tailings and storage facilities or stockpiles of ore and waste rock;
(o) Proposed decommissioning plans, including financial arrangements for decommissioning;
(p) Security measures.

Article ##. Responsibility of the Authorized Person (Licensee)

(1) The authorized person (licensee) bears primary responsibility for ensuring the safety and security of any mining and processing activities conducted pursuant to the relevant authorization (licence).
(2) The authorized person (licensee) shall ensure compliance with all relevant regulations and requirements of the licence issued by the [name of regulatory body].
(3) The authorized person (licensee) shall notify the [name of regulatory body] of its intention to introduce modifications to any activity or practice it is authorized to conduct, whenever the modifications could have significant implications on its safety or security, and shall not implement those modifications unless authorized by the [name of regulatory body].
(4) The authorized person (licensee) shall provide information required by the [name of regulatory body] and the access necessary to verify compliance with applicable regulations and licence conditions.
(5) The authorized person (licensee) shall maintain such records as required by the [name of regulatory body] and shall make them available for inspection as required.

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Chapter 9

TRANSPORT OF RADIOACTIVE MATERIAL

9.1. BACKGROUND

Chapter 9 of the 2003 Handbook [1] describes the IAEA's long-standing programme for providing guidance on the safe transport of radioactive material. As with aircraft and commodities that pose safety issues, it was recognized early in the process of worldwide nuclear development that harmonized standards could avoid significant confusion and weaknesses in the handling of such materials when they are transferred among and between States. In cooperation with other international bodies responsible for the regulation of the transport of hazardous material, the IAEA regularly publishes detailed Regulations for the Safe Transport of Radioactive Material (the Transport Regulations) [25] addressing all categories of radioactive material. Also, in May 2005 the IAEA Board of Governors approved a new policy for reviewing and revising the Transport Regulations [26]. According to this policy, the IAEA Secretariat will continue to review the Transport Regulations at intervals consistent with the schedules of the United Nations Sub-committee of Experts on the Transport of Dangerous Goods and of the relevant international modal organizations in order to remain in step with the review cycles of the other relevant international bodies. As discussed in the 2003 Handbook, a number of international instruments covering air, sea and land transport have incorporated the IAEA Transport Regulations. This provides a highly desirable level of uniformity in how radioactive material is managed in international commerce. Such uniform treatment obviously makes a major contribution towards enhancing the safety and security of nuclear and other radioactive material during international transit. Many States incorporate these regulations directly into their own national regulatory arrangements. Thus, even for States with modest programmes for using radioactive material, it is useful for national legislation to reference the IAEA Transport Regulations and to translate them into the national language.

9.2. MODEL PROVISIONS ON TRANSPORT

Article ##. Regulation of the Transport of Radioactive Material

(1) The [name of responsible agency] shall establish requirements for the transport of radioactive material to, from and within the jurisdiction of [name of State].
(2) The requirements adopted pursuant to this Article shall include a categorization of radioactive material that takes into account the potential hazard posed by types, quantities and activity levels of such material.
(3) The requirements adopted pursuant to this Article shall take into account the technical requirements of the latest edition of the Regulations for the Safe Transport of Radioactive Material issued by the International Atomic Energy Agency.
(4) The requirements adopted pursuant to this Article shall include measures for the physical protection of radioactive material consistent with the latest guidance documents promulgated by the International Atomic Energy Agency.

Article ##. Requirement for Authorization to Transport Radioactive Material

(1) No person or entity shall engage in the transport of radioactive material without complying with the requirements established pursuant to Article [insert number of relevant article] above.
(2) The person or entity authorized (licensed) to engage in the transport of radioactive material shall have the primary responsibility for ensuring its safety and security during transport.

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Chapter 10

RADIOACTIVE WASTE AND SPENT FUEL

10.1. BACKGROUND

Radioactive waste management is considered in chapter 10 of the 2003 Handbook [1]. Radioactive waste results from a wide range of radioactive material and activities, including nuclear reactors and fuel cycle facilities, and the use of radioactive sources or human made radionuclides in medicine, agriculture, industry and research. The characteristics of radioactive wastes can vary widely, requiring different measures for handling, treatment and conditioning for interim and long term storage and for final disposal. Also, States have differing national policy approaches to the management and disposal of radioactive waste, based on their own economic, social, political, industrial and geographical circumstances. Some States have adopted special provisions for a national decision in principle to be made by political bodies on whether to proceed with development of nuclear activities of major significance, including nuclear waste management. Notwithstanding differences in national development policies, States utilizing nuclear energy have been able to reach a consensus on the basic principles that should be applied in the field of radioactive waste and spent fuel management. This consensus is reflected in the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the Joint Convention) [13]. This convention, although of an incentive nature, provides basic guidance for States on framing legislation for radioactive waste and spent fuel management that implements whatever national decision in principle has been adopted.

One significant difference among States is the approach adopted for the management of spent fuel from nuclear power reactors. For some States, spent fuel is a resource to be reprocessed for the production of new fuel. For other States, spent fuel is treated as waste, to be stored pending final disposal without reprocessing. The Joint Convention, through its dual structure, reflects this differing policy perspective.

National legislation for radioactive waste management will need to reflect both the nature of a State's nuclear programme and its basic national policy decisions concerning how it will manage the waste generated by that programme.

As discussed in chapter 1 of the 2003 Handbook and in the Introduction to this volume, the content of any legislative provision covering a specific subject will depend on whether the provision is part of a broad, comprehensive nuclear law or a separate law. General provisions, such as basic initial provisions on

scope, objectives and definitions, as well as those on the role of the regulatory body, radiation protection and regulatory functions, need not be repeated if the subjects of radioactive waste and spent fuel are treated in another part of a comprehensive law. If a separate law on nuclear waste is adopted, it would be desirable to include specific scope and objectives provisions, as well as some of the other initial provisions. As reflected in the Joint Convention, the objectives of waste management and spent fuel legislation are:

— To achieve a high level of safety in the management of radioactive waste (and spent fuel) in the State;
— To ensure that during all stages in the management of radioactive waste (and spent fuel) effective measures are taken to protect people and the environment from harmful effects of ionizing radiation, now and in the future, so that the needs and aspirations of the current generation are met without compromising the ability of future generations to meet their needs and aspirations;
— To prevent accidents with radiological consequences and to mitigate their consequences should they occur during any stage of the management of radioactive waste (and spent fuel).

As with other subjects, detailed technical provisions concerning radioactive waste and spent fuel management are more appropriately set forth in detailed regulations. However, basic policy and institutional matters need to be addressed in legislation. Eight of these matters are set forth in the model text in Section 10.2.

First, the State's basic decision about whether to treat spent fuel as radioactive waste should be clearly indicated in a scope article. Alternative texts have been set forth, the first for a State that has made a national decision to treat spent fuel as waste and the second for a State that considers spent fuel a resource for further development.

Second, it is useful to set forth basic principles of waste management to guide decision making by both regulators and licensees.

Third, the law should make clear that waste management activities are prohibited unless an appropriate authorization has been granted by the regulatory body.

Fourth, the law should contain a general provision on how regulatory control is to be exercised over radioactive waste and spent fuel management, including designation of the appropriate regulatory body. If these regulatory functions have already been set forth in earlier chapters of a comprehensive law, they need not be repeated here. Also, if different bodies are expected to exercise concurrent regulatory functions, the division of responsibilities needs to be clearly spelled out in the legislation.

Fifth, as in other areas, the primary responsibility of the licensee for ensuring the safety of radioactive waste or spent fuel management needs to be codified. The law should also provide a clear allocation of responsibilities between the generator of waste and the entity implementing spent fuel and waste management activities at the national level. This is necessary to avoid any gaps or overlaps in responsibilities.

Sixth, the law should identify the disposal plan to be developed by the operator as a key requirement for radioactive waste and spent fuel management. This provision reflects the terms of the Joint Convention [13].

Seventh, the law needs to explicitly state the national policy on import of nuclear waste generated outside the importing State. Three alternatives are presented. The first covers a State that has decided to prohibit any import of radioactive waste for any purpose. The second covers a State that has decided to prohibit any import of externally generated waste unless a national interest determination has been made by a political body (legislature, government or political official) and a licence to this effect has been issued by the relevant regulatory body. The third covers a State where waste may be imported without the need for such a political determination, but only provided that a licence has been issued by the relevant regulatory body.

Eighth, and finally, the law should cover possible export of radioactive waste in a manner consistent with the Joint Convention.

10.2. MODEL PROVISIONS ON RADIOACTIVE WASTE AND SPENT FUEL

Article ##. Scope [for Radioactive Waste]

This Law shall apply to the management of any radioactive waste resulting from civilian applications in [name of State], [but shall not apply to waste that contains only naturally occurring radioactive material and that does not originate from the nuclear fuel cycle, unless it is declared as radioactive waste for the purposes of this Law by the [name of regulatory body]].

[(2) This Law shall also apply to the management of spent fuel resulting from the operation of civilian nuclear reactors in [name of State].]

Article ##. National Policy and Strategy (Not in Place)

A national policy and strategy for radioactive waste (and spent fuel) management shall be initiated by the [name of regulatory body] and approved at the national level.

Article ##. National Policy and Strategy (in Place)

The present Law implements the general principles defined in the national policy and strategy as approved in the following documents: [insert numbers and dates of relevant documents].

Article ##. General Principles

At all stages in the management of radioactive waste (and spent fuel) in [name of State], the following principles shall be applied by all persons and entities, including governmental bodies:

(a) That people and the environment are adequately protected against radiological and other hazards;
(b) That the generation of radioactive waste is kept to the minimum practicable;
(c) That the interdependence among the different steps of radioactive waste (and spent fuel) management is taken into account;
(d) That protective measures for radioactive waste (and spent fuel) management in [name of State] are implemented in a manner that reflects internationally recognized criteria, standards and guidance, specifically those adopted by the International Atomic Energy Agency;
(e) That biological, chemical and other hazards that may be associated with radioactive waste (and spent fuel) management are adequately addressed;
(f) That criticality and removal of residual heat generated during radioactive waste (and spent fuel) management are adequately addressed;
(g) That actions imposing reasonably predictable impacts on future generations greater than those permitted for the current generation are avoided;
(h) That undue burdens on current and future generations are avoided;
(i) That appropriate funding arrangements are in place.

Article ##. Authorization (Licensing) Requirement for Radioactive Waste (and Spent Fuel) Management

No person or entity shall operate a radioactive waste (or spent fuel) management facility without an authorization (licence) issued by the [name of regulatory body].

Article ##. Regulation of Radioactive Waste (and Spent Fuel) Management

To ensure the safe and secure management of radioactive waste (and spent fuel) in [name of State], the [name of regulatory body] shall establish:

(a) Applicable safety and security requirements and regulations for the protection of people and the environment from adverse impacts of radioactive waste (and spent fuel) management activities;
(b) A system of authorization (licensing) of radioactive waste (and spent fuel) management activities;
(c) A system of regulatory inspection, documentation and reporting for radioactive waste (and spent fuel) management activities, and in the case of disposal, a system of institutional control;
(d) A system of enforcement to ensure compliance with applicable regulations and the terms and conditions of authorizations (licences) for radioactive waste (and spent fuel) management activities.

Article ##. Responsibility for Safety and Security of Radioactive Waste

(1) The prime responsibility for ensuring the safety and security of radioactive waste (spent fuel) inside or outside a radioactive waste or spent fuel management facility throughout its life rests with the holder of the relevant authorization (licence).
(2) The responsibility for ensuring the safety and security of radioactive waste (spent fuel) for which no authorized person (licensee) or entity can be determined shall rest with [name of relevant governmental body].

Article ##. Disposal Plan

The authorized person (licensee) of a nuclear waste disposal facility shall prepare a plan for the closure of that facility that includes both active and passive institutional controls. The [name of regulatory body] shall approve this plan prior to authorizing the operation of that facility.

Article ##. Import of Radioactive Waste (Prohibition)

Radioactive waste generated outside the territory of [name of State] shall not be imported into [name of State] for any purpose.

Article ##. Import of Radioactive Waste (National Interest Determination)

Radioactive waste generated outside the territory of [name of State] shall not be imported into [name of State] unless a determination has been made by [name of governmental official or body — e.g. Government, Cabinet of Ministers, President] that the import would be in the national interest and an authorization (licence) has been issued by the [name of regulatory body].

Article ##. Import of Radioactive Waste (Authorization or Licensing)

Radioactive waste generated outside the territory of [name of State] may be imported into [name of State] only upon the issuance of an authorization (licence) by the [name of regulatory body].

Article ##. Export of Radioactive Waste

(1) Radioactive waste (or spent fuel) generated within [name of State] may be exported only upon the issuance of an authorization (licence) by [name of governmental body].
(2) Radioactive waste (or spent fuel) shall not be authorized (licensed) for export to a destination south of latitude 60 degrees south for storage or disposal.

Article ##. Criteria for the Export of Radioactive Waste

The following criteria shall be applied in determining whether to approve an export authorization (licence):

(a) Whether the importing State will be notified of the transfer of radioactive waste (spent fuel) prior to its receipt and has consented to such transfer;
(b) Whether movement of the exported material will be conducted in conformity with relevant international obligations in all States through which the material will transit;
(c) Whether the importing State possesses the administrative and technical capacity, as well as the regulatory structure, needed to manage the exported radioactive waste (spent fuel) in a manner that ensures its safety and security, consistent with relevant internationally recognized standards, particularly those promulgated by the International Atomic Energy Agency.

Article ##. Re-import of Radioactive Waste

If an authorized (licensed) export of radioactive waste (or spent fuel) cannot be completed in conformity with this Law, the radioactive waste (or spent fuel) shall be re-imported into [name of State] unless alternative safe and secure arrangements can be made.

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Chapter 11

NUCLEAR LIABILITY AND COVERAGE

11.1. BACKGROUND

As discussed in chapter 11 of the 2003 Handbook [1], special arrangements have been adopted under both national laws and international legal instruments to deal with the problem of how to compensate persons for injuries and other damage that could result from nuclear incidents. These special regimes have been considered necessary to adequately cope with the nuclear risk. Nuclear incidents, although assessed to have a low risk of occurrence, may cause major nuclear damage, triggering very large claims for compensation. Such claims may include damage occurring outside the territory of the State in which a nuclear incident has taken place, and complex evidentiary questions may arise from the fact that health effects of radiation exposure may only manifest themselves long after such an incident. For these and other reasons, traditional laws of delict or tort law were considered to be inadequate to handle nuclear damage claims.

The 2003 Handbook describes the various international legal instruments that establish an international regime for civil liability for nuclear damage. This regime is based on a number of key principles (discussed in greater detail in Ref. [1]), the most important of which are the following:

(a) A defined scope for the liability regime based on specific concepts, namely, 'nuclear installation', 'operator', 'nuclear incident' and 'nuclear damage';
(b) Strict (no fault) liability imposed on the operator of a nuclear installation (also referred to as 'absolute' liability);
(c) Exclusive liability of the operator (so-called legal channelling of liability onto one person — namely, the operator — to the exclusion of other persons);
(d) Exonerations of the operator from liability only in certain exhaustively enumerated circumstances (e.g. nuclear incidents directly due to warlike events, grave natural disasters of an exceptional character, conduct on the part of the person suffering the damage which amounts to gross negligence or intent to cause damage);
(e) Possibility of limiting the liability in amount;
(f) Mandatory financial security of the operator to meet liability;
(g) Limitation of liability in time;
(h) Non-discrimination and equal treatment of victims;
(i) Exclusive jurisdiction of a single competent court;

(j) Obligation to recognize and enforce final judgements entered by the competent court in other contracting States without re-examination of the merits.

At present there are five main instruments that reflect these key principles of nuclear liability law. Two of these instruments establish a regional regime, whereas the other three instruments establish a global regime:

— The 1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy (the Paris Convention) [27] and the 1963 Brussels Convention Supplementary to the Paris Convention (the Brussels Supplementary Convention) [28], concluded under the auspices of the Organisation for Economic Co-operation and Development (OECD) and open to OECD Member States. The Paris Convention currently has 15 Parties, 12 of which are also Party to the Brussels Supplementary Convention.
— The Protocol of 12 February 2004 to the 1960 Paris Convention (2004 Paris Convention) [29] and the Protocol of 12 February 2004 to the 1963 Brussels Supplementary Convention (2004 Brussels Supplementary Convention) [30], concluded under OECD auspices and open to OECD Member States. These two protocols are not yet in force.
— The 1963 Vienna Convention on Civil Liability for Nuclear Damage [3], concluded under IAEA auspices and open to all Member States of the United Nations, its specialized agencies or the IAEA. The 1963 Vienna Convention currently has 36 Parties.
— The Protocol to Amend the Vienna Convention (1997 Vienna Convention) [31], concluded under IAEA auspices and open to all States. The 1997 Vienna Convention was adopted on 12 September 1997 and entered into force on 4 October 2003, and currently has 5 Parties.
— The Convention on Supplementary Compensation for Nuclear Damage (1997 CSC) [32], concluded under IAEA auspices and open to all Parties to the Paris and Vienna Conventions and to States which are Party to neither the Paris nor the Vienna Convention but have domestic legislation in place which is consistent with the principles embodied in those conventions. The 1997 CSC is not yet in force.

There is also the Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention of 21 September 1988 [33], which bridges the Paris Convention and the Vienna Convention by mutually extending the benefit of the special regime of civil liability for nuclear damage set forth under each Convention to eliminate conflicts arising from the simultaneous application of both Conventions to a nuclear incident. The Joint Protocol currently has

26 Parties, including 16 States Party to the Vienna Convention and 10 States Party to the Paris Convention.

Each of these instruments has its own field of application (although the definitions under the 1997 Vienna Convention, the 2004 Paris Convention and the 1997 CSC are effectively the same). In general, however, they all apply to liability for nuclear damage caused by a nuclear incident in a nuclear installation located in the territory of a Contracting Party, or by a nuclear incident in the course of transport of nuclear material to or from such an installation.

The nuclear liability instruments obligate Contracting Parties to conform their national laws to the provisions of the relevant instrument. Their purpose is to harmonize the national legislation of the various Contracting Parties in the area of nuclear liability, which constitutes an essential basis for implementing an international compensation regime based on the key principles discussed above and for facilitating international trade in nuclear material and items. Although Contracting Parties have some discretion in shaping national legislation on some issues, the instruments establish a unified basic regime of nuclear liability among the Contracting Parties. Moreover, these instruments adopt harmonized rules on how to resolve conflicts of laws and other procedural issues. Achieving conformity between national law and the provisions of the liability conventions is reinforced by the requirement in some of the instruments (e.g. the Vienna Conventions and the 1997 CSC) to furnish copies of national laws and regulations on nuclear liability to the IAEA for dissemination to other Contracting Parties. Further, each Contracting Party may challenge another Contracting Party's national law on the ground that it does not conform to the applicable convention provision, an action that would trigger the applicable convention's dispute resolution provisions.

The nuclear liability conventions have been drafted to make most of their provisions (particularly the basic principles) self-executing. In principle, therefore, each Contracting Party is free to decide, on the basis of its national constitutional and legal system, which approach it will use to bring its law into conformity with the relevant convention: self-executing application of the convention or transformation of the convention's content into a national nuclear liability law.

Most States with nuclear installations are likely to have nuclear liability legislation in place. If so, when joining a nuclear liability convention they will have to ensure that their legislation conforms to the convention by the time the convention enters into force for them. If national legislation does not conform, or if no special nuclear liability legislation is in place, States can freely decide — consistent with their constitutional principles — how to implement the convention. They may make the convention directly applicable and amend the existing legislation as necessary, or enact new legislation to the extent the

convention leaves discretion for the national legislator, or they may transform the convention as a whole into a national law. In the last case, they need to ensure that the content of the convention is incorporated into national legislation correctly and in full.

States without nuclear installations are unlikely to have specific nuclear liability legislation. Many of these States seem to rely on their general national law on civil liability to protect domestic victims against nuclear damage originating from nuclear installations situated in other States. As is described in the 2003 Handbook, however, a general law on civil liability might lack certain features inherent in nuclear liability regimes that would facilitate swift and adequate compensation of victims (notable differences might include, for example, stricter evidentiary rules, no channelling of liability and jurisdiction, a wider range of defences to liability, and availability of supplementary or additional public funds). In particular, transboundary nuclear damage requires internationally harmonized legal provisions based on treaty relations. Non-nuclear States may particularly benefit from the provisions on jurisdiction and the competent court, and on the enforcement and recognition of the final decisions of such courts.

Once a State without a nuclear installation has joined a convention, its courts will have jurisdiction in the event of a nuclear incident occurring in its territory, including its territorial sea, or, where applicable, in an exclusive economic zone. The court will mainly apply the lex fori (i.e. the law of the non-nuclear State), and it will only exceptionally or if stipulated by the convention take recourse to the law of the Installation State. Thus, even a State without a nuclear installation will be required to give effect to the provisions of the applicable convention, in particular its basic principles.

If its constitutional system so permits, a contracting State without a nuclear installation may prefer to make the convention directly applicable in its national legal system. This approach avoids the drafting and enactment of specific legislation. If such direct application is not possible, such a State will need to adopt legislation implementing at least the basic principles outlined above. States without nuclear installations are obviously not required to make determinations required of States with such installations (e.g. designation of the operator, or the limit of the operator's liability and the amount, type and terms of insurance or other financial security which the operator is required to have and maintain). However, in cases where their courts have jurisdiction under a convention, they will be required to give effect to the law of the Installation State in certain limited areas specified by the applicable convention. For example, the court will have to refer to the law of the Installation State to determine the extent to which damage suffered in a non-contracting State is covered. Moreover, even a non-nuclear State opting for the direct application of the relevant convention within its

domestic legal system may wish to take advantage of some of the options which the convention leaves to the law of the competent court, most notably in respect of the definition of nuclear damage.

Special liability rules have been developed in the conventions for cases of nuclear damage occurring in the course of transport. Liability for such damage rests with the operator of a nuclear installation. This can be either the sending or the receiving operator. Only exceptionally and in accordance with a defined procedure may the carrier replace the operator and be held liable. The transfer of liability from one operator to another will normally be regulated by a contract in writing. In the absence of such a contract, liability is imposed on the sending operator until the receiving operator has taken charge of the material involved.

All the nuclear liability conventions make express provision for the situation where the nuclear material is sent to or from the operator of a nuclear installation situated in a non-contracting State. Where the nuclear material is consigned to a destination in a non-contracting State, the sending operator remains liable until the material has been unloaded from the means of transport by which it arrived in the territory of that State. In the converse situation, where the material is being carried from a non-contracting State to a contracting State, liability is exceptionally imposed upon the receiving operator, provided that he or she has consented in writing to the sending of that material: the logic of this solution lies in the fact that, since the sending operator cannot be held liable under the applicable convention, it is vital for the victims of a nuclear accident that there should always be someone liable in the territory of a Contracting Party. These rules cannot be set aside by contract between the sending and receiving operator.

As with damage occurring in nuclear installations, the liability limit for damage occurring in the course of transport should be specifically set forth in national legislation, consistent with the terms of the convention to which the State is Party.

The model text in Section 11.2 provides only a very general framework based on the principles noted above, primarily reflecting the terms of the 1997 Vienna Convention, and is drafted for States that have a nuclear installation.

It should be noted that States joining the international regime through the annex to the 1997 CSC would be required to adopt legislation mirroring most of the substantive terms of the 1997 Vienna Convention or the 2004 Paris Convention, but also some additional provisions to cover the supplementary compensation limits made available by the 1997 CSC.

As the previous discussion makes clear, drafters of national legislation on nuclear liability will need to refer carefully to the terms of specific international instruments to which they may be a Party or to which they may consider becoming a Party, as well as to their own constitutional and legal rules for the application and implementation of international instruments.

11.2. MODEL PROVISIONS ON NUCLEAR LIABILITY

Article ##. Definitions

For the purposes of this Law:

(a) 'Operator', in relation to a nuclear installation, means the person designated or recognized by [name of State] as the operator of that installation.

(b) 'Nuclear material' means:
  (i) Nuclear fuel, other than natural uranium and depleted uranium, capable of producing energy by a self-sustaining chain process of nuclear fission outside a nuclear reactor, either alone or in combination with some other material;
  (ii) Radioactive products or waste.

(c) 'Nuclear fuel' means any material which is capable of producing energy by a self-sustaining chain process of nuclear fission.

(d) 'Radioactive products or waste' means any radioactive material produced in, or any material made radioactive by exposure to the radiation incidental to, the production or utilization of nuclear fuel, but does not include radioisotopes which have reached the final stage of fabrication so as to be usable for any scientific, medical, agricultural, commercial or industrial purpose.

(e) 'Nuclear installation' means:
  (i) Any nuclear reactor other than one with which a means of sea or air transport is equipped for use as a source of power, whether for propulsion thereof or for any other purpose;
  (ii) Any factory using nuclear fuel for the production of nuclear material or any factory for the processing of nuclear material, including any factory for the reprocessing of irradiated nuclear fuel;
  (iii) Any facility where nuclear material is stored, other than storage incidental to the carriage of such material.

[NOTE: The definition may also provide that, if the Government or competent State authority so decides, the nuclear installations of one operator located at the same site shall be considered as a single nuclear installation.]

(f) 'Nuclear reactor' means any structure containing nuclear fuel in such an arrangement that a self-sustaining chain process of nuclear fission can occur therein without an additional source of neutrons.

(g) 'Nuclear damage' means:

(i) Loss of life or personal injury;

(ii) Loss of or damage to property;

(iii) Economic loss arising from loss or damage referred to in subsection (i) or (ii), in so far as not included in those subsections, if incurred by a person entitled to claim in respect of such loss or damage;

(iv) The costs of measures of reinstatement of impaired environment, unless such impairment is insignificant, if such measures are actually taken or to be taken, and in so far as not included in subsection (ii);

(v) Loss of income deriving from an economic interest in any use or enjoyment of the environment, incurred as a result of a significant impairment of that environment, and in so far as not included in subsection (ii);

(vi) The costs of preventive measures, and further loss or damage caused by such measures;

(vii) Any other economic loss, other than any caused by the impairment of the environment, if permitted by the general law on civil liability of the competent court,

in the case of subsections (i)–(v) and (vii) above, to the extent that the loss or damage arises out of or results from ionizing radiation emitted by any source of radiation inside a nuclear installation, or emitted from nuclear fuel or radioactive products or waste in, or of nuclear material coming from, originating in, or sent to, a nuclear installation, whether so arising from the radioactive properties of such matter, or from a combination of radioactive properties with toxic, explosive or other hazardous properties of such matter.

[NOTE: With respect to the heads of damage in subsections (iii)–(vii) above, the legislator should determine in the Law the extent of their coverage.]

(h) 'Nuclear incident' means any occurrence or series of occurrences having the same origin which causes nuclear damage or, but only with respect to preventive measures, creates a grave and imminent threat of causing such damage.

(i) 'Special drawing right', hereinafter referred to as SDR, means the unit of account defined by the International Monetary Fund and used by it for its own operations and transactions.

(j) 'Measures of reinstatement' means any reasonable measures which have been approved by the competent authorities of the State where the measures were taken, and which aim to reinstate or restore damaged or destroyed

components of the environment, or to introduce, where reasonable, the equivalent of these components into the environment.

[NOTE: The law of the State where the damage is suffered shall determine who is entitled to take such measures.]

(k) 'Preventive measures' means any reasonable measures taken by any person after a nuclear incident has occurred to prevent or minimize damage referred to in subsections (g)(i)–(v) or (vii), subject to any approval of the competent authorities required by the law of the State where the measures were taken.

(l) 'Reasonable measures' means measures which are found under the law of [name of court] to be appropriate and proportionate having regard to all the circumstances, for example:

(i) The nature and extent of the damage incurred or, in the case of preventive measures, the nature and extent of the risk of such damage;

(ii) The extent to which, at the time they are taken, such measures are likely to be effective;

(iii) Relevant scientific and technical expertise.

Article ##. Liability of the Operator

(1) Subject to the provisions of this Law, only the operator of a nuclear installation shall be liable for nuclear damage wherever suffered, upon proof that such damage has been caused by a nuclear incident at the operator's nuclear installation.

(2) Liability for nuclear damage caused by nuclear material which was stolen, lost, jettisoned or abandoned lies with the operator who was last authorized to possess such material.

(3) Liability for nuclear damage shall apply to nuclear damage wherever suffered.

[NOTE: The Law, however, may provide for the exclusion of nuclear damage suffered (a) in the territory of a non-contracting State to the 1997 Vienna Convention; or (b) in any maritime zones established by a non-contracting State in accordance with the international law of the sea. Such exclusion, however, shall only apply to such a non-contracting State which has a nuclear installation in its territory or in any of its established maritime zones and does not afford reciprocal benefits.]

[NOTE: Under the Paris regime, liability for damage suffered in the territory, or maritime zones, of a non-contracting State which has a nuclear installation in its territory is not covered, unless that State, at the time of the nuclear incident, is (a) a Contracting Party to the 1963 Vienna Convention (and any amendment thereto which may be in force for it) and to the 1988 Joint Protocol, provided that the Installation State is also a Party to the Joint Protocol; or (b) has in force nuclear liability legislation "which affords equivalent reciprocal benefits, and which is based on principles identical to those of this Convention, including, inter alia, liability without fault of the operator liable, exclusive liability of the operator or a provision to the same effect, exclusive jurisdiction of the competent court, equal treatment of all victims of a nuclear incident, recognition and enforcement of judgements, free transfer of compensation, interests and costs".]

Article ##. Liability during Transport

(1) In the case of transport of nuclear material, the sending operator shall be liable for nuclear damage until the receiving operator has taken charge of the material involved, unless the sending and receiving operators have entered into a written agreement to shift liability at another stage of transport or to shift liability to the carrier of the material at its request. In the latter case, the carrier shall be considered as the operator liable in accordance with this Law.

(2) In the case where the nuclear material has been sent to a person within the territory of a State that is not Party to the [title of the convention], the sending operator shall be liable before the nuclear material has been unloaded from the means of transport by which it has arrived in the territory of that non-contracting State.

(3) In the case where the nuclear material has been sent from a person within a State that is not Party to the [title of the convention], the receiving operator shall be liable only after the nuclear material has been loaded on the means of transport by which it is to be carried from the territory of that non-contracting State.

Article ##. Amount of Liability

The minimum amount of liability of the operator of a nuclear installation is [300 million SDRs under the 1997 Vienna Convention and the 1997 CSC, 700 million EUR under the 2004 Paris Convention] for nuclear damage caused by any one nuclear incident.

[NOTE: Alternatively, the amount may be set at 150 million SDRs, provided that in excess of that amount and up to at least 300 million SDRs, public funds shall be made available to compensate nuclear damage.]

[NOTE: The 300 million SDRs is a minimum amount foreseen in the 1997 Vienna Convention and the 1997 CSC, and a higher amount may be provided for in the Law. The 1997 CSC also foresees contributions by Contracting Parties to an international fund, if this national compensation amount is inadequate to ensure the payment of all claims for compensation for damage. Should unlimited liability be chosen, this provision and section 3 of the article below on Financial Security will need to be amended accordingly.]

[NOTE: A lower amount of liability for the operator may be established, having regard to the nature of the nuclear installation or nuclear material involved and to the likely consequences of a nuclear incident that could result therefrom, provided that in no event shall any amount so established be less than 5 million SDRs and provided that public funds shall be made available up to 300 million SDRs.]

[NOTE: The 2004 Paris Convention provides for a minimum amount of 350 million EUR for liability of the operator in respect of nuclear damage caused by any one nuclear incident for a maximum period of five years from the date of adoption of the Protocol of 12 February 2004. Also under the 2004 Paris Convention, liability for nuclear damage occurring in a non-contracting State that has a nuclear installation on its territory at the time of a nuclear incident may be fixed lower than 700 (or the transitional amount of 350) million EUR to the extent that such State does not afford reciprocal benefits of an equivalent amount.]

Article ##. Financial Security

(1) The operator of a nuclear installation shall be required to have and maintain insurance or other financial security covering its liability for nuclear damage.

(2) The operator of a nuclear installation shall submit for approval to [name of relevant governmental body] the conditions of the financial security required under para. (1).

(3) The Government of [name of State] shall ensure the payment of claims for compensation for nuclear damage which have been established against the operator to the extent that the yield of the insurance or financial security of the operator set under para. (1) is inadequate to satisfy such claims. In any event, the payment of such claims shall not be in excess of the amount established in Article ## [Amount of Liability].

[NOTE: This Article is not needed for States without nuclear installations.]

Article ##. Extinction of Rights of Compensation

(1) Rights of compensation for nuclear damage under this Law shall be extinguished if an action is not brought:
   (a) With respect to loss of life or personal injury, within 30 years from the date of the nuclear incident;
   (b) With respect to any other nuclear damage, within 10 years from the date of the nuclear incident.

(2) Rights of compensation for nuclear damage under this Law shall be extinguished 3 years from the date on which the person suffering damage had knowledge or ought reasonably to have had knowledge of the damage and of the operator liable for the damage, unless the time limits established in para. 1 of this Article have expired.

(3) Unless the law of the [competent court] provides to the contrary, any person who claims to have suffered nuclear damage and who has submitted a claim for compensation within the period applicable pursuant to this Article may amend the claim to take into account any aggravation of the damage, even after the expiration of that period, provided that a final judgement has not been entered.

[NOTE: Under the 1997 CSC, an Annex State is only required to have an extinction period of 10 years. However, there is nothing to prevent an Annex State from opting for 30 years in line with that in the 1997 Vienna Convention and the 2004 Paris Convention.]

Article ##. Compensation

(1) The nature, form and extent of the compensation, as well as the equitable distribution thereof, shall be governed by the provisions of this Law.

(2) Where claims exceed, or are likely to exceed, the maximum amount made available pursuant to Article ## [Amount of Liability], compensation for nuclear damage caused by a nuclear incident shall be provided first for compensation for any loss of life or personal injury. After all these claims have been satisfied, claims for other loss or damage shall be compensated.

(3) Interest and costs awarded by the competent court for compensation for nuclear damage shall be exclusive of the minimum liability amounts specified in Article ## [Amount of Liability].

Article ##. Jurisdiction

(1) The [competent court] shall be the only court having jurisdiction to examine claims for compensation for nuclear damage pursuant to this Law caused by a nuclear incident occurring within the territory or within the exclusive economic zone of [name of State] and which are brought before that court according to the provisions of this Law.
(2) Any person who has a right of compensation for nuclear damage pursuant to this Law may bring an action for compensation against the liable operator, or directly against the insurer or against any other person providing financial security pursuant to Article ## [Financial Security].

[NOTE: Any State may bring an action on behalf of persons who have suffered nuclear damage, who are nationals of that State or have their domicile or residence in its territory, and who have consented thereto.]

Article ##. Exceptions to Liability

(1) The operator of a nuclear installation shall not be liable for nuclear damage that is proved to be directly caused by an act of armed conflict, hostilities, civil war or insurrection.
(2) The operator of a nuclear installation shall not be liable for nuclear damage:
    (a) To the nuclear installation itself or any other nuclear installation, including a nuclear installation under construction, on the site where the installation is located;
    (b) To any property on the same site which is used or to be used in connection with any such installation.
(3) If the operator of a nuclear installation proves that the nuclear damage resulted wholly or partly either from the gross negligence of the person suffering the damage or from an act or omission of such person done with intent to cause damage, the operator may be relieved, wholly or partly, from his obligation to pay compensation in respect of the damage suffered by such person.
(4) Nothing in this Law shall affect the liability of any individual for nuclear damage for which the operator, by virtue of paras 2 and 3 of this Article, is not liable and which that individual caused by an act or omission done with intent to cause damage.

Article ##. Judgements

A final judgement by a foreign court awarding compensation in the case of nuclear damage shall be recognized and enforced as if it were a judgement of [name of State], except:

(a) Where the judgement was obtained by fraud;
(b) Where the Party against whom the judgement was pronounced was not given a fair opportunity to present his case; or
(c) Where the judgement is contrary to the public policy of [name of State] or is not in accord with fundamental standards of justice.

[NOTE: Recognition and enforcement of foreign courts' final judgements is relevant only with respect to States in treaty relations under the applicable nuclear liability instrument.]

Article ##. Non-discrimination

[This chapter of the Law] shall be applied without discrimination based upon nationality, domicile or residence.

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Chapter 12

SAFEGUARDS

12.1. BACKGROUND

As discussed in chapter 12 of the 2003 Handbook [1], the safeguards measures implemented by the IAEA are the key means of verifying compliance by States with their commitments not to use nuclear material to develop nuclear weapons or other explosive devices. As also indicated in that volume, the implementation of safeguards depends on the State's adherence to relevant international treaties, such as the Treaty on the Non-Proliferation of Nuclear Weapons (the NPT) [7] and/or regional nuclear-weapon-free zone treaties, and to the provisions of the safeguards agreement(s) and relevant protocols concluded by the State with the IAEA. Under the safeguards agreement concluded pursuant to the NPT, a State is required to establish a system of accounting for and control of nuclear material. The provisions in the national law will need to address the establishment of such a system and the regulatory body responsible for it. Other specific requirements, for example, those pertaining to actions required of authorized persons (licensees), are, however, more appropriately contained in national implementing regulations.

It should be noted that the application of safeguards also involves issues related to the export and import of nuclear material and related facilities, equipment and material (see Chapter 13 for a discussion of these issues).

The basic elements of a legislative framework for safeguards are similar to those for other subjects covered in this volume. They include:

(a) A clear statement of the objectives of the law or relevant chapter of the law;
(b) A basic undertaking of the general principle affirming the exclusively peaceful use of nuclear energy in the State;
(c) Clear definitions of key terms used in implementing the relevant safeguards agreement(s) and protocols thereto;
(d) Designation of a regulatory body to coordinate the implementation of safeguards;
(e) Provisions regarding authorization or licensing, inspection, and enforcement measures relevant to nuclear material, nuclear facilities and other items subject to the safeguards agreement(s) and protocols thereto;
(f) Establishment and maintenance of a State system of accounting for and control of nuclear material;
(g) Arrangements for supporting verification activities conducted by the IAEA;

(h) Requirements for record keeping by those authorized to produce, process or use nuclear material;
(i) Requirements for reporting of information to the regulatory body and to the IAEA;
(j) Arrangements for the submission of amplifications or clarifications of any information requested by the IAEA.

Some of these elements may already have been included in other parts of the law. In this case they need not be repeated in a safeguards chapter.

12.1.1. Small quantities protocol

Since the publication of the 2003 Handbook, an important development in safeguards has taken place which may be relevant to States having little or no nuclear material. Since 1974, the Board of Governors of the IAEA has approved protocols to comprehensive safeguards agreements for States having limited quantities of nuclear material and no nuclear material in a facility based on annex B of the Standard Text of Safeguards Agreement(s) in connection with the Treaty on the Non-Proliferation of Nuclear Weapons [34]. These protocols, commonly referred to as small quantities protocols (SQPs), held in abeyance the implementation of most of the detailed measures provided for in part II of a comprehensive safeguards agreement for as long as the State continued to satisfy the criteria for eligibility (i.e. that the quantities of nuclear material in the State remained below the quantities specified in the SQP and that the State had no nuclear material in a facility). It is important to note in this context, however, that the obligation pursuant to para. 7 of IAEA document INFCIRC/153 [35], to establish and maintain a State system of accounting for and control of nuclear material (SSAC), was not held in abeyance for an SQP State, nor was the obligation to report imports and exports of any nuclear material or material containing uranium or thorium.

Against the background of efforts to strengthen the IAEA's safeguards system, it was recognized that the 1974 standard text of the SQP represented a weakness in the safeguards system. As discussed in the 2003 Handbook, the Model Additional Protocol, approved by the Board of Governors in 1997 [36], enhanced the IAEA's ability to draw safeguards conclusions for States with comprehensive safeguards agreements, including SQP States. However, the implementation of an additional protocol in an SQP State did not address the IAEA's need to receive an initial declaration by the State of nuclear material in the State, or design information for nuclear facilities at an early stage. Nor did it address the IAEA's need to be able to verify such information on a routine basis. As a consequence, the IAEA Board of Governors decided on 20 September 2005

that, although SQPs should remain part of the IAEA's safeguards system, they should be modified in several respects. The modification of the standard text resulted in a revision of the eligibility criteria for any new SQPs and a revision of the standard text of the SQP (see GOV/INF/276/Mod.1 and Mod.1/Corr.1, 21 and 28 February 2006, respectively [37]). The Board of Governors also asked the IAEA Secretariat to renegotiate protocols with SQP States in accordance with the revised criteria, and where the State would no longer qualify for an SQP, to agree with the State on the rescission of the old SQP. The consequences of the Board's decision are threefold: First, an SQP is no longer available to a State which has either a planned or an existing facility (as defined in INFCIRC/153 [35]). Second, an SQP State will be required to provide an initial report on nuclear material and to provide early design information as soon as the decision to construct or to authorize construction of a new facility has been taken. Third, the implementation of inspections in the State will no longer be held in abeyance. Given the changes mentioned above, it is essential for States which have SQPs in force, or which may be eligible for an SQP under the new criteria, to consider adopting, or revising, their national legislation accordingly.

12.2. MODEL PROVISIONS ON SAFEGUARDS

Article ##. Peaceful Use Commitment

(1) Nuclear material in [name of State] shall be used exclusively for peaceful purposes and in accordance with relevant international obligations undertaken by [name of State].
(2) Nuclear weapons and other explosive devices, the direct or indirect control over such weapons or devices, the manufacture or other acquisition of such weapons or devices, and the seeking or receiving of any assistance in the manufacture of nuclear weapons or other explosive devices is prohibited in [name of State].

Article ##. Application of Safeguards

(1) To ensure compliance with the relevant commitments of [name of State] pursuant to [name(s) of relevant instruments — e.g. the NPT, nuclear-weapon-free-zone treaties or other non-proliferation undertakings], the International Atomic Energy Agency (IAEA) shall have the right to apply safeguards as provided for in the relevant agreement(s) between [name of State] and the IAEA, and any protocols thereto.

(2) The [name of responsible governmental body] shall ensure the implementation of the obligations of [name of State] arising from [insert reference to the NPT and/or any other relevant non-proliferation treaty], the [insert reference to the relevant safeguards agreement] and any protocols thereto.
(3) The [name of responsible governmental body] shall:
    (a) Verify the implementation of the obligations of [name of State] arising from the instruments referred to in para. (2) above;
    (b) Collect and provide to the IAEA the information required to fully implement the safeguards agreement and any protocols thereto;
    (c) Facilitate access by IAEA inspectors within the territory of [name of State];
    (d) Coordinate with [name(s) of other relevant governmental bodies] in connection with the provision of information to the IAEA in connection with the safeguards agreement and any protocols thereto.

Article ##. Cooperation in the Application of Safeguards

All agencies of the Government of [name of State] and authorized (licensed) persons and entities shall cooperate fully with the IAEA in the application of safeguards measures, including by:

(a) Promptly providing all necessary information under the relevant safeguards agreement(s) and any protocols thereto between [name of State] and the IAEA;
(b) Providing access to locations as required by the relevant safeguards agreement and any protocols thereto;
(c) Providing support to State and IAEA inspectors in the performance of their tasks;
(d) Rendering to State and IAEA inspectors all necessary services in connection with their inspections.

Article ##. Safeguards Inspections

(1) Duly authorized representatives of the [name of responsible governmental body] and designated inspectors of the IAEA shall have access to any location or facility as provided for under the safeguards agreement and any protocols thereto, with a view to conducting the verification activities authorized by these instruments.
(2) Any person performing activities subject to the safeguards agreement and any protocols thereto shall allow the [name of responsible governmental

body] and duly designated inspectors of the IAEA to carry out any measures the [name of responsible governmental body] or the IAEA, respectively, considers necessary or appropriate for achieving compliance with the undertakings of [name of State] arising from such instrument(s).

Article ##. Designation of IAEA Inspectors and Issuance of Visas

(1) The [name of responsible governmental body] shall be responsible for approving the designation to [name of the State] of inspectors proposed by the IAEA.
(2) The [name of responsible governmental body] shall issue any necessary permission(s), including visas, where required, in an expedited manner, to enable designated inspectors of the IAEA to [name of State] to enter and remain in the territory of [name of State] for the purpose of carrying out their safeguards functions in accordance with the safeguards agreement and any protocols thereto.

Article ##. State System of Accounting for and Control of Nuclear Material (SSAC)

The [name of responsible governmental body] shall ensure the effective implementation of safeguards in [name of State] by establishing and implementing:

(a) A system for the measurement of nuclear material;
(b) A system for the evaluation of measurement accuracy;
(c) Procedures for reviewing measurement differences;
(d) Procedures for carrying out physical inventories;
(e) A system for evaluation of unmeasured inventories;
(f) A system of records and reports for tracking nuclear material inventories and flows;
(g) Procedures for ensuring that accounting procedures and arrangements are being operated correctly;
(h) Procedures for reporting to the IAEA.

Article ##. Responsibility of Authorized Persons (Licensees)

Persons authorized (licensed) to possess, use, handle or process nuclear material subject to the safeguards agreement and any protocol thereto shall:

(a) Maintain records as prescribed by [name of responsible governmental body];
(b) Submit the prescribed reports to the [name of responsible governmental body] in the form, and at the times, specified by [name of responsible governmental body];
(c) Perform the measurements of nuclear material and maintain required measurement control programmes, as specified by [name of responsible governmental body];
(d) Provide the [name of responsible governmental body] with information regarding the design of any nuclear facility, including any design changes, as specified by [name of responsible governmental body];
(e) Conduct physical inventories of nuclear material, as specified by [name of responsible governmental body];
(f) Give notice to the [name of responsible governmental body] of the import or export of nuclear material, as specified by [name of responsible governmental body];
(g) Maintain physical protection and other security measures with respect to nuclear material, as specified by [name of responsible governmental body];
(h) Without delay, report to [name of responsible governmental body] any loss of nuclear material in excess of limits prescribed by [name of responsible governmental body];
(i) Provide reports on planned future activities, as specified by [name of responsible governmental body];
(j) Allow authorized representatives of the [name of responsible governmental body] and designated officials of the IAEA to carry out, without hindrance, inspections at any facility or other location as provided for under this Law, the safeguards agreement or any protocol thereto.

Article ##. Information Requirements for Research and Development Activities Related to the Nuclear Fuel Cycle

(1) Any person intending to carry out research and development activities related to the nuclear fuel cycle, as defined in the safeguards agreement and any protocols thereto, shall provide to the [name of responsible governmental body] information on these activities prior to their commencement;
(2) Any authorized person (licensee) performing activities subject to the safeguards agreement or any protocol thereto shall submit to [name of responsible governmental body] the information and data necessary for compliance by [name of State] with the undertakings by [name of State] arising from these instruments.

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Chapter 13

EXPORT AND IMPORT CONTROLS

13.1. BACKGROUND

As discussed in chapter 13 of the 2003 Handbook [1], controls over transfers of nuclear and other radioactive material and related equipment and technology are conducted for a variety of reasons. Such controls are often seen only as a means of influencing activities taking place beyond the State's borders. However, in a fundamental sense, both export and import controls are important to enable a State to maintain its sovereign control over activities taking place within its own territory. As discussed in the Introduction to this volume, the 3S concept is relevant to export and import controls because these controls are relevant to safety, security and safeguards measures in the State.

Export controls are clearly an important means of helping to prevent the spread of nuclear weapons and nuclear explosive devices. Such controls are required under relevant multilateral and regional nuclear non-proliferation instruments, most prominently, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) [7], and the reporting of certain exports and imports to the IAEA is required under safeguards agreements negotiated in connection with such instruments. From a security perspective, both export and import controls are relevant to preventing and detecting illicit trafficking, and can help to prevent the acquisition of nuclear and radioactive material by persons or entities that could seek to use them for malicious purposes. Export and import controls also contribute to safety by helping States to ensure that exported or imported items[2] are only acquired by persons or entities with the capability of using them in an acceptable manner and only for authorized purposes.

Effective export and import controls are based on a number of key elements of a legislative framework, including:

(a) A prohibition of the export or import of nuclear and other radioactive material, and of other related equipment or technology, without authorization as required by the relevant governmental body or bodies;

[2] The legislation of some States refers to 'goods', while that of other States refers to 'items'; other States use both 'goods and 'items'. For the purposes of this volume, both formulations have been included.

(b) A list of such specified material, equipment and technology subject to export/import controls;
(c) A system of regulatory control of transfers of such specified material, equipment and technology;
(d) Verification measures to ensure that transferred commodities are not diverted from their authorized uses;
(e) Measures to ensure that the necessary information on the functioning of the export and import control system is available to stakeholders, including persons engaged in nuclear commerce;
(f) A system of enforcement for violations of export or import controls.

States have generally adopted one of two approaches to control nuclear related goods/items. The first is to include the list of nuclear related goods/items subject to export and import controls in a general strategic trade law covering all exported or imported commodities controlled by the State. The second approach is to include export and import control provisions (including the list of controlled nuclear related goods/items) in a separate chapter of a comprehensive nuclear law. Whichever approach is adopted by a State, legislative drafters need to ensure that all relevant elements are included in the State's legislation.

There are certain requirements contained in safeguards agreements, and in protocols thereto, which are relevant to national export and import legislation. Comprehensive safeguards agreements (CSAs) concluded pursuant to the NPT contain provisions related to international transfers of nuclear material (see paras 34 and 91–97 of INFCIRC/153 [35]). Under additional protocols to such agreements, additional information is required to be reported to the IAEA concerning nuclear related exports and imports (see, e.g., Article 2.a.(ix) of INFCIRC/540 [36], requiring reporting of exports and imports in connection with equipment and non-nuclear material specified in annex II of the additional protocol).

Prevention of the unauthorized transfer — commonly referred to as 'illicit trafficking' — of nuclear and other radioactive material is also related to measures for export and import control. This subject is discussed in chapter 14 of the 2003 Handbook, on Physical Protection. For consistency, the present volume also places the discussion of illicit trafficking in Chapter 14, which also discusses nuclear security and physical protection.

Since the drafting of the 2003 Handbook, a number of events, and the development of new and revised international instruments, have reinforced the need to adopt and implement effective nuclear export and import controls. One such development was the adoption in April 2004 of United Nations Security Council resolution 1540 (2004) [38]. This resolution has broad implications for efforts to enhance both nuclear non-proliferation and nuclear security, and is

discussed in greater detail in Chapter 14 of this volume. The resolution is binding on all United Nations Member States, having been enacted pursuant to the United Nations Security Council's authority under chapter VII of the United Nations Charter to adopt measures in response to threats to international peace and security. Therefore, it is important for drafters of export and import legislation to ensure that provisions implementing Security Council resolution 1540 are covered by the State's law. Paragraph 3 of that resolution mandates that:

> "[A]ll States shall take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear, chemical, or biological weapons and their means of delivery, including by establishing appropriate controls over related materials and to this end shall … [e]stablish, develop, review and maintain appropriate effective national export and trans-shipment controls over such items, including appropriate laws and regulations to control export, transit, trans-shipment and re-export and controls on providing funds and services related to such export and trans-shipment such as financing, and transporting that would contribute to proliferation, as well as establishing end-user controls; and establishing and enforcing appropriate criminal or civil penalties for violations of such export control laws and regulations".

Another significant event in connection with export and import controls was the development by the IAEA of a publication entitled Guidance on the Import and Export of Radioactive Sources [17], which contains a number of provisions that should be considered for inclusion in the law to prevent the loss of control of radioactive sources that could jeopardize safety and security. The guidance in Ref. [17] follows the categorization of sources adopted in the Code of Conduct on the Safety and Security of Radioactive Sources (2004) [16] and provides a useful framework for the review of applications and decisions on authorizing the export or import of radioactive sources in categories I and II. The basic elements of Ref. [17] are as follows:

— Identification of a point of contact by each State for facilitating export and import of relevant sources;
— For export authorizations, a set of procedures that include recommended factors to be considered in granting consent to export, information to be provided in a request for consent, criteria for evaluation of a request and notification prior to shipment;
— For import authorizations, a number of factors to be considered;
— Guidance on the handling of cases involving exceptional circumstances such as considerable health or medical need or imminent radiological hazard;

— Factors relating to transit and trans-shipment;
— A State self-assessment questionnaire (annex I).

National legislation on nuclear related export and import controls will need to include the basic regulatory functions necessary for implementation. If these are set forth in other parts of the law, they need not be included in a separate chapter on export and import controls. Legislation should, however, reflect the State's obligations under relevant international instruments to which it is Party. Some States have committed themselves to controlling the export of certain materials, goods/items and technology in accordance with procedures agreed by a group of States (see Refs [39, 40]). For States that have entered into such commitments, relevant basic legislative provisions as outlined below need to be reflected in the national laws and regulations. Detailed provisions need not be included in implementing legislation.

First, there needs to be a clear assignment of responsibility for implementing export and import controls. In many States, this function is not normally carried out by the nuclear regulatory body, but by a ministry or department with overall responsibility for international trade (e.g. a customs ministry). In such cases, the law should provide a clear delineation of responsibilities, including participation by the nuclear regulatory body in export or import decisions, in order to reflect technical expertise in the nuclear field.

Second, the law should contain a requirement in connection with nuclear and nuclear related exports and imports for authorization by the relevant authority or authorities. This authorization should take into consideration the need for consistency and harmonization with other regulatory controls implemented to ensure safety and security of other activities (e.g. those discussed in Chapter 3, such as manufacturing, use, storage).

Third, the basic features of the export and import control system should be outlined in the legislation. While an important feature is the establishment of national lists of controlled materials, equipment and technology, such lists are more appropriately published in the form of regulations, so that they may be more easily revised and updated to reflect technological developments and other relevant changes of circumstance.

Fourth, the law can usefully include general licensing criteria for both exports and imports, although more specific requirements may be set forth in national regulations.

Fifth, the law needs to clearly provide the relevant State authority with the means to obtain complete and timely information concerning exported or imported material, equipment and technology, to enable the State to provide relevant information to the IAEA in accordance with its safeguards agreement and any protocols thereto.

Sixth, provisions on the enforcement of export and import controls, including appropriate criminal or civil penalties for violations, must be included in this chapter unless they are already established in another part of the law.

13.2. MODEL PROVISIONS ON EXPORT AND IMPORT CONTROLS

Article ##. Objectives of Export and Import Controls

Controls over the export and import of nuclear and other radioactive material, nuclear related and other relevant equipment and technologies (hereinafter referred to as [goods] [items]) to and from [name of State] shall be conducted to advance the following objectives:

— To protect the public and the environment and to ensure the security and economic interests of [name of State];
— To meet the obligations of [name of State] under relevant international instruments entered into by [name of State];
— To support international cooperation in the safe and peaceful uses of nuclear energy;
— To support international efforts to prevent the proliferation of nuclear weapons and explosive devices or radiological dispersal devices.

Article ##. List of Controlled [Goods] [Items]

In accordance with the international obligations and commitments of [name of State], the [name of governmental body] shall establish a list of [goods] [items] subject to control for purposes of import into and export from [name of State].

Article ##. Prohibition of Unauthorized (Unlicensed) Transfers

The export from or import into [name of State] of a controlled [good] [item] without prior authorization (licence) by [name of responsible governmental body] in accordance with the required procedure is prohibited.

Article ##. Authority to Control Nuclear Exports and Imports

The [name of governmental body] of [name of State] shall adopt the necessary measures, including a system of authorizations (licences), to control the export and import of controlled [goods] [items].

Article ##. Authorizations (Licences)

(1) The [name of responsible governmental body] shall issue regulations setting forth the details of the authorization (licensing) process for exports and imports of controlled [goods] [items], including:
   (a) The procedures for applying for an authorization (licence), including schedules for reviewing and deciding on applications;
   (b) A list of [goods] [items] requiring an authorization (licence);
   (c) Provision for periodic revision or updating of lists of controlled [goods] [items] to reflect developments in technology or changes in relevant circumstances;
   (d) Criteria for the evaluation of an application and issuance of an authorization (licence);
   (e) End user controls;
   (f) Requirements for notification prior to shipment of exports where such notification has been determined to be necessary;
   (g) A schedule of fees or charges for granting authorizations (licences);
   (h) Provisions for trans-shipment of [goods] [items] otherwise not requiring an export authorization (licence);
   (i) Requirements for records to be kept regarding authorized activities;
   (j) Protection of confidential information relating to authorized activities.

(2) Review and approval of authorizations (licences) shall be conducted with the participation and concurrence of [names of relevant governmental bodies].

Article ##. Export Authorization (Licensing) Criteria

Criteria for the granting of an authorization (licence) to export [goods] [items] identified by the [name of governmental body] as being subject to control shall include the following:

(a) That the receiving State has made a binding commitment to use the transferred [goods] [items] for peaceful purposes only;
(b) That IAEA safeguards will be applied to the transferred [goods] [items];
(c) [That the receiving State has placed all its nuclear material and nuclear facilities under international safeguards;][3]

[3] It should be noted that the inclusion of this provision is dependent upon the policy/practices of the exporting State.

(d) That retransfer of exported [goods] [items] to a third State is subject to a right of prior approval by [name of State];
(e) That any reprocessing of supplied nuclear material, or nuclear material product, processed or used in or by the use of exported [goods] [items] is subject to a right of prior approval by [name of State];
(f) That levels of physical protection that will apply to the exported material will be consistent with those set forth in the Convention on the Physical Protection of Nuclear Material;
(g) That the applicant has provided information on the end use and end user of the [goods] [items] to be transferred that confirms the legitimate peaceful and safe use of such [goods] [items];
(h) That, for spent nuclear fuel or nuclear waste, [name of State] has received prior notification and has consented to the transfer;
(i) That, for spent nuclear fuel or nuclear waste, [name of State] shall have demonstrated the administrative and technical capability and regulatory structure necessary to manage the material in a safe and secure manner;
(j) That nuclear material will not be transferred to geographical areas where such materials may not be transferred under the terms of international instruments adopted by [name of State].

Article ##. Import Authorization (Licensing) Criteria

Criteria for the granting of an authorization (licence) to import [goods] [items] identified by the [name of governmental body] as being subject to control shall include the following:

(a) That the import of the [goods] [items] is not otherwise prohibited by the legislation of [name of State];
(b) That the designated recipient of any imported [goods] [items] subject to authorization (licensing) has been granted the appropriate authorization (licence) consistent with the applicable laws and regulatory requirements in [name of State];
(c) That the end user of the imported [goods] [items] has the demonstrated technical and administrative capability and resources to use the imported [goods] [items] in a safe and secure manner.

Article ##. Enforcement and Penalties

(1) Investigations of possible non-compliance with (violation of) [the provisions of] this Law and applicable regulations shall be conducted by [name of governmental body].

(2) Any person who fails to comply with this Law, applicable regulations or the terms of any authorization (licence) may be subject to administrative measures established by this Law and any applicable regulations of the [name of governmental body].

(3) Any person who fails to comply with this Law, applicable regulations or the terms of any authorization (licence) may be subject to a monetary penalty not to exceed [amount in national currency] for each violation.

(4) Any person who intentionally and with a criminal motive fails to comply with this Law, applicable regulations or the terms of an authorization (licence) may, upon conviction in a court of law, be subject to a fine not exceeding [amount in national currency] or imprisonment for a period not exceeding [amount of time], or to both a fine and imprisonment.

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Chapter 14

NUCLEAR SECURITY, PHYSICAL PROTECTION AND ILLICIT TRAFFICKING

14.1. BACKGROUND

In the context of the IAEA's activities, nuclear security has been defined by the IAEA Advisory Group on Nuclear Security (AdSec) as "the prevention and detection of, and response to theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities". As discussed in chapter 14 of the 2003 Handbook [1], protecting nuclear material from these kinds of threats has traditionally been regarded as a matter almost exclusively within the sovereign authority of national governments. Measures to address security threats obviously involve sensitive matters such as intelligence, the exercise of police powers, trustworthiness, assessment of persons working with nuclear material, and criminal investigation and prosecution. Governments have been reluctant to address these matters in international forums. A limited exception has been the area of physical protection, with the promulgation in 1972 of the recommendations in IAEA document INFCIRC/225 (subsequently revised in 1977, 1989, 1993 and 1998) [41] and adoption of the Convention on the Physical Protection of Nuclear Material [4] in 1980 (with entry into force in 1987). In addition, before 2001, security related issues received at least some attention in IAEA guidance documents focused primarily on safety (see, e.g., the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources [42]).

Over the past decade, the threat of terrorist and other malicious acts involving the potential use of nuclear or other radioactive material has increased. This has led to an international effort to build a nuclear security framework. The IAEA and its Member States have given heightened attention to international cooperation that could contribute to preventing the acquisition of nuclear or other radioactive material by individuals or groups with a malicious intent. The international community has come to recognize that the threats to nuclear security have an international dimension that requires an international response and, through this, a strengthening of the 'weakest link' in the security chain. Among the documents relevant to nuclear security are the following:

— The Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.4) [41];

— The International Convention for the Suppression of Terrorist Bombings (hereinafter the Terrorist Bombings Convention) (1997) [43];
— United Nations Security Council resolution 1373 (2001) [44] on threats to international peace and security caused by terrorist acts;
— United Nations Security Council resolution 1540 (2004) [38] on non-proliferation of weapons of mass destruction;
— The Code of Conduct on the Safety and Security of Radioactive Sources (2004) [16] and the companion publication on Guidance on the Import and Export of Radioactive Sources (2005) [17];
— The Convention on the Physical Protection of Nuclear Material (CPPNM) [4] and the 2005 Amendment thereto [45];
— The Protocol to the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (SUA Convention) (2005) [46];
— The Protocol of 2005 to the Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf (2005) [47];
— The International Convention for the Suppression of Acts of Nuclear Terrorism (hereinafter the Nuclear Terrorism Convention) (2005) [5].

Furthermore, in accordance with the relevant decisions of the IAEA's Board of Governors and resolutions of the IAEA's General Conference, the IAEA is implementing its Nuclear Security Plan for 2010–2013. This Plan continues to give high priority to the production of guidance documents in the IAEA Nuclear Security Series. Although much of the detailed content in these guidance documents would be more appropriate for inclusion in implementing regulations, they can also provide useful material for the development of national legislation on nuclear security.

Effective implementation of these international instruments or guidance documents obviously requires a careful review of their specific provisions. The remainder of this section summarizes the basic approach taken in the most relevant instruments in the nuclear security field to aid such a review.

14.1.1. Code of Conduct on the Safety and Security of Radioactive Sources

The 2004 Code of Conduct on the Safety and Security of Radioactive Sources [16] provides detailed guidance on measures needed to protect individuals, society and the environment from the harmful effects of possible accidents and malicious acts involving radioactive sources. The Code is structured into three basic parts and includes an important annex I that divides the most commonly used radioactive sources into three categories based on the likelihood that they would cause severe or permanent injury if not safely

managed or securely protected. Part I of the Code provides definitions of key terms and is an important aid for harmonizing implementation among States and users of sources. Part II defines the scope and objectives of the Code, making clear that it does not apply to nuclear material (except for sources incorporating plutonium-239). The very detailed part III sets out the basic principles and provides guidance in several areas, including: general matters, legislation and regulations, the regulatory body, import and export of radioactive sources, the role of the IAEA and dissemination of the Code.

14.1.2. Convention on the Physical Protection of Nuclear Material and the 2005 Amendment thereto

The 2005 Amendment to the Convention on the Physical Protection of Nuclear Material (CPPNM) [45] significantly extends the scope of the earlier instrument to cover the physical protection of domestic nuclear activities and sabotage of nuclear facilities. The Amendment requires States Parties to establish, implement and maintain an appropriate physical protection regime with the aim of: protecting against theft or other unlawful taking of nuclear material; ensuring implementation of rapid measures to recover missing or stolen material; protecting facilities and material from sabotage; and mitigating or minimizing radiological consequences of sabotage. To implement this regime, States Parties are obliged to: establish and maintain a legislative and regulatory framework for physical protection; designate a competent authority responsible for implementing this framework; and take other appropriate administrative measures necessary for the physical protection of nuclear material and facilities. Another significant feature of the Amendment is the identification of 12 fundamental principles of physical protection that States Parties should undertake to apply when setting up a physical protection regime, "insofar as is reasonable and practicable". These principles cover the following subjects: responsibility of the State; responsibilities during international transport; legislative and regulatory framework; competent authority; responsibility of licence holders; security culture; threat; graded approach; defence in depth; quality assurance; contingency plans; and confidentiality. Other provisions of the Amendment require States Parties to identify and make known to each other and to the IAEA a point of contact for matters within the scope of the CPPNM, and to strengthen measures of information sharing, coordination and cooperation in dealing with cases of sabotage, theft or unauthorized acquisition of nuclear material. The Amendment also extends the list of acts that must be made punishable offences under national law. It is notable that the Amendment has defined acts that cover smuggling of nuclear material and sabotage. The

Amendment also includes additional provisions regarding extradition of persons and mutual legal assistance.

14.1.3. United Nations Security Council resolution 1373 (2001)

This resolution was adopted under chapter VII of the United Nations Charter in the wake of the attacks in the United States of America on 11 September 2001. It seeks to increase international cooperation and enhance national measures "to prevent and suppress…the financing and preparation of any acts of terrorism" [44]. States are to take some twenty specific measures under the resolution, some of which are required and some of which are voluntary. Operative para. (4) of the resolution notes with concern the close connection between international terrorism and transnational organized crime and illegal movement of nuclear material. United Nations Security Council resolution 1373 calls upon Member States to report to the United Nations Counter-Terrorism Committee on implementation of the measures.

14.1.4. United Nations Security Council resolution 1540 (2004)

United Nations Security Council resolution 1540 [38] was also adopted under chapter VII of the Charter of the United Nations. It deals with weapons of mass destruction and non-State actors. The resolution, which establishes the 1540 Committee, refers specifically to the CPPNM and to the IAEA Code of Conduct.

The resolution obliges States to adopt and enforce appropriate effective laws which prohibit any non-State actor to manufacture, acquire, possess, develop, transport or use (among other things) nuclear weapons, in particular for terrorist purposes. It further states that:

> "[A]ll States shall take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear, chemical, or biological weapons and their means of delivery, including by establishing appropriate controls over related materials and to this end shall:
>
> (a) Develop and maintain appropriate effective measures to account for and secure such items in production, use, storage or transport;
> (b) Develop and maintain appropriate effective physical protection measures;
> (c) Develop and maintain appropriate effective border controls and law enforcement efforts to detect, deter, prevent and combat, including through international cooperation when necessary, the illicit trafficking and brokering in such items in accordance with their national legal authorities and legislation and consistent with international law;

(d) Establish, develop, review and maintain appropriate effective national export and trans-shipment controls over such items, including appropriate laws and regulations to control export, transit, trans-shipment and re-export and controls on providing funds and services related to such export and trans-shipment such as financing, and transporting that would contribute to proliferation, as well as establishing end-user controls; and establishing and enforcing appropriate criminal or civil penalties for violations of such export control laws and regulations" [38].

United Nations Security Council resolution 1540 explicitly states, inter alia, that none of its obligations shall be interpreted so as to conflict with or alter the rights and obligations of States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons [7] or alter the responsibilities of the IAEA.

14.1.5. International Convention for the Suppression of Terrorist Bombings

Another relevant instrument is the 1998 International Convention for the Suppression of Terrorist Bombings [43]. It defines an 'explosive or other lethal device' as a weapon or device "that is designed, or has the capability, to cause death, serious bodily injury or substantial material damage through the release, dissemination or impact of … radiation or radioactive material". Thus, the Convention represents one of several instruments that have incorporated provisions relevant for nuclear law, even though their primary focus is not related to activities involving nuclear or other radioactive material.

14.1.6. International Convention for the Suppression of Acts of Nuclear Terrorism

The International Convention for the Suppression of Acts of Nuclear Terrorism (Nuclear Terrorism Convention) [5] entered into force on 7 July 2007. The Convention's preamble identifies an "urgent need to enhance international cooperation between States in devising and adopting effective and practical measures for the prevention" of acts of nuclear terrorism. The definitions of 'radioactive material', 'nuclear material', 'nuclear facility' and 'device' are incorporated into Article 1. Article 2 codifies a range of offences intended to cause death or serious bodily injury or substantial damage to property or the environment, or to compel a natural or legal person, an international organization or a State to do or refrain from doing an act. These offences include terrorist acts associated with the development of nuclear explosives or radiological dispersal devices (RDDs, or 'dirty bombs'), and with damage to nuclear facilities.

Additional offences are created for threats, demands, attempts, participation as an accomplice, organization or direction and contribution to acts of nuclear terrorism. States Parties are required to establish the offences set forth in Article 2 as criminal offences under national law. Additional articles in the Convention establish a range of other obligations, including measures: to counter nuclear terrorism; to exchange information; to detect, prevent and respond to nuclear terrorist acts; and to identify competent authorities and liaison points. A number of other articles deal with jurisdictional and procedural issues arising from apprehension and prosecution of persons alleged to have committed offences identified in the Convention. A duty to 'extradite or prosecute' (known in international law as the doctrine of 'aut dedere, aut judicare') is codified in Article 13 of the Convention. Obligations to render harmless and ensure the protection of any radioactive material seized during incidents of possible nuclear terrorism are set forth in Article 18 of the Convention, which also incorporates by reference the IAEA's safeguards measures and physical protection recommendations.

A common feature of several of these instruments is a provision noting the importance of a national legislative and regulatory framework for the protection of nuclear and other radioactive material and associated facilities. In addition, some of these instruments mandate the enactment of national laws prohibiting certain unauthorized activities involving nuclear material or facilities and calling for the establishment of stringent criminal penalties for violations. Other common requirements in these international instruments for nuclear security involve cooperation and assistance in addressing security issues, sharing relevant information and protecting sensitive information.

Another issue of great importance in the nuclear security field is the scope of coverage of nuclear security to cover radioactive material that is not relevant from a nuclear proliferation point of view but that could be used to produce an RDD. The majority of international instruments in the nuclear security field limit their scope to nuclear material or nuclear weapons. RDDs are not considered nuclear weapons, nor are they typically considered weapons of mass destruction (another term used in some instruments). However, as stated above, the Terrorist Bombings Convention and the Nuclear Terrorism Convention include 'radioactive material' of the kind suitable for RDDs within the category of materials subject to their provisions (e.g. materials or substances "which may, owing to their radiological or fissile properties, cause death, serious bodily injury or substantial damage to property or to the environment" [5, 43]). Also, certain categories of radioactive sources may contain types and quantities of radioactive material that could be used in an RDD. As previously discussed, the IAEA Code of Conduct on the Safety and Security of Radioactive Sources [16] provides that States should establish a legislative and regulatory framework that includes

requirements for security measures to deter, detect and delay the unauthorized access to, or the theft, loss or unauthorized use or removal of, radioactive sources during all stages of management, and the capacity to take appropriate enforcement actions.

Thus, as described above, legislative drafters will need to consider the relevant provisions of the international instruments to which their respective States are a Party, as well as their national policies, in drafting their national legislation in this field.

14.2. BASIC ELEMENTS OF NUCLEAR SECURITY LEGISLATION

From the most basic perspective, nuclear security legislation needs to reflect a number of basic elements, including:

(a) A physical protection regime for nuclear and other radioactive material and related facilities;
(b) Provisions regarding authorization (licensing), inspection and enforcement measures relevant to nuclear material and nuclear facilities (and other radioactive material);
(c) Measures for the prevention and detection of, and response to, incidents of theft or other unauthorized acquisition of or illicit trafficking in nuclear and other radioactive material or sabotage of related facilities;
(d) Criminal offences for violations of applicable laws and regulations, with stringent penalties, particularly for malicious acts;
(e) National arrangements necessary to implement international cooperation in protecting radioactive material, recovering stolen or lost material and dealing with offenders.

These elements take into account the various obligations contained in the international instruments relevant to nuclear security.

14.2.1. Model provisions on nuclear security, physical protection and illicit trafficking

Article ##. Regulation of Physical Protection

The [name of regulatory body] shall establish requirements for the physical protection of nuclear (and other radioactive) material, including:

(a) A categorization of nuclear (and other radioactive) material based on an assessment of the damage that could result from theft or diversion of a certain type and quantity of material from authorized uses, or from sabotage of a facility in which nuclear and other radioactive material is produced, processed, used, handled, stored or disposed of;
(b) Protection measures necessary for different categories of material;
(c) Accounting and control measures for nuclear (and other radioactive) material[4];
(d) Authorization (licensing) requirements and procedures that include licence conditions for physical protection;
(e) Inspection and monitoring measures to verify compliance with applicable physical protection requirements;
(f) Enforcement measures in case of non-compliance with (violation of) applicable regulations or licence conditions.

Article ##. Physical Protection — Responsibilities of the Authorized Person (Licensee)

(1) A person or entity authorized (licensed) to conduct activities or practices utilizing nuclear (or other radioactive) material is primarily responsible for ensuring the physical protection of such material and related facilities pursuant to applicable regulations and licence conditions.
(2) Where there has been a theft, threat of theft or loss of nuclear (or other radioactive) material, the licensee shall:
    (a) Notify the [name of regulatory body] without delay of the incident and circumstances thereof;
    (b) Provide a written report, including particulars, to the [name of regulatory body] as soon as practicable after providing notice;
    (c) Provide the [name of regulatory body] with any additional information requested.

Article ##. International Cooperation and Assistance

(1) In the event of theft, robbery or unlawful taking, or credible threat of unlawful taking, of nuclear (or other radioactive) material, the [name of governmental body] shall take appropriate steps as soon as possible to inform other States or international organizations that may be affected of the circumstances of the incident.

[4] See the discussion on safeguards in Chapter 12.

(2) The [name of governmental body] shall be the central authority responsible for physical protection of nuclear material and for coordinating recovery and response in the event of any theft or unlawful taking of nuclear (or other radioactive) material.
(3) In the event of theft or any other unlawful taking of nuclear (or other radioactive) material, the [name of governmental body] shall be responsible for determining the necessary cooperation and assistance arrangements in the recovery and protection of such material to be agreed with any State or international organization that so requests.
(4) The [name of governmental body] shall provide information on incidents involving the theft, robbery or any other unlawful taking of nuclear (or other radioactive) material, equipment and technology to the International Atomic Energy Agency under arrangements established by that Agency.

[Article ##. Protection of Confidential Information

(1) No person shall disclose confidential information, including any such information that is acquired pursuant to the provisions of the Convention on the Physical Protection of Nuclear Material and its Amendment.
(2) A person who discloses confidential information is guilty of an offence under the laws of [name of State].]

Article ##. Communication prejudicing security of nuclear material or an associated item

(1) Whoever communicates information to someone else knowing that the communication could prejudice the physical security of nuclear material, or an associated item, to which Section [cite relevant section] applies shall be punished with penalties as provided in [cite relevant article].
(2) Subsection (1) does not apply if the communication is authorized by a person who has been granted a permit to possess the nuclear material or associated item.

14.3. OFFENCES RELATING TO NUCLEAR SECURITY

Some of the international instruments discussed in this chapter require States to adopt new or expanded criminal or penal legislation to deal with nuclear related security issues. These requirements for ‘criminalization’ raise some basic issues for legislative drafters. The most important of these is the need to ensure a synergy between a State’s criminal and penal legislation and its nuclear laws. In

many legal systems a separate law — for example, the criminal code — deals with all criminal offences under the State's jurisdiction. In such States, to include criminal provisions in a comprehensive nuclear law would be inconsistent with national practice. Rather, such provisions would be included in the State's general criminal code. Procedural issues, such as extradition, might be included in a code of criminal procedure. However, some other States may find it adequate to include nuclear security related offences in a comprehensive nuclear law. This is a matter to be determined by national policy and legal practice. Nevertheless, harmonization of national laws and related procedures in these areas can help prevent or resolve difficult issues such as double jeopardy and punishment and extradition of alleged offenders. As several of the key international instruments relevant to nuclear security include the obligation to establish certain acts as punishable offences, it has been considered relevant to include model provisions and examples covering such offences in this volume. This is also consistent with the approach taken in the 2003 Handbook, where enforcement issues are addressed in chapter 14.

14.3.1. Criminal offences

The model criminal provisions set out in this section cover the offences set forth in the CPPNM and the Amendment thereto, and in the Terrorist Bombings Convention and the Nuclear Terrorism Convention, and as such were prepared jointly with the Terrorism Prevention Branch of the United Nations Office on Drugs and Crime.

[NOTE: This section merges the offences set forth in the CPPNM, the Terrorist Bombings Convention and the Nuclear Terrorism Convention. Bracketed parts reflect additional language introduced by the Amendment to the CPPNM, which has not entered into force.

The rationale for the merger is that the offences to be found in the two legal regimes deal with the same offences to a great extent. This section proposes therefore to address them in an integrated and coordinated manner. Definitions should be set out in the first part of the respective national law.

Ancillary offences such as attempt, participation, contribution and other ancillary conduct should also be incorporated in the relevant offences.

National authorities can choose to criminalize the following acts by referring to either radioactive or nuclear material, taking into consideration:

— *That the definition of 'radioactive material' in the Nuclear Terrorism Convention includes 'nuclear material' (see definitions in Chapter 1);*
— *That the CPPNM only requires States Parties to establish as offences acts committed in relation to "nuclear material used for peaceful purposes", whereas the Nuclear Terrorism Convention has an expanded scope of application covering "radioactive material" in general.]*

Article ##. Handling of Radioactive/Nuclear Material and Devices

(1) Whoever, without lawful authority, receives, possesses, transfers, alters, or disposes of radioactive/nuclear material or possesses a device:
  (a) with the intent to cause:
    (i) death or serious bodily injury; or
    (ii) substantial damage to property or to the environment; or
  (b) which causes or is likely to cause death or serious injury to any person or substantial damage to property or to the environment

  shall be punished with penalties which take into account the grave nature of those offences.

(2) Whoever commits:
  (a) a theft or robbery of radioactive/nuclear material;
  (b) an embezzlement or fraudulent obtainment of radioactive/nuclear material;
  (c) [an act which constitutes the carrying, sending, or moving of radioactive material into or out of a State without lawful authority]

  shall be punished with penalties which take into account the grave nature of those offences.

(3) Whoever threatens to commit an offence set forth in para. 2(a) of this Article in order to compel a natural or legal person, international organization or State to do or to refrain from doing any actshall be punished with penalties which take into account the grave nature of those offences.

(4) Whoever demands radioactive/nuclear material or a device by threat, or by use of force, or by any other form of intimidation, under circumstances which indicate the credibility of the threatshall be punished with penalties which take into account the grave nature of those offences.

[NOTE: The specific intention to "cause death or serious bodily injury", etc., contained in para. 1(a), reflects language used in the 2005 Nuclear Terrorism Convention. Such intention is not found in the 1980 CPPNM, which requires, instead, that the acts in question "cause or are likely to cause" such death, injury or damage. The intent language used by the CPPNM is reflected in para. 1(b). States that are Parties to both legal frameworks are advised to adopt both paras 1(a) and 1(b) for full consistency with their overall treaty obligations.

States that are Party to only one of the two legal frameworks should choose either para. 1(a) or 1(b), depending on which convention they are bound by.

The meaning of 'device' appears in Article 1.4 of the Nuclear Terrorism Convention.]

Article ##. Use of Radioactive/Nuclear Material

(1) Whoever, without lawful authority, uses or disperses in any way radioactive/nuclear material or uses or makes a device:
   (a) with the intent to cause:
      (i) death or serious bodily injury; or
      (ii) substantial damage to property or to the environment; or
   (b) to compel a natural or legal person, an international organization, or a State to do or refrain from doing an act; or
   (c) which causes or is likely to cause death or serious injury to any person or substantial damage to property or to the environment

   shall be punished with penalties which take into account the grave nature of those offences.

(2) Whoever threatens to commit the offence set forth in para. (1) of this Article shall be punished with penalties which take into account the grave nature of those offences.

[NOTE: See commentaries to the previous article. In addition, for reasons related to the legal practice followed by a number of States, it is proposed to deal with 'handling' and 'using' offences in two separate articles. This preference is also motivated by the fact that some States might prefer to apply different sets of penalties, lighter in the case of 'handling' and more severe in the case of 'using'. States may of course decide otherwise, and regroup all of the relevant offences according to their specific criminal policies and legal structures.]

Article ##. Offences Relating to Nuclear Facilities

(1) Whoever uses or damages a nuclear facility, [interferes with its operation, or commits any other act directed against a nuclear facility] in a manner which releases or risks the release of radioactive material:
   (a) with the intent to cause:
      (i) death or serious bodily injury; or
      (ii) substantial damage to property or to the environment; or
   (b) [with knowledge that the act is likely to cause death or serious injury to any person or substantial damage to property or to the environment by exposure to radiation or release of radioactive substances (unless the act is undertaken in conformity with the national law of the State Party in the territory of which the nuclear facility is situated),]
   (c) to compel a natural or legal person, an international organization or a State to do or refrain from doing an act

   shall be punished with penalties which take into account the grave nature of those offences.

(2) Whoever threatens to commit an offence set forth in para. (1) of this Article shall be punished with penalties which take into account the grave nature of those offences.

(3) Whoever demands a nuclear facility by threat or by use of force or by any other form of intimidation, under circumstances which indicate the credibility of the threat shall be punished with penalties which take into account the grave nature of those offences.

[NOTE: The proposed article contains the criminalization requirements of the Nuclear Terrorism Convention in relation to 'nuclear facilities'. As mentioned in the general commentary to this section, bracketed language reflects similar provisions to be found in the Amendment to the CPPNM, not yet in force.

To the extent that States choose to implement the Nuclear Terrorism Convention only, the term 'nuclear facility' is taken to mean, as a minimum:

- *Any nuclear reactor, including reactors installed on vessels, vehicles, aircraft or space objects for use as an energy source in order to propel such vessels, vehicles, aircraft or space objects or for any other purpose;*
- *Any plant or conveyance being used for the production, storage, processing or transport of radioactive material.*

The above definition of 'nuclear facility' differs from the one contained in the Amendment to the CPPNM, which includes:

> *"[A] facility (including associated buildings and equipment) in which nuclear material is produced, processed, used, handled, stored or disposed of, if damage to or interference with such facility could lead to the release of significant amounts of radiation or radioactive material".*

The difference in the definition of 'nuclear facility' would have practical as well as legal implications in respect of paras (1)(b) and (3) above.

It should also be noted that the Amendment to the CPPNM introduces the definition of 'sabotage' as any deliberate:

> *"[A]ct directed against a nuclear facility or nuclear material in use, storage or transport which could directly or indirectly endanger the health and safety of personnel, the public or the environment by exposure to radiation or release of radioactive substances."*

Such acts are considered offences in accordance with the Amendment to the CPPNM unless the act is undertaken in conformity with the national law of the State Party in the territory of which the nuclear facility is situated.]

14.3.2. Establishing jurisdiction

Article ##. Jurisdiction

[Name of State] shall have jurisdiction over the offences set forth in [cite relevant article] as follows:

(a) When the offence is committed within the territory of [name of State] or on board a ship or aircraft registered in [name of State];
(b) When the alleged offender is a national or permanent resident of [name of State];
(c) When the alleged offender is present in the territory of [name of State] and is not extradited to any other State asserting jurisdiction;
(d) When an act is done outside [name of State] if the act is done in the course of international transport of nuclear material in a case where it is the State where the shipment originates or the State of ultimate destination.

[NOTE: As regards international nuclear transport, the State where the shipment originates (exporting State) and the State of ultimate destination (importing State) should have the same respective meanings as they have in the CPPNM.]

14.3.3. Extradition

Article ##. Extradition (for States Requiring an Extradition Treaty)

The offences set forth in [cite relevant article] shall be considered as extraditable offences pursuant to any extradition treaty between [name of State] and any other State or between [name of State] and any State Party to the Convention on the Physical Protection of Nuclear Material and its Amendment.

Article ##. Extradition (for States Not Requiring an Extradition Treaty)

The offences set forth in [cite relevant article] shall be considered as extraditable offences, subject to the laws and procedures of [name of State].

Article ##. Penalties

[NOTE: Links to examples of penalties imposed for the commission of any of the offences cited in Section 14.3.1 can be found on the IAEA web site: http://ola.iaea.org]

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Chapter 15

MISCELLANEOUS, FINAL AND TRANSITIONAL PROVISIONS: ENTRY INTO FORCE, SUCCESSION, REPEAL

15.1. BACKGROUND

For several reasons, it is necessary to deal with a number of procedural or organizational issues arising from a law. These issues are typically addressed at the end of a legislative enactment. Since this part of the law does not involve technical issues arising from nuclear energy or ionizing radiation, it is particularly important that the drafting process include experts with experience in national law. Such experts will be able to draft final or transitional provisions in a manner that reflects the legislative practice of the particular State.

Most States will have in place some form of legislative framework applicable to the control of nuclear energy and ionizing radiation. With the adoption of a new law or amendments to an existing law, it is necessary to clearly indicate when and how new provisions come into force and how they relate to previous enactments. For example, it may be desirable to provide some transition time between adoption of a new law and its entry into full legal effect. This is particularly the case where a new regulatory body is being created or where new requirements are being imposed on existing authorized (licensed) persons or entities.

In most States it is a common rule of statutory interpretation that the latest law adopted will be valid in situations where there is a conflict with the provisions of a previous law. However, there may be some situations in which it is intended that a previous law (or portions of that law) shall remain valid or controlling, notwithstanding the adoption of a later law. In such a case it is important that a later law include a provision (often called a 'savings' provision) to make clear the intent of the legislature. As always, the form and content of these miscellaneous provisions will be determined by the national legislative practice of each State. However, this section offers some illustrations of typical provisions covering four issues:

(1) The first deals with entry into force, namely, a clear indication of when the new or revised law takes legal effect. Such provisions can be based on a specific date or the taking of an administrative action by a designated official or governmental body. Since stakeholders need to have notice of a

change in the law, such provisions typically link the effective date to publication in an official journal or gazette.

(2) The second provision provides for the assumption by a newly created regulatory body of certain functions and resources of a predecessor body.

(3) The third provision contains transitional arrangements for authorizations or licences previously issued.

(4) The fourth and final provision indicates what previous laws have been repealed and no longer have legal effect.

15.2. MODEL PROVISION ON ENTRY INTO FORCE

Article ##. Entry into Force

This Law [or full name of Law] shall enter into force on [date].

[Alternative: This Law [or full name of Law] shall enter into force on [a date determined by [title of official — e.g. President]] and when published in [name of official publication or gazette].]

15.3. MODEL PROVISION ON SUCCESSION

Article ##. Succession

Upon entry into force of this Law [name of Law], the [name of new regulatory body] shall assume all legal responsibilities and interests of [name of previous responsible governmental body, if any]. These shall include:

(a) All title and interest in any monetary funds or accounts, real or personal property, or contractual or commercial interests of any kind held by [name of previous governmental body or bodies];

(b) All employment contracts and benefits payable to current and former employees (officers and agents) of [name of previous governmental body or bodies] under applicable laws and regulations covering such employment;

(c) All responsibilities for regulatory control of matters previously assigned to [name of previous governmental body] with the exception of [list any excepted responsibilities].

15.4. MODEL TRANSITIONAL PROVISIONS ON LICENCES

Article ##. Transitional Provisions

(1) On entry into force of this Law, its provisions shall be applied to all pending applications for authorization.
(2) Any authorizations (licences) granted pursuant to [cite previous law or article] shall [continue to be in valid legal force] [be considered to have been granted under this Law]. However, they shall expire, at the latest, [specify time period] after the entry into force of this Law.
(3) Any person engaging in an activity or practice when this Law enters into force must apply for an authorization (licence) as required in this Law within [specify time period] of the entry into force of the Law.
(4) The [name of regulatory body] may, on written notice, revoke any authorization (licence) condition granted under para. (2) of this Article, to the extent that it is inconsistent with the terms of this Law. Notwithstanding the above, financial measures implemented according to the authorization conditions shall, however, remain in force for a maximum of [specify time period] after the entry into force of this Law.
(5) If, when granting an authorization (licence) under [cite previous law or article], the authorization is considered to include operations requiring a construction or operating authorization under this Law, and if such an operation referred to in the authorization is started, at the latest, within [specify time period] after the entry into force of this Law, the construction or operation authorization in accordance with this Law is considered to be included in the authorization granted under [cite applicable law or article].
(6) Should a decision issued under [cite applicable law or article] allow the processing, or storage or disposal of radioactive waste in a way which is intended to be final, an authorization (licence) for building such a nuclear facility may be granted notwithstanding the provision in [cite applicable law or article].

[Alternative version:

(1) Persons conducting activities pursuant to authorizations (licences) granted under [name of previous law] shall, within [specify time period] following entry into force of this Law, submit a report to the [name of regulatory body] detailing practices or activities being conducted pursuant to the relevant authorization (licence).

(2) Within [specify time period] of the date of submission of a report pursuant to para. (1), the [name of regulatory body] may require a person conducting practices or activities to apply for an authorization (licence).]

15.5. MODEL PROVISION ON REPEAL

Article ##. Repeal

Upon entry into force of [this Law] [name of new Law], the following provisions of [name(s) of previous law(s)] are hereby repealed: [list of laws or provisions in previous laws to be repealed in whole or in part].

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This handbook is a practical aid to legislative drafting that brings together, for the first time, model texts of provisions covering all aspects of nuclear law in a consolidated form. It is the authors' broad experience in providing legislative assistance to Member States in the different areas of nuclear law that has made this unique publication possible.

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This handbook is a practical aid to legislative drafting that brings together, for the first time, model texts of provisions covering all aspects of nuclear law in a consolidated form. Organized along the same lines as the Handbook on Nuclear Law, published by the IAEA in 2003, and containing updated material on new legal developments, this publication represents an important companion resource for the development of new or revised nuclear legislation, as well as for instruction in the fundamentals of nuclear law. It will be particularly useful for those Member States embarking on new or expanding existing nuclear programmes.

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