Experience and Trends in Nuclear Law

LEGAL SERIES No.8

INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1972

EXPERIENCE AND TRENDS IN NUCLEAR LAW

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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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EXPERIENCE AND TRENDS IN NUCLEAR LAW

A SELECTION OF PAPERS PRESENTED AT THE
SEMINAR ON THE DEVELOPMENT OF NUCLEAR LAW,
BANGKOK, 6-11 APRIL 1970
AND
THE INTER-REGIONAL TRAINING COURSE ON
THE LEGAL ASPECTS OF NUCLEAR ENERGY,
ATHENS, 7-18 DECEMBER 1970

INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 1972

FOREWORD

The legal aspects of the peaceful uses of atomic energy were dealt with at an international training course, the first of its kind, organized by the International Atomic Energy Agency in April 1968. The lectures given at the course were published by the Agency in 1969 as Legal Series No. 5, under the title "Nuclear Law for a Developing World".

In view of the interest of national atomic energy authorities in such a training program for lawyers and technicians interested or involved in the organizational, regulatory and liability aspects of nuclear activities for peaceful purposes, a Seminar on the Development of Nuclear Law was held by the IAEA in Bangkok, Thailand, on 6-11 April 1970. The Seminar was attended by participants and observers from eleven countries in Asia and the Pacific area, the United States of America and the European Nuclear Energy Agency (ENEA). The IAEA further organized an Inter-regional Training Course on the Legal Aspects of Nuclear Energy on 7-18 December 1970 in Athens, Greece, for Member States in Africa, Europe and the Middle East. Participants and observers from thirteen countries in these areas attended the course, at which lectures were given by members of the Secretariat of the IAEA and the ENEA, and by specialists provided by the Governments of India, the Federal Republic of Germany, Spain and the United States of America, and by two European insurance associations.

A number of papers presented at the Seminar and the Training Course have been selected for publication, as reflecting both experience in the development of nuclear legislation at a national level, and trends in an international approach to legal issues raised by the expanding uses of nuclear energy. The opinions expressed are personal and do not necessarily reflect the views of the governments or organizations concerned.

The papers by the following authors were presented at the Seminar in Bangkok: Messrs. Boulanger (paper in Section IV), Ha Vinh Phuong (paper in Section II), Maeda, Spingarn, Strohl (paper in Section III).

The papers by the following authors were presented at the Inter-regional Training Course in Athens: Messrs. Boulanger (papers in Sections III and IV), Ha Vinh Phuong (paper in Section I), Lacroix, Miles, Santos Lasúrtegui and Alonso Santos, Shapar, Strohl (papers in Sections III and IV).

Outlines of the basic elements of legislation for radiation protection, drawn up by a Working Group convened by the IAEA in co-operation with the International Labour Organisation (ILO) and the World Health Organization (WHO) in December 1969 in Vienna, and a survey of legislation on atomic energy in countries in Asia and the Far East, which were provided as working papers for both the Seminar and the Training Course, are also reproduced in this publication.

EXPERIENCE AND TRENDS IN NUCLEAR LAW
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NUCLEAR SAFETY AND ENVIRONMENTAL PROTECTION

IAEA SAFETY STANDARDS, THEIR LEGAL STATUS AND IMPLEMENTATION

HA VINH PHUONG
International Atomic Energy Agency,
Vienna

I. SCOPE OF APPLICATION

The IAEA safety standards, which mean norms, regulations or recommendations established to protect health, ensure nuclear safety, and minimize danger to life and the environment, comprise the following:

(a) Basic safety standards prescribing maximum permissible levels of exposure to radiation and fundamental operational principles; and
(b) Detailed operational standards, which are complementary to the basic safety standards and provide safety prescriptions or guidance relating to particular fields of operation.

The basic safety standards are of a general fundamental nature. They are applicable to all radiation sources and work with radioactive nuclides, including use, storage, transport and waste management or disposal. The standards prescribe the maximum permissible doses and the dose limits for various groups of the population and workers. The standards also include fundamental operational principles which outline the basic requirements for a radiation protection program, such as licensing or registration, surveillance both outside and inside radiation facilities or nuclear installations, a system of notification in case of serious accidents or incidents, determination of a competent authority to be in charge of radiation protection measures, and a system of inspection to enforce the safety prescriptions. The basic safety standards are based, to the extent practicable, on the recommendations of the International Commission on Radiological Protection.

The detailed operational standards include (i) specialized regulations such as the Transport Regulations, which are aimed at providing a comprehensive framework of principles and rules for the harmonization of national and international transport regulations in order to ensure the safe movement of radioactive materials, and (ii) codes of practice providing safety criteria and guidance in particular applications of atomic energy for peaceful purposes.

In addition to the standards, safety guides are issued from time to time, covering a wide range of nuclear activities. They are intended to provide advice and guidance, in particular for those countries which have not yet acquired sufficient experience in such operations.

II. LEGAL STATUS

The safety standards – which are drawn up by panels of experts recommended by Member States but selected in their personal capacity to advise the IAEA Secretariat – are approved by the Board of Governors:

(a) To apply to the Agency's own operations and to projects carried out by Member States with the Agency's assistance; and
(b) To serve as a basis for national regulations and to apply, as appropriate, through international regulations.

Under the Agency's Statute (Art. III. A. 6), such standards are mandatory in respect of operations undertaken by the Agency and may become binding on a Member State in respect of projects for which assistance is received from or through the Agency, pursuant to specific agreements concluded between the Agency and that State. Except in such instances, therefore, the Agency's safety standards only have the value of recommendations issued by a qualified international body. In appropriate cases, some of these standards are jointly issued by the IAEA and other international organizations concerned with the peaceful applications of atomic energy, and accordingly such standards become recommendations of these organizations also, thus reflecting a concerted approach to the issues for which guidance is deemed desirable at the international level.

In the past years, a number of radiation and nuclear safety standards had been jointly issued by the IAEA and other qualified international or regional bodies, such as FAO, ILO, IMCO, WHO and ENEA[1]. WHO has, for example, agreed to co-sponsor several IAEA standards, and it has become an accepted practice that standards and recommendations relating to radiological protection, nuclear safety and waste management are issued under the joint authority of both organizations and, where appropriate, also of other interested agencies. The Special Legal Committee of the Inter-American Nuclear Energy Commission has also prepared recommendations to the Members of the Organization of American States that take fully into account the IAEA safety standards.

These standards are published in the IAEA Safety Series [1], as are the guides or manuals offering guidance relevant to specific fields of operation. The latter publications, which are also prepared by panels of experts (or by consultants) in co-operation with the IAEA Secretariat and other international organizations involved, are not, however, subject to approval by the Board of Governors since they are not standards within the purview of the Agency's Statute and merely aim at giving advice on particular aspects of the peaceful uses of atomic energy.

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[1] A list of publications in the IAEA Safety Series is to be found in Agency document INFCIRC/139/Add. 1, Annex II. See also Ref. [1] and the chart on the elaboration and promulgation of the IAEA safety standards, in the Annex.

III. IMPLEMENTATION

A. Through appropriate agreements

For the provision of the Agency's assistance to Member States in respect of technical co-operation projects, research and development projects, or reactor projects, which involve the supply by or through the IAEA of services, equipment, facilities or nuclear materials, the requisite agreements between the Agency and the Member States concerned require, inter alia, the observance of relevant Agency safety standards or of national or other standards approved by the Agency as consistent with its own and equally effective, pursuant to several provisions of the Agency's Statute[2] and the directives of the Board of Governors for the implementation of such statutory requirements[3].

1. Technical assistance projects

In accordance with the procedures laid down in the Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the IAEA[4], an agreement is to be concluded between the Agency and the receiving Member State, setting out the terms and conditions under which each project should be implemented. Through such agreements, a considerable number of countries eligible for technical assistance undertake, inter alia, to apply the Agency's safety standards to the projects for which assistance is given by the Agency. For instance, 52 countries were to receive technical assistance in the form of experts and equipment to be provided from the Agency's own resources in 1971. Accordingly, specific agreements in a simplified standard form had to be entered into by these countries with the Agency for the implementation of such projects, except for those countries which have concluded with the Agency a Supplementary Agreement to the UN Revised Standard Agreement on the Provision of Technical Assistance [2], under which the implementation of each project is merely the subject of a notification by the Agency to the Member State concerned through the UNDP Office in that country. Over 30 Member States[5] [3] have to date concluded such Supplementary Agreements providing, inter alia, for the application of the Agency's safety standards wherever deemed necessary by the Agency in respect of the technical co-operation given by it.

2. Research and development projects

The supply of minor quantities (gram, milligram and microgram) of nuclear material by or through the Agency for research and development projects is subject to the conclusion of a "framework agreement" called

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[2] Articles III.A.6, XI.F.2 and XII.A.2.

[3] INFCIRC/18: The Agency's Health and Safety Measures, 1960.

[4] GC(IV)/RES/65, Annex, reproduced in the publication "IAEA Services and Assistance", 1970, Annex II, pages 51 et seq.

[5] To the list of States party to a Supplementary Agreement with the Agency should be added: Khmer Republic, 18 April 1969; Republic of Zaire, 7 December 1971.

Master Agreement for Assistance by the Agency in Furthering Projects by the Supply of Materials, and of Supplementary Agreements thereto in respect of each specific project. Such agreements, which are based on the requirements of Article XI.F of the Agency's Statute, prescribe, inter alia, the application of the Agency's safety standards or of national standards consistent therewith, as appropriate, to the projects for which the material needed is procured through the Agency.

Agreements of this type are in force between the Agency and the following Member States: Brazil, Bulgaria, Greece, India, Pakistan, Romania, Turkey and Yugoslavia.

3. Reactor projects

With regard to the Agency's assistance connected with projects which require the supply of natural or enriched uranium for the operation of subcritical assemblies, training or research or power reactors, the agreements concluded between the Agency and the Member States setting up such projects require, inter alia, the application of the Agency's safety standards as appropriate. Reactor project agreements are in force between the Agency and the following countries in respect of a number of projects: Argentina, Chile, Finland, Greece, Indonesia, Iran, Japan, Mexico, Norway, Pakistan, Philippines, Spain, Uruguay, Viet-Nam, Yugoslavia and Zaire.

B. Enactment by national authorities

Through its advisory services on nuclear safety regulations and procedures and its training program in nuclear law, the IAEA has over the years assisted several Member States, especially countries at an early stage of nuclear development in Africa and the Middle East, Latin America and Asia, in the framing of legislation to ensure in particular the safety of activities involving radiation hazards. The standards and recommendations conveyed under such assistance are usually reflected in national regulations enacted or contemplated in an increasing number of countries and have proved of value in the establishment of national control systems on nuclear safety and for health and environmental protection.

C. Incorporation into international regulations

In respect of the international transport of radioactive substances and nuclear materials, the IAEA Regulations[6] [4] have been incorporated into the following international regulations governing the carriage of dangerous goods by different means of transport [5]:

Rail: International Regulations Concerning the Carriage of Dangerous Goods by Rail (RID), effective 1 April 1967, in Annex I to the International Convention Concerning the Carriage of Goods by Rail (CIM);

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[6] Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6, 1967 Edition. A revised edition, started in 1970, is expected to be submitted to the Agency's Board of Governors for approval in 1972.

Road: European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR), effective 29 January 1968; Annex A: Provisions Concerning Dangerous Substances and Articles, and Annex B: Provisions Concerning Transport Equipment and Transport Operations, effective 29 July 1968;

Sea: International Maritime Dangerous Goods Code, IMCO, July 1967;

Air: Regulations Relating to the Carriage of Restricted Articles by Air, IATA, Thirteenth Edition, effective 1 June 1970;

Inland waterway: Draft European Agreement Concerning the Carriage of Dangerous Goods by Inland Waterway (ADN);

Post: Detailed Regulations for Implementing the Universal Postal Convention, effective 1 January 1966;

All modes of transport: Regulations for the Transport of Radioactive Materials, Council for Mutual Economic Assistance (COMECON), Moscow, 1966.

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IAEA/WHO, Safe Operation of Critical Assemblies and Research Reactors, 1971 Edition, Safety Series No.35, IAEA, Vienna (1971).
IAEA/WHO, Disposal of Radioactive Wastes into Rivers, Lakes and Estuaries, Safety Series No.36, IAEA, Vienna (1971).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Law for a Developing World, Legal Series No.5, IAEA, Vienna (1969) 243.

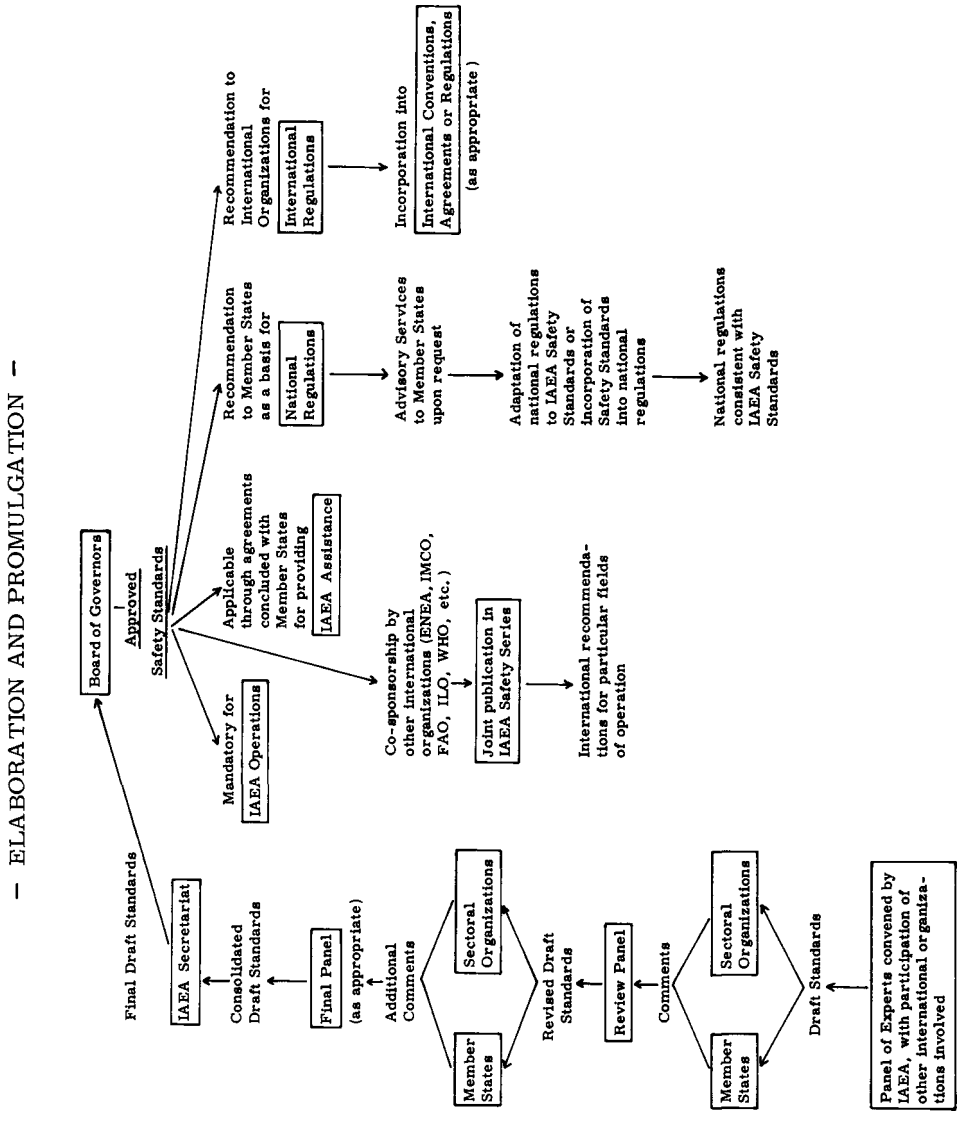
[3] ibid., p.247.

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Materials (1967 Edition), Safety Series No.6, IAEA, Vienna (1967).

[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Law for a Developing World, Legal Series No.5, IAEA, Vienna (1969) 225.

ANNEX

IAEA SAFETY STANDARDS FOR PEACEFUL USES OF ATOMIC ENERGY INCLUDING ENVIRONMENTAL PROTECTION



THE 'JUNTA DE ENERGIA NUCLEAR' OF SPAIN
Legal status, structure and responsibilities, particularly in nuclear safety and radiation protection

A. de los SANTOS LASURTEGUI, A. ALONSO SANTOS
Junta de Energía Nuclear,
Madrid,
Spain

INTRODUCTION

Before beginning this review of the legal status, structure and responsibilities of the Spanish Junta de Energía Nuclear (JEN) let us briefly summarize the legal developments which led to the provisions, now in force, where these matters are defined.

As early as 1945, Spain, being aware of the possibilities opened up by the peaceful uses of nuclear energy, began providing itself with legislation and with institutions specifically designed for developing this new activity. So, in 1948, a first Research Commission was formed, its main tasks being the training of personnel in the field of nuclear physics, small-scale mining of known uranium deposits, limited exploration for new deposits and research on the treatment of these ores and the metallurgy of uranium. A year later, in 1949, another entity was set up named Empresa de Patentes y Aleaciones Especiales (EPALE). As a corporation, EPALE was endowed with separate legal personality, so that it could act in carrying out very similar functions to those of the former Commission.

The importance of the work to be done in the field of nuclear energy and the diversity of tasks involved prompted the Government to establish a new organization. In 1951, a decree-law created the Junta de Energía Nuclear. In the foreword of this decree-law it was stated that the State, ever since it had foreseen the importance of nuclear physics as a new energy source, had adopted legal measures as regards training of personnel in nuclear science and technology; this aim achieved, it was advisable to amplify this work by establishing an institution that would undertake to direct and co-ordinate the different tasks required. To fulfil these functions the agency so created was given a wide legal and economic basis.

The different tasks assigned to the Junta at that time covered a broad scope of activities ranging from the training of personnel to the international relations in the field of nuclear energy. Special attention was given to the mining of radioactive materials, which was put under the direction of the Junta. Exploration by private individuals was encouraged; strikes had to be reported to the Junta and the claimants were entitled to compensation.

This first Junta, attached to the office of the Prime Minister, consisted of a chairman, a vice-chairman and a board of scientific and technological personalities of nationally recognized competence, appointed by the Prime Minister.

From this time on, advisory committees began to be set up in order to advise on questions related to the eventual construction and operation of nuclear power plants. They were intended to encourage and co-ordinate the development in this field as well. Outstanding scientific and technical personalities formed these committees, which carried out their activities in close connection with industry.

When the structure of public administration was reorganized in 1957, the Directorate-General of Nuclear Energy was formed within the Ministry of Industry and the Junta was placed under its authority.

The placement of the Junta under the authority of the Ministry of Industry clearly indicates the industrial role envisaged for nuclear energy, since this department deals specifically with industrial matters and the government department to which the Junta was originally attached deals with matters of a general nature.

A decree of 1960 gave wide powers to the Directorate-General for Nuclear Energy in relation to licensing of nuclear installations. It was also the competent authority in regard to mining of radioactive ores and to protection against ionizing radiations. In 1962, the Directorate-General was phased out and the Junta was placed directly under the authority of the Minister of Industry. Shortly thereafter a Directorate-General of Energy was created in which there is a Sub-directorate of Nuclear Energy.

The next phase in the history of the Junta began in 1958 with an Act passed in July where provision was made to endow it with separate legal personality and to make it financially and administratively independent. This Act also modified the system that had been applied to the mining of uranium ores by establishing the principle known as 'freedom of the mining industry'. Private enterprises were authorized to mine deposits outside the zones reserved for the Junta and to carry out other activities in this field, although they had to obtain first the necessary permits and concessions from the Ministry of Industry.

The process that had started in 1948 ended in 1964 with the Nuclear Energy Act which gave to the Junta its present character that subsequent provisions have completed.

THE JUNTA DE ENERGIA NUCLEAR AT PRESENT

The Nuclear Energy Act was adopted on 29th April 1964, entered into force on 5th May 1964 and covers a wide range of matters related to nuclear energy. Its 15 chapters, divided in 97 sections, deal with different matters, as this Act was intended to be a general law, incorporating the texts of the previous laws and assembling the rules governing nuclear energy and radiation protection. In order to give it more flexibility, many provisions of the Act have a general character and are developed further in ensuing regulations.

The provisions as regards the Junta de Energía Nuclear are included in Chapter II entitled 'Administrative Authorities and Bodies', but some of its functions and responsibilities are also regulated in other chapters, as, for instance, in Chapter V which deals with matters related to permits for nuclear and radioactive installations and Chapter VI where safety measures and protection against ionizing radiation are included. It is

therefore in this Act that we can find the main features of the character the Junta has at present, as completed by further regulations. All together have formed the Junta, as detailed in the pages that follow.

Legal status and structure (see Organization Chart)

The Junta is a body governed by public law, having separate legal personality and complete economic and administrative independence, in accordance with the provisions of the Act on the Legal Status of Independent State Corporations of which it is one.

The JEN's resources derive from: annual allocations from the general budget of the State; any extraordinary appropriations granted to it; receipts arising from agreements entered into with an official national or international enterprise and from the performance of services; proceeds of property disposed of by the JEN in the exercise of its powers; subsidies, contributions or gifts from various sources.

The structure of the JEN consists of: a Chairman; an Executive Vice-president; a Board assisted by an Executive Committee; a General Manager; several departments; and a general and technical secretariat. These bodies are defined in the Nuclear Energy Act as completed or amended by a decree of July 16th, 1964 and an act of 1968.

The Chairman is appointed by the Head of State, by means of a decree countersigned by the Minister of Industry. On the proposal of the Chairman of the Junta, and after consultation with the Board, the Minister of Industry appoints the Executive Vice-president, from among the members of the Board, and the General Manager.

The Board consists of representatives from government departments appointed by the Minister of Industry on recommendation of the heads of these departments. The Joint Chiefs of Staff and the trade unions should be represented on the Board as well. The other members of the Board are appointed from among scientific and technological personalities of nationally recognized competence. The total number of members may not exceed fourteen. The General Technical Secretary of the JEN acts as a Secretary of the Board, with the right to express opinions but not to vote.

The Board is the supreme decision taking and executive body of the JEN and its main tasks are the following:

- draw up general programs of research, development and other activities
- prepare budget estimates, which are to be submitted to the Government for approval
- study and report on matters which, by reason of their nature or importance, are referred to it
- appoint the Executive Committee and define its duties
- approve, on the proposal of the Director General, the appointments of Heads of Department and of the Technical Secretary General.

The Chairman of the JEN, who is its representative for all official and external purposes, presides over the Board and the Executive Committee and represents the Junta in all such official and legal acts as shall be performed in reference to it.

The Junta, allowed by the law to contain such departments, divisions, sections and work centres as may be considered necessary for the achievement of its aims and exercise of its powers, consists of five departments concerned with the following matters: administration; geology and mining; physics and reactor calculations; pilot and industrial plants; chemistry and isotopes. They are further divided into divisions and sections. Moreover there are two independent divisions: nuclear and electronic engineering, and medicine and protection. A certain number of advisers assist the Chairman in the exercise of his duties.

The General Technical Secretariat carries out several tasks, the more important being those related with planning and economics studies and, specially, nuclear safety.

The JEN also has an Executive Committee, members of which are appointed by the Board. It is required to assist the latter in its work.

A very important institution within the JEN is the Institute of Nuclear Studies set up with a view to co-ordinating research and training connected with nuclear energy. The Institute is managed by a Chairman, appointed by the government on recommendation of the Minister of Industry and by a Board in which the various bodies responsible for training in the field of nuclear energy and the industries concerned with nuclear energy are represented. The members of the Board are appointed by the Minister of Industry in agreement with the Minister of Education and Science. These two authorities also appoint, on the proposal of the Board, a Director who is a member of the Board but has no vote.

Although the structure of the JEN consists of the above-mentioned bodies, there are also some consultative bodies set up within the Junta or closely related to it. Moreover, in the Nuclear Energy Act provision is made for the establishment of joint committees of an advisory nature, in which the Junta shall always be represented, for the purpose of studying and implementing matters covered by the Act which come within the competence of departments other than the Ministry of Industry.

Responsibilities

Since 1951, when the Junta was first created, it had organized its activities as a research centre, as an advisory body to the Government, as the institution responsible for questions of safety and radiation protection and as the promoter of industrial development in so far as applications of nuclear energy were concerned.

The Nuclear Energy Act confirmed all these functions and enounced them in two sections. In one of them they are expressed in a general way: "Its function shall be to promote, guide and direct research, studies, experiments and work conducive to the development of the applications of nuclear energy for national purposes and to the establishment of a nuclear materials and equipment industry". In other sections and chapters the Junta's tasks are specifically described. Its responsibilities can be grouped in the following areas:

(i) Regulation. The Junta is responsible for making proposals to the Minister of Industry for regulations regarding radiation protection and general measures for encouraging applications of nuclear energy.

(ii) Administration. One important task of the Junta is to submit the prescribed report to the Minister of Industry during the procedure of

handling applications from physical or legal persons, under public or private law, concerning matters relating to the peaceful uses of nuclear energy.

As this responsibility of the Junta will be referred to in some detail later, it is only mentioned here without further explanation, but it can be said that it constitutes one of its main tasks.

One other administrative function of the JEN is representing the State in the application of the provisions of the Act in so far as this is not the responsibility of the Minister of Industry or of other specified authorities, bodies or groups.

(iii) Advising. The Junta is responsible for advising the Government, through the Minister of Industry, on matters covered by nuclear legislation, as advising courts of justice on matters of nuclear hazards and damage.

(iv) Science. The JEN is entrusted with the function of encouraging and carrying out such research, studies, projects, works and operations and installations as are necessary for its purposes. Moreover, it is responsible for the specialized training of scientific and technical personnel, without prejudice to that given in universities and colleges of advanced technology, in problems directly related with nuclear energy and assisting and advising training centres.

(v) Mining. The JEN is charged of mine prospecting in territories under Spanish sovereignty to discover deposits of radioactive ores or other ores of nuclear interest. It also exploits mining areas reserved or to be reserved for it, either directly or through a third party.

The responsibilities of the Junta for procuring, preparing, importing, storing and processing of ores or chemicals, when necessary for the discharge of its functions, can also be included in this group.

(vi) Technology. Other tasks specifically assigned to the Junta are those related to industry. It is responsible for encouraging and introducing applications of radioisotopes and supervising their distribution and use. It should also promote and develop the production of nuclear fuels and materials, and of equipment for reactors or other radioactive installations, and provide advice and technical assistance in this field.

(vii) International relations. The JEN maintains, on an exclusive basis in matters within its competence, official relations with similar foreign institutions. In carrying out this task, the Junta works in co-operation with the Ministry of Foreign Affairs.

(viii) Safety and radiation protection. The Junta is entrusted with studying safety standards and measures for radiation protection. In this function, the Directorate-General of Health shall co-operate with the JEN.

Having listed the main responsibilities of the Junta, let us look in more detail at those related with licensing of nuclear installations, including its responsibility for nuclear safety and radiation protection.

Licensing and regulation of nuclear power plants in Spain follow the guidelines described in the proposed detailed 'Regulations', applicable for trial use and comments. Essentially these Regulations, based on the Nuclear Energy Act, establish that the following permits are necessary.

(a) A Preliminary Permit, essentially a statement of the suitability of the site.
(b) A Construction Permit.

(c) A Preliminary Operating Permit, essentially a permit to conduct the nuclear testing.
(d) An Operating Permit.

Before analysing each of the four steps, it is important to realize that the Ministry of Industry is the authority who grants the permits; JEN advises the Ministry on safety matters and this advice cannot be overruled by the Ministry, so a great deal of responsibility and authority are invested on the Junta.

To obtain a Preliminary Permit the applicant must present documentation concerning the site, must prove he needs the power and must give some evidence on the economic soundness of his proposal. The Junta looks at the documentation, visits the site, talks to the applicant, runs calculations on the radiological consequences of extreme accidents and writes a report advising on whether or not the Permit should be granted. If it finds the proposal acceptable, the Junta may impose limits and conditions to be followed before the Construction Permit is granted.

To obtain a Construction Permit the applicant must present essentially the Preliminary Safety Report. The Junta analyses the report, maintains contacts with the applicant and issues a statement proposing or rejecting the Permit. As before, the Junta imposes limits and conditions applicable during the construction of the plant.

During construction the Junta inspèctors visit the site to assure compliance with the proposed design. Inspectors may also go to the factories where components for the plant are being manufactured. For each visit the inspectors write a document with the results of their findings. This official document is written on the spot and is signed by the inspector himself and by a representative of the company, who may formulate any comment he wants to.

To obtain the Preliminary Operating Permit the applicant must present, well in advance, the Final Safety Report. He must also submit, as separate documents, proposals for technical specifications, emergency plans, administrative procedures, and radiological protection.

The Junta reviews these documents and discusses their contents with the applicant until complete satisfaction is obtained. At the same time the Junta reviews all the testing done, especially on the engineered safeguards, and makes a thorough and complete inspection of the plant.

The applicant must also present a detailed program of the nuclear testing he plans to perform. The Junta looks thoroughly into this program and discusses it with the applicant until complete satisfaction is obtained.

Previously the applicant will have submitted requests for operator' s licences for the personnel. There are two types of licences, for operators and supervisors. These licences are granted by the President of the Junta after analysing the qualifications of each person concerned. In most cases examinations, written and oral, are given to the candidates, who must also pass a medical test.

Once the Junta has verified that the plant is completed, the staff ready and the documents satisfactory, it issues a report to the Minister of Industry proposing that the Preliminary Operating Licence be granted; as before, the Junta may impose limits and conditions.

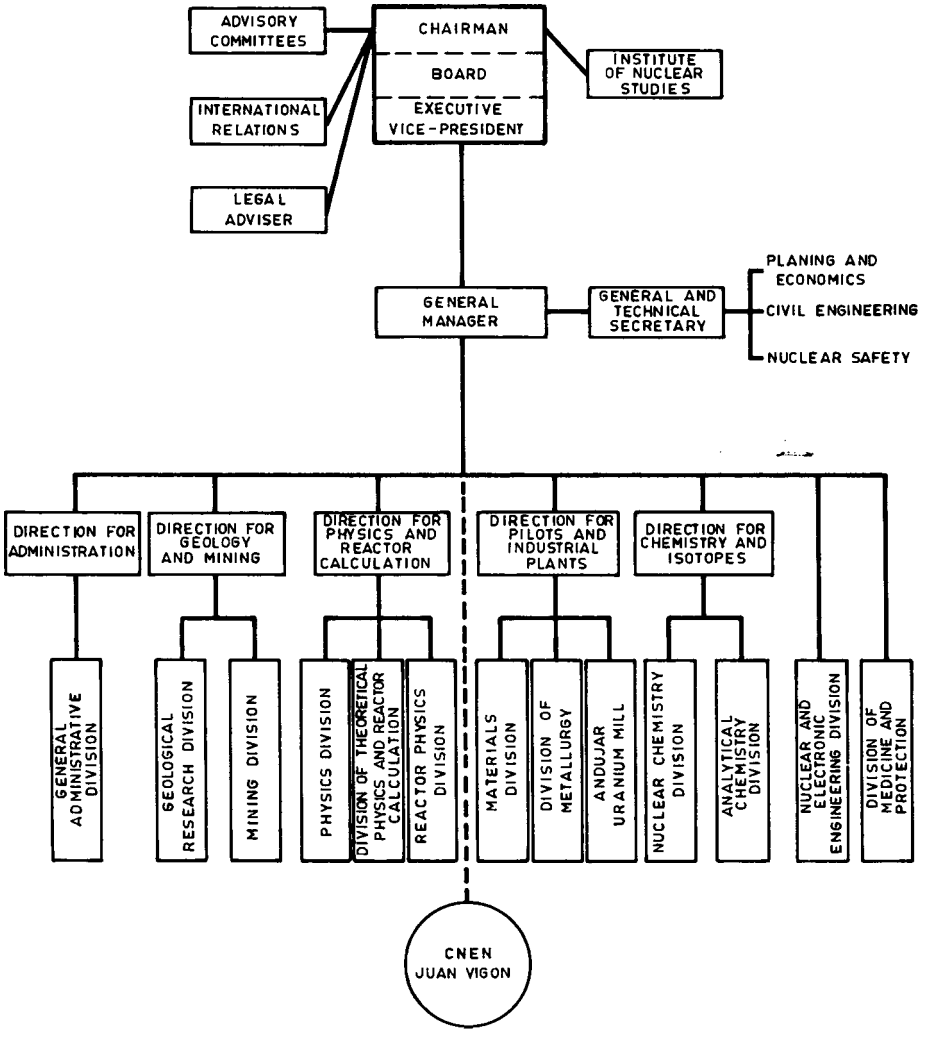
During preliminary operation, inspectors are often present to check compliance with the proposed program, with the documents, and with the imposed limits and conditions. As before, they write a report on their findings.

To obtain the Operating Permit the applicant must show that the testing is complete and satisfactory. He must also prove that the documents he has submitted for regulating the operation of the plant are workable; if not, he must submit new ones. The Junta looks at this new documentation and sends its inspectors to the site for a final check. Once satisfaction is obtained, the Junta issues a report to the Minister recommending that the Permit be granted. The Junta may also impose new limits and conditions.

During normal operation of the plant inspectors are present from time to time to check compliance with the approved documents, technical specifications, emergency manual, administrative procedures, radiological protection, applicable regulations and the imposed limits and conditions.

ORGANIZATION CHART

JUNTA DE ENERGIA NUCLEAR
ORGANIZATION CHART



RADIATION CONTROL FOR HEALTH AND SAFETY AND PROTECTION OF THE ENVIRONMENT
Recent developments in United States legislation and policy

H.K. SHAPAR
USAEC, Washington, D.C.,
United States of America

INTRODUCTION

Unlike many other areas in which law and science meet, the legal techniques and institutions for the licensing and regulation of nuclear power reactors in the United States have, from the start, embodied a positive approach to the social control of the new relationships between man and his environment.

The protection of the public health and safety from the potential hazards of radiation in the peaceful uses of atomic energy is the primary goal of the United States Atomic Energy Commission's (USAEC) extensive licensing and regulatory program. The Congress of the United States has charged the Commission with this responsibility and the Commission has developed a body of regulations and procedures designed to assure that safety will take precedence over other considerations in the development of atomic energy.

Primarily because of the immediate use of nuclear technology and materials in the national weapons program, and the large capital investment required for development, facilities using nuclear energy and most of the materials necessary to that utilization, were initially Government-owned [1]. The next step in this development, which was novel in United States public law, was in the direction from Governmental monopoly to private participation. The Atomic Energy Act of 1954 [2] permitted the private ownership and use of nuclear facilities, including plants utilizing atomic energy for the generation of power, in place of Governmental ownership of such facilities. However, that Act permitted private ownership of nuclear facilities only under a comprehensive, pervasive system of Federal regulation and licensing by the USAEC.

The initial and continued control of the uses of nuclear energy by a government agency charged with the protection of the public health and safety from the radiological hazards of such uses has meant that the nuclear industry in the United States has developed under a legal system directed more towards the prevention of accidents and uncontrolled hazards, than to the correction of conditions which have led to accidents and damage to the environment. The United States system for control of nuclear energy has had the benefit of advance planning as contrasted with primary dependence on an adversary system of law or on attempts to remedy hazardous or undesirable situations through the imposition of penalties after such situations have developed. Furthermore, in carrying out its statutory

mission, the USAEC has had the benefit of international standards and of participation in the resolution of problems in the atomic energy field which transcend national borders.

To help put things in some perspective, I would like to describe the numbers and varieties of uses of nuclear power reactors. Before doing so, I should like to quote part of a 1970 article by Chairman Glenn T. Seaborg of the USAEC:

> "All in all, while our reserves of fossil fuels seem large, we should not complacently think of them as unlimited – especially when we know that we can expect an enormous rise in the world-wide demand for energy to meet essential human needs.
> "From the standpoint of abundant natural resources, logistics, and economics, nuclear power presents an entirely different picture. With the introduction of breeder reactors beginning in the 1980s we can have nuclear systems that will extend our nuclear fuel resources to thousands of years. Large-scale nuclear power stations will reduce the cost of electricity over the years so that there will be a financial payoff to the American tax-paying consumers of billions of dollars on their investment in the development of nuclear power. And from an international standpoint, the compactness of nuclear fuel – and hence its transportability – will allow many energy-starved areas of the world the economic, reliable electric power needed for development." [3]

The primary use of nuclear power reactors is, of course, the production of electrical energy. At present there are in the United States eighteen licensed operating central station nuclear power plants (ranging in capacity from 40 000 to 809 000 kW(e)), four licensed but not operating (ranging in capacity from 16 000 to 75 000 kW(e)), and fifty-one under construction (ranging from 497 000 to 1 124 000 kW(e)). It has been predicted that by 1980, 25 - 30% of the total electrical generating capacity in the United States will be produced by nuclear power plants [4]. One factor in the increasingly predominant place of nuclear energy in the total energy picture may be the fact that the operation of a nuclear power plant does not produce the oxides of sulphur and nitrogen which are released by the uncontrolled combustion of fossil fuels in a conventional power plant [5] and which are major contributors to air pollution. Present and potential air pollution is now a major concern of Federal, State and local governments in the United States.

In addition to generation of electricity, nuclear power plants may be used to desalt water, to improve the quality of waters and to renovate waste waters. These applications of nuclear power plants may be particularly useful in the more arid parts of the world. The USAEC has been conducting studies of specific uses for nuclear desalting plants, many of which have involved International Atomic Energy Agency (IAEA) participation, in other lands (Israel, United Arab Republic, Greece, Mexico).

The heat generated by nuclear power reactors may also be used in process heating for industry, or central heating of municipalities. An application for a nuclear reactor licence which contemplates the sale of process steam for other industrial uses has already been received.

Consideration is being given to the development of multipurpose industrial and agro-industrial complexes constructed about huge nuclear energy centres. Low-cost electricity generated at the site by nuclear

reactors could be used to produce fresh water, chemicals, metallurgical products and fertilizer, which would make the surrounding lands productive. A study of this "nuplex" concept has been undertaken by the Atomic Energy Commission's Oak Ridge National Laboratory [6]. Huge nuclear-powered "resource centres" have also been envisaged. Such centres would be essentially reclaiming and reprocessing plants which would break down wastes and separate them into basic materials, which might then be returned in the form of basic raw materials to industry. These resource centres for the processing of wastes could be part of the agro-industrial "nuplex" just described [7].

Nuclear power reactors are already being used for the propulsion of ships; it is anticipated that they may eventually be used in other modes of transportation.

UNITED STATES SYSTEM FOR CONTROLLING POTENTIAL HAZARDS OF NUCLEAR POWER GENERATION

While the benefits which can accrue to mankind from the application of nuclear-generated power are enormous, it has long been recognized that the potential hazards associated with production of such power need to be controlled. These potential hazards arise from the routine generation of gaseous and liquid radioactive wastes from the operation of the reactor, and the accumulation of fission products in the reactor fuel.

There are several themes and goals that you will readily identify as the licensing and regulatory process is described. Some of the more important ones are as follows:

(1) First and foremost, as I have already stated, is the objective of protecting the public from the radiological effects of reactor operation. We are committed to the concept of defense in depth as well as design reliability. This leads to a requirement for systems of different function as well as redundance and independence.
(2) Next, there is the principle of multiple review – both by physical stages (construction stage and operating stage) and by different safety review groups.
(3) Next, there is the concept of providing the public with an opportunity to participate in the regulatory system.
(4) Finally, there is emphasis on the themes of flexibility and informality in the development and administration of our procedures.

I hasten to add a thought that is almost too obvious to mention. The development of our system and procedures was responsive to our own particular political and historical environment. They are offered as neither a panacea nor a paradigm – only as one example.

The statutory scheme in the United States

Under the Atomic Energy Act of 1954 (the Act) it is unlawful to construct or operate a "utilization facility" except under a licence issued by the Atomic Energy Commission [8]. A "utilization facility" is defined in the Act as "any equipment or device, except an atomic weapon, determined by rule of the [Atomic Energy] Commission to be capable of making use of special

nuclear material [that is, fissionable material] in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public, ... or ... any important component part especially designed for such equipment or device as determined by the Commission" [9]. The Commission has defined "utilization facility" as "any nuclear reactor other than one designed or used primarily for the formation of plutonium or U-233"[10] thus subjecting to licensing requirements nuclear reactors used for power production and other peaceful purposes.

The reactor licensing process is, under our organic Act, a two-step procedure. The Act requires the issuance of a construction permit before a utilization facility may be constructed [11]. Upon (1) completion of the construction in compliance with the terms and conditions of the construction permit, (2) filing of any additional information needed to bring the original application up to date, and (3) a Commission finding that the facility has been constructed and will operate in conformity with the application and the Commission's rules and regulations, and in the absence of good cause being shown why the granting of a licence would not be in accordance with the provisions of the Act, an operating licence is issued to the applicant.

The Act requires the Commission to hold a public hearing on each application for a power reactor licence at the construction permit stage [12]. The hearing is subject to the provisions of our Administrative Procedure Act [13] which affords to parties in certain proceedings before Federal administrative agencies the protection of quasi-judicial procedures.

The Atomic Energy Act of 1954 requires that applications for licences for power reactors be reviewed by an Advisory Committee on Reactor Safeguards, a committee composed of experts in various technical and scientific disciplines related to reactor safety [14]. The Act also permits the Commission to use, as the presiding officer at licensing hearings, a board composed of two technically qualified members and one member qualified in the conduct of administrative proceedings [15]. Boards are selected from a panel of qualified persons drawn from public or private life who serve for the most part on a part-time basis.

These two mechanisms are representative examples of the innovative techniques that are being used to keep the control and regulation of nuclear power reactors in the United States abreast of the technology. The Advisory Committee on Reactor Safeguards provides a formal channel for expert advice to the Commission in different scientific and engineering specialities. The atomic safety and licensing boards bring to bear at the public hearing stage the technical expertise of those conducting the hearing and making the decision on the granting or denial of power reactor licences. This decision, in many cases, is the final decision of the Commission. The authorization by the Congress of the use of atomic safety and licensing boards reflected a recognition of the need to provide persons fully competent in technical matters to render what is largely a technical decision.

The final decision of the agency may, under the Act, be reviewed by a United States Court of Appeals upon the petition of a party aggrieved by the decision [16].

The Act gives the Commission broad powers to adopt rules and regulations and to issue orders governing licensed activities and facilities [17]. The Act provides for the imposition of criminal and civil penalties for, and the issuance of injunctions against, violation of the provisions of the Act or the Commission's regulations [18].

The licensing process in action

The licensing of power reactors in the United States is accomplished through a multi-step review of the safety of the proposed plant – review by the Commission's staff, the Advisory Committee on Reactor Safeguards, an atomic safety and licensing board, and the Commission itself (or, in some cases, an Atomic Safety and Licensing Appeal Board).

The staff

The licensing and regulatory functions of the Commission are largely carried out by a Director of Regulation, who is responsible directly to the Commission, and staff divisions reporting to him. The Division of Reactor Licensing reviews the safety of reactors subject to licensing, issues construction permits and operating licences, maintains liaison with the Advisory Committee on Reactor Safeguards and collects, analyzes and disseminates information pertaining to the design and operation of nuclear plants. The Division of Reactor Standards develops safety standards, criteria and guides and proposed rules for the location, design, construction and operation of reactors and other nuclear facilities. The Division of Materials Licensing issues licences for the materials used in or which may be produced by nuclear reactors, including irradiated fuel, and for non-reactor nuclear facilities, such as fuel reprocessing plants. The Division of Compliance inspects the facilities of licensees to determine compliance with applicable statutory and regulatory provisions and licence conditions. It initiates action necessary to assure compliance on the part of licensees. The Division of Radiation Protection Standards develops the health and safety standards for protection of the public against radiation from operation of nuclear reactors, as well as from other licensed activities and nuclear materials.

Preliminary steps in obtaining a construction permit – filing of application; consideration by staff and the Advisory Committee on Reactor Safeguards

A prospective applicant for a licence to construct and operate a nuclear reactor usually asks the Commission's regulatory staff for an informal evaluation of the suitability of one or more reactor sites which he is considering. The application for a construction permit then is prepared by the applicant – usually an electric utility – with the help of the reactor manufacturer and the architect-engineer. The Commission's regulations describe the information which should be supplied by the applicant and set out criteria under which the Commission will issue a licence [19]. The application is required to demonstrate the financial qualifications of the applicant to build and operate the reactor. It must also contain a safety analysis report.

At the construction permit stage, that report must include [20]:

(1) A description and safety assessment of the site on which the reactor is to be located, with appropriate attention to features affecting facility design

(2) A summary description and discussion of the reactor, with special attention to design and operating characteristics, unusual or novel design features, and principal safety considerations

(3) The preliminary design of the reactor, including the principal design criteria; the design bases and the relation of the design bases to the principal design criteria; and information relative to materials of construction, general arrangement, and approximate dimensions, sufficient to provide reasonable assurance that the final design will conform to the design bases with adequate margin for safety

(4) A preliminary analysis and evaluation of the design and performance of structures, systems, and components of the reactor with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of (i) the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and (ii) the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents

(5) An identification and justification for the selection of those variables, conditions, or other items which are determined to be probable subjects of "technical specifications" for the reactor – that is, provisions placing limits and conditions on operations

(6) A preliminary plan for the applicant's organization, training of personnel, and conduct of operations

(7) A description and evaluation of the quality assurance program to be applied to the design, fabrication, construction, and testing of the structures, systems and components of the reactor

(8) An identification of those structures, systems or components of the reactor, if any, which require further research and development to confirm the adequacy of their design, and

(9) The applicant's technical qualifications.

When the application for a construction permit is filed with the Commission, copies are made available to the public and are sent to interested state and local officials and the Advisory Committee on Reactor Safeguards. The next step is the Commission's regulatory staff review of the application. The objectives of this review are to (1) obtain adequate technical information on the reactor design; (2) reach an understanding of the technical basis for the safety of the proposed plant; (3) initiate discussions on preparation of the technical specifications; and (4) permit the staff to make an independent safety analysis.

In conducting its safety review, the staff, to the extent necessary or appropriate for the particular application, seeks the advice of expert consultants from outside the Commission, including those from other Federal agencies which are experienced in evaluating environmental impact. The U.S. Geological Survey is consulted with respect to the geological aspects of the site. The U.S. Fish and Wildlife Service is consulted with respect to potential radiological effects on fish, other marine life and wildlife from operation of the proposed reactor. The U.S. Weather Bureau and the Coast and Geodetic Survey are called upon for advice on meteorology and seismology. The U.S. Army Corps of Engineers may furnish hurricane data on coastal areas to enable the Commission to determine whether special protective construction should be required. In addition to consultation with experts from Government agencies, the Commission staff may consult experts from universities and private organizations on special problems.

Concurrent with the Commission's regulatory staff consideration of the application in the licensing process is the review by the Advisory Committee on Reactor Safeguards. Collectively, the members of the Advisory Committee on Reactor Safeguards have competence in the major disciplines bearing on reactor safety. In order to facilitate the Committee's review, the Commission's regulatory staff prepares a preliminary analysis of the application shortly after it is received. The preliminary analysis identifies the principal safety issues and provides a starting point for the detailed reviews by the staff and the Committee which follow. There continues to be an exchange of technical comment between the staff and the Committee as the review process goes forward. Both the utility representatives and the staff respond to questions from the Committee. After completion of its initial review, the staff prepares a report to the Advisory Committee on Reactor Safeguards, discussing its evaluation of the major safety issues which have been identified.

When the Committee has concluded its own review, it submits its recommendations in a letter to the Commission. The letter comments upon the safety of the project, spells out any areas of technical concern, and may make recommendations for research and development efforts in those areas. The letter of the Advisory Committee on Reactor Safeguards and the safety evaluation of the Commission's staff are both made public and distributed to the interested State and local officials prior to the public hearing before an atomic safety and licensing board, which is the next step in the procedure.

The hearing

Upon receipt of the letter from the Advisory Committee on Reactor Safeguards and completion of the staff safety evaluation, a notice, setting out the issues to be considered at the hearing, is published in the Federal Register (a serial publication by the Federal Government containing notices, rules and proposed rules issued by Federal agencies, Presidential proclamations, and Executive Orders). In an uncontested case, the issue to be decided is whether the application and record contain sufficient information, and the review of the application by the Commission's regulatory staff has been adequate, to justify the issuance of a provisional construction permit and the supporting findings [21]. If the case is contested, the issues are whether:

(1) The applicant has described the proposed design of the reactor and identified the major features or components for the protection of the health and safety of the public

(2) Such further technical or design information required to complete the safety analysis and which can reasonably be left for later consideration will be supplied

(3) Safety features or components requiring research and development have been described and a research and development program will be conducted to resolve any safety questions associated with them

(4) On the basis of the foregoing there is reasonable assurance that the remaining safety questions will be satisfactorily resolved at or before completion of the reactor, and taking into consideration the Commission's site criteria, the reactor can be constructed and operated at the proposed location without undue risk to the health and safety of the public

(5) The applicant is both technically and financially qualified to design and construct the proposed reactor

(6) The issuance of a permit for the construction of the reactor will be inimical to the common defense and security or to the health and safety of the public [22].

The notice also states the procedures by which interested persons can participate in the proceeding, either as a party by a motion for leave to intervene, or by the more restricted "limited appearance".

A person permitted to intervene becomes a party to the proceeding, and has all the rights of the applicant and the regulatory staff to participate fully in the conduct of the hearing. The Act directs the Commission to admit as a party any person whose interest may be affected by the proceeding [23]. A person permitted to make a limited appearance does not become a party, but is permitted to state his position and raise questions within the scope of the hearing which he would like to have answered.

A prehearing conference is held to define the technical areas of concern to the atomic safety and licensing boards, to identify significant safety questions and any matters in controversy, to facilitate the preparation of evidentiary material to provide a complete record, and to settle other procedural matters.

The purpose of the public hearing is to inform the public as well as to develop a record sufficient to support the issuance of a construction permit by the Commission. In the absence of intervenors, the parties are the licence applicant and the Commission's regulatory staff, whose function it is to represent the public interest in the protection of public health and safety and the common defense and security. Documentary evidence is presented and testimony, both prepared and oral, is given on the safety aspects of the reactor and on the applicant's technical and financial qualifications to construct and operate it.

The Commission has stressed the desirability of informality and expedition in the conduct of the proceeding, consistent with the development of a clear and adequate record. The order of presentation of testimony may be varied in the course of the hearing, and expert testimony taken from witnesses on a round-table basis after the receipt in evidence of prepared written testimony.

The atomic safety and licensing board is not expected in an uncontested case to conduct a de novo review of the application, but rather, to test the adequacy of the staff's review upon which the proposed action is based. The boards are expected to determine whether there are any significant gaps in the consideration of safety issues by the utility applicant and the Commission's regulatory staff. If any significant gaps are found and additional information is required, then the staff or applicant is requested to supply it.

In contested cases the boards determine the matters in controversy and make technical judgments of their own on these matters. However, even in contested proceedings, the Commission does not expect the boards to make a de novo review of matters not in controversy.

Commission review

After an atomic safety and licensing board's decision is issued, a party may take an appeal to the Commission (or, in some cases, to the Atomic

Safety and Licensing Appeal Board) as a matter of right. The Commission (or the Atomic Safety and Licensing Appeal Board) reviews each initial decision by an atomic safety and licensing board. This is done formally if an appeal is taken from the initial decision, or informally if no appeal is filed. The Commission (or the Atomic Safety and Licensing Appeal Board) may allow a board's decision to become the final decision of the Commission, may modify a board's decision, or may send the case back to the board for additional testimony on particular points or for further consideration of particular issues.

Operating licence

When construction of the plant is nearing completion, the utility applies for an operating licence. It submits its final safety analysis report, in which the technical information is brought up to date. The final safety analysis report presents information developed as a result of environmental and meteorological monitoring programs during construction; a description and analysis of the reactor, including the containment system and other engineered safety features, and the radioactive waste handling systems; and a description of the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures. It also includes plans for operation and for coping with emergencies. The Commission's staff and the Advisory Committee on Reactor Safeguards again evaluate and make a public report on the reactor.

When the operating licence is issued, it requires compliance with all Commission rules and regulations and contains technical specifications which place limits and conditions on operation, including requirements for surveillance and tests by the licensee, limits on operational variables, and requirements for equipment important to safety.

When significant changes in the reactor become desirable or necessary, they must be reviewed and authorized by the Commission. Similarly, changes in the technical specifications or other conditions of the licence must be reviewed and approved.

In advance of reactor start-up, the Commission must determine that persons who are to manipulate the controls of the reactor are qualified. Such individuals must be licensed by the Commission. They must first pass an examination on their knowledge of the specific reactor as well as general radiological safety principles and reactor theory.

The enforcement program

After a facility operating licence has been issued, the reactor project continues to be subject to regulatory surveillance. The purpose is to assure that the reactor is operated safely and in accordance with Commission regulations and licence conditions. The Commission does this in two ways: first, by surveillance, in which any necessary changes in design or operation are reviewed, evaluated and authorized by the AEC; and second, by periodic inspections during construction and operation. The Commission has ample statutory authority to issue orders necessary to protect the public health and safety and the common defense and security, including the shutting down of the reactor.

The Division of Compliance carries out a program of inspection and enforcement to assure that reactors are constructed and operated in compliance with the Commission's regulatory requirements. The Commission makes inspections designed to satisfy itself that the licensee is carrying out his safety responsibilities. The frequency of inspections depends on whether the facility is under construction or in operation or other special considerations.

In addition to regular inspections, the Commission investigates promptly any significant incident and determines what hazard exists, if any. It also makes sure that the licensee has taken, or is taking, timely and proper action to protect the public health and safety.

Reactor inspections are directed towards five principal areas. The areas are: (1) organization and management; (2) quality control; (3) test programs; (4) procedures; and (5) plant operations.

Compliance inspection reports serve as the basis for action required to achieve compliance with the Commission's requirements or for improvement in safety of operations. These actions include licence amendments to require design changes in the reactor or changes in the technical specifications, notices of alleged violation, conferences with licensee management, or, when necessary, the shut-down of a reactor until some important safety condition or requirement is met.

SUBSTANTIVE STANDARDS FOR LICENSING AND OPERATION OF NUCLEAR POWER REACTORS

Under the Atomic Energy Commission's regulations, the Commission must find, in licensing a power reactor, that there is reasonable assurance that the health and safety of the public will not be endangered by the reactor's operation [24]. The principal safety objective in the design and operation of nuclear reactors is to assure that fission products remain confined at all times – either within the fuel or at least within the plant structure. The information supplied in the safety analysis report and the staff's evaluation of that information form the basis for the Commission's finding that there is reasonable assurance that the public health and safety will not be endangered by the operation of the reactor. Evaluation of the design of the reactor and the engineered safety features is accomplished through consideration of their performance in relation to the type of accidents that might occur. The applicant must show the plant's ability to contain fission products even in the event of these postulated accidents. Limitations on operation considered necessary by the Commission are imposed by licence conditions, including technical specifications.

The appropriateness of the site of the proposed reactor from the viewpoint of the public health and safety is determined by reference to the site criteria in the Commission's regulations [25]. Those criteria for reactor siting are designed to assure a low risk of public exposure to radiation. The application of these criteria by the Commission has led, in general, to the location of reactors outside areas of high population density.

The Commission has also established in its regulation 10 CFR Part 20 limits on the permissible concentrations of radioactive materials that may result from the routine operation of licensed reactors, in both gaseous

and liquid effluents released to "unrestricted areas" – that is, areas beyond the plant site [26]. In addition, special provisions are usually incorporated in power reactor licences limiting the quantities of radioactive materials that may be released in air. A continuous monitoring program by the licensee utility is necessary to assure that the limits are not exceeded.

The Commission's limits on the concentrations of radioactive materials in effluents that may be released to unrestricted areas are based on guides developed by the Federal Radiation Council, which provides guidance for Federal agencies in the formulation of radiation standards. The guides developed by the Federal Radiation Council are consistent with the radiation standards promulgated by the National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP). The latter body, set up in 1928, is an international commission which has helped to originate and shape the concepts and theory of radiation protection. The NCRP was established in 1929 and performs a similar function in the United States [27].

The objectives of Part 20 as related to the protection of the environment from releases of radioactivity in effluents from the normal operation of nuclear facilities are:

(1) To limit releases of radioactivity to the environment from each nuclear facility or other licensed activity so that exposures of the general public to ionizing radiation from the cumulative effects of all licensed atomic energy activities when added to other sources of exposure are not likely to exceed radiation protection guides recommended by the FRC and approved by the President
(2) To provide reasonable assurance that levels of radioactivity added to the environment are well below levels that are likely to result in perceptible adverse effects on the ecology of the environment, and
(3) To provide reasonable assurance that appropriate efforts are made to maintain releases of radioactive materials in effluents to unrestricted areas as far below the limits specified in the regulations as practicable.

The principle followed in the Part 20 regulation is that the point of regulatory control of radioactivity is at the source prior to its release from a restricted area (i.e. an area which is controlled by a licensee for purposes of protection of individuals from exposure to radiation and radioactive materials). The basic objective of the regulation is to limit the radiation dose to people off-site to levels that are well within radiation protection guides. However, for purposes of regulation the AEC has considered it impractical to impose legal limits on licensees expressed as dose to individuals in the population or to population groups. Rather, derived regulatory limits are formulated as concentrations and/or quantities of radioactivity in air and water effluents released from a restricted area to the environment. The regulations are administered in the licensing program so that resultant exposures of individual members of the public generally and to the population as a whole from nuclear activities from all important pathways of exposure are small fractions of recommended radiation protection guides.

Upper limits on concentrations of radionuclides in air and water effluents released to unrestricted areas are specified in Part 20. These

limits are generally applicable to all licensed nuclear activities unless different limits are included as conditions in a specific licence. For the most part, the concentration values for the approximately 250 radionuclides listed are one-tenth of the most restrictive maximum permissible concentration in air and water for occupational exposure, 168-hour week, listed in NCRP-NBS Handbook 69 and in ICRP Publications 2 and 6.

The concentration values for the radionuclides of iodine, strontium-89, strontium-90, and radium-226 have been derived from the guidance in FRC Report No. 2. In any case where there is a mixture in air and water of more than one radionuclide, the sum of the relative concentrations of each radionuclide in the mixture divided by its respective concentration limit must not exceed unity. Concentrations may be averaged over a period not greater than one year. The limits apply at the boundary of the restricted area.

For the great majority of licensed nuclear activities, releases of radioactivity to the environment occur in small volumes of air or water at concentrations well within the specific limits provided in Part 20. The types and quantities of radionuclides releases are such that the dilution that will occur in the environment before persons are exposed to radioactivity under these conditions will limit exposures of individual members of the public to small fractions of radiation protection guides and average exposure of the public to much smaller fractions of these guides.

Part 20 reflects a clear recognition of the need to take into account the cumulative effect of all sources of exposures and that some nuclear activities (e. g. uranium processing mills, reactor fuel chemical reprocessing plants, nuclear power plants) may release large volumes of liquid and gaseous effluents containing a mixture of radionuclides. A thorough and detailed assessment of the nature of the radioactive material released and its behaviour in the environment, such as reconcentration in the food chain, may be required in these cases to assure that all important pathways of exposure of people are identified and evaluated. In such cases the total quantity of each type of radionuclide released may be more critical with respect to limiting exposure than the Part 20 concentration limit in air and water. For this reason, Part 20 provides that in addition to limiting concentrations in effluent streams, the Commission may limit total quantities of radioactive materials released in effluents during a specified period of time if it appears that in any situation the daily intake of radioactive material from all pathways of exposure (air, water and food), by a suitable sample of an exposed population group, averaged over a period not exceeding one year, would otherwise exceed the daily intake resulting from continuous exposure to air or water containing one-third the concentration of radioactive materials specified as limits in the regulations. In effect, this provision would limit the dose to the critical organ to the suitable sample of an exposed population group from all sources of exposure to one-third the dose limit for individuals in the population recommended by the FRC, NCRP and ICRP. It is intended that this provision of the regulation be implemented in the licensing process if it appears likely that such a large quantity of radioactivity will be released that exposures to people off-site will be a significant fraction of radiation protection guides. In such cases, an assessment must be made of the types and quantities of radionuclides releases, their chemical and physical behaviour in the environment, important pathways to humans, population groups likely to be exposed and predicted doses to such groups. Quantity limits based on such a study would

then be derived so that actual exposures to the public from all pathways would be well within radiation protection guides.

For some nuclear activities it may not be practicable to comply with the concentration limits at the point of release from a restricted area as specified in Part 20. Part 20 provides for Commission approval of concentration limits higher than those specified on a case-by-case basis, provided the applicant demonstrates that he has made a reasonable effort to minimize the radioactivity contained in effluents to unrestricted areas and that exposures of individuals and of a suitable sample of exposed population groups do not exceed the exposure criteria specified in the regulation.

Although the experience with AEC licensed activities has shown that such activities have, in the main, been conducted well within Part 20 limits, the Atomic Energy Commission has recently taken further steps to improve the framework for assuring that reasonable efforts are made by all Commission licensees to continue to keep exposures to radiation and releases of radioactivity in effluents as low as practicable, to specify design and operating requirements with a view to minimizing quantities of radioactivity released in gaseous and liquid effluents from nuclear power reactors.

As is well known, the Federal Radiation Council in its recommendations has added to the numerical guidance on maximum limits the further guidance that "every effort should be made to encourage the maintenance of radiation doses as far below this guide as practicable". Similar statements are also included in NCRP and ICRP recommendations.

The Commission has always subscribed to the general principle that, within radiation protection guides, radiation exposures to the public should be kept as low as practicable. This general principle has been a central one in the field of radiation protection for many years.

Amendments to Part 20, and to Part 50, the AEC regulation for licensing of power reactors, among other things, were published on December 3, 1970, effective January 2, 1971, to require all AEC licensees to make every reasonable effort to maintain radiation exposures and releases of radioactivity in effluents to the environment as far below Part 20 limits as practical, and to specify design and operating requirements to minimize quantities of radioactivity released in gaseous and liquid effluents from nuclear power reactors.

The Atomic Energy Commission has also recently adopted a new policy with respect to the problem of high-activity wastes produced in the chemical reprocessing of reactor fuel elements to recover unused uranium. On November 14, 1970, the AEC published a statement of policy on the siting of fuel reprocessing plants and related waste management facilities. High-level waste disposal will be permitted only on land owned and controlled by the Federal Government, thus accomplishing not only isolation of such wastes from the biological environment but also the avoidance of proliferation of such waste repositories.

FINANCIAL PROTECTION AND INDEMNITY AGAINST CLAIMS ARISING FROM NUCLEAR ACCIDENTS

The regulation of nuclear power reactors in the United States has been characterized not only by the development of measures designed to prevent

accidents, but also by measures to assure compensation for injuries in the unlikely event that an accident does occur. These measures are an integral part of the Commission's regulatory program. Although the possibilities of such accidents and injuries are remote, the theoretical possibilities of injuries are such that beforehand provision has been made, through legislation, to assure the availability of funds to satisfy claims in the highly unlikely event of a catastrophic accident, and to eliminate the deterrent to the use of atomic energy for power production presented by the threat of high liability claims in the event of such an accident. That legislation, the "Price-Anderson" amendments to the Atomic Energy Act [28], requires persons licensed to operate power reactors or other production and utilization facilities to have and maintain financial protection, in the form of insurance or otherwise, to cover public liability claims up to an amount specified by the Commission. For large power reactors, the amount is currently $82 million, the maximum amount available through private insurance [29]. The Commission provides indemnity protection, over and above the amount of financial protection required, up to $500 million. The liability of the reactor operator is limited to the sum of the financial protection required and the indemnity, not to exceed $560 million [30]. Insurance policies issued to provide the financial protection required by the Atomic Energy Act, as well as the Government indemnity agreements, cover off-site property of persons indemnified and nuclear risks in the transport of nuclear material to and from the facility site.

The indemnity legislation does not fix the basis of legal liability. The claimant's ability to establish legal liability, on which his right to recover from the insurance-indemnity fund is based, turns on the tort laws of general application of the various States which make up our Federal republic. Not only have different State courts taken different positions in accepting or rejecting the doctrine of strict liability, but, in a number of States, the question is unsettled. The concern that victims of "nuclear incidents" [31] in some States might never, or only after lengthy litigation, receive the compensation contemplated by the statute, led to significant amendments of the Act in 1966 [32]. The amendments authorized the Atomic Energy Commission, with respect to any "extraordinary nuclear occurrence", to incorporate provisions in its indemnity agreements, and to require incorporation of provisions in insurance policies or contracts furnished as proof of financial protection, which waive issues or defenses (1) as to the conduct of the claimant or fault of persons indemnified, (2) as to charitable or governmental immunity and (3) based on any statute of limitations, if suit is instituted within three years from the date on which the claimant first knew, or reasonably could have known, of his injury or damage and its cause, but not more than ten years after the date of the nuclear incident. An "extraordinary nuclear occurrence" was defined in the amendments as any event causing discharge or disposal of radioactive material in amounts off-site, or causing radiation levels off-site, which the Commission determines has resulted or will probably result in substantial damages to persons or property off-site [33]. The Commission has adopted detailed criteria for determination of an "extraordinary nuclear occurrence" [34].

In addition, the amendments authorized the Commission to make payments for immediate assistance of claimants following a nuclear incident, without requiring a release or compromise of their claims [35].

DIVISION OF AUTHORITY OVER RADIOLOGICAL EFFECTS BETWEEN FEDERAL GOVERNMENT AND THE INDIVIDUAL STATES

In the United States, by the Atomic Energy Act of 1946, the first atomic energy statute passed by the Congress, atomic energy activities were largely a Federal monopoly. The Atomic Energy Act of 1954, while it permitted private uses of atomic energy under Federal licensing, made no provision for controls by the individual States which, in other fields, had traditionally regulated potentially hazardous activities.

A unique readjustment of Federal-State responsibilities for the control of atomic energy took the form of an amendment to the Atomic Energy Act in 1959 – the addition of a new Section 274 [36], the so-called "Federal-State Amendment", which provides a mechanism for the States to assume the regulation of certain atomic energy materials by an agreement with the Atomic Energy Commission. This amendment was passed only thirteen years or so after the subject of atomic energy was first formally considered in the Congress [37].

By March 1970, twenty-two of the fifty States had signed "Section 274 Agreements" with the AEC.

The expressed purposes of the "Federal-State Amendment" give a clear idea of what was intended by Congress. The first four of these purposes are:

(1) To recognize the interests of the States in the peaceful uses of atomic energy, and to clarify the respective responsibilities under the Atomic Energy Act of the States and the AEC with respect to the regulation of by-product, source, and special nuclear materials
(2) To recognize the need, and to establish programs, for co-operation between the States and the AEC with respect to control of radiation hazards associated with use of such materials
(3) To promote an orderly regulatory pattern between the AEC and State governments with respect to nuclear development and use and regulation of by-product, source, and special nuclear materials, and
(4) To establish procedures and criteria for discontinuance of certain of the AEC's regulatory responsibilities with respect to by-product, source, and special nuclear materials, and the assumption thereof by the States [38].

There is a two-step procedure for a "Section 274 Agreement". First, the Governor of the State certifies that the State has a program for the control of radiation hazards adequate to protect public health and safety with respect to the materials to be covered by the Agreement, and that the State desires to assume regulatory responsibility for those materials. Second, the AEC finds that the State program is compatible with the AEC's program for the regulation of the materials, and that the State program is adequate to protect public health and safety [39].

A "Section 274 Agreement" covers only the so-called "agreement materials". These are: (1) by-product materials – popularly known as radioisotopes; (2) source materials – generally meaning thorium and uranium ores; and (3) special nuclear materials – generally meaning enriched uranium and plutonium – in quantities not sufficient to form a "critical mass". The "Section 274 Agreements" do not cover other radiation

sources such as radium, X-ray machines, and cyclotron-produced isotopes which are not within the regulatory jurisdiction of the Atomic Energy Commission and have always been subject to State regulation. Nor do they permit State regulation of certain activities still reserved for exclusive Federal control, including the possession and use of large quantities of special nuclear materials, the construction and operation of nuclear reactors or certain other facilities, the export and import of materials, the ocean disposal of waste materials, the transfer, storage or disposal of high-level radioactive waste, and the transfer by the manufacturer of consumer products containing by-product material.

The concept that the control of radiological effects from nuclear reactors should be under the exclusive authority of the Federal Government went largely unchallenged until fairly recently. There is pending litigation, however, over whether a State may impose radiological standards, in connection with the operation of a nuclear power reactor, stricter than those established by the AEC. Northern States Power Company versus State of Minnesota and the Minnesota Pollution Control Agency, United States District Court, District of Minnesota, Third Division.

NEW LEGISLATIVE DEVELOPMENTS

The above discussion points up the direction and some of the accomplishments of the United States' program for the licensing and regulation of nuclear power reactors from the standpoint of their radiological impact on the environment. The control of other effects on the environment from the construction and operation of nuclear power reactors is in a transitional phase. I refer to the problems associated with all large energy generating plants, such as thermal effects on adjacent waters and effects upon the physical environment. The Congress has only of recent years launched a major effort to deal with such problems; accordingly, in most cases, the measures taken must be corrective as well as preventive.

Large quantities of water are used for cooling in the main condenser, in large-scale nuclear-fuelled and fossil-fuelled power plants alike. The water is usually pumped from a nearby river, lake or ocean through the condenser and discharged back into the body of water with an increase in temperature. There is no firm consensus on the effect of the rise in temperature of water returned to rivers, lakes or oceans on the plant and animal life in those waters. However, it is generally thought that higher water temperature reduces the oxygen content of the waters and alters the ecology.

NEW UNITED STATES LEGISLATION AND POLICY

The National Environmental Policy Act of 1969

The National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190) became effective on January 1, 1970. The stated purposes of NEPA are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere

and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.

Section 101(B) of NEPA provides that, in order to carry out the policy set forth in the Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and co-ordinate Federal plans, functions, programs, and resources toward certain stated ends.

In section 102, the Congress authorizes and directs that, to the fullest extent possible, the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in the Act. All agencies of the Federal Government are required, among other things, to include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on certain specified environmental considerations, to wit:

(i) the environmental impact of the proposed action
(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented
(iii) alternatives to the proposed action
(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Before making the detailed statement, the responsible Federal official is required to consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of the statement and comments and views of appropriate Federal, State and local agencies which are authorized to develop and enforce environmental standards are required to be made available to the President, the Council on Environmental Quality and to the public as provided by the Public Information Act (5 USC 552), and to accompany the proposal through the existing agency review processes (Sec. 102(2)(C)).

Section 102 also requires all agencies of the Federal Government, to the fullest extent possible, to

(A) Utilize a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment
(B) Identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, which will ensure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations
(C) Study, develop, and describe appropriate alternatives to recommend courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources

(D) Recognize the world-wide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international co-operation in anticipating and preventing a decline in the quality of mankind's world environment
(E) Make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment
(F) Initiate and utilize ecological information in the planning and development of resource-oriented projects, and
(G) Assist the Council on Environmental Quality established by title II of this Act.

Section 103 of NEPA provides that all agencies of the Federal Government shall review their present statutory authority, administrative regulations, and current policies and procedures for the purpose of determining whether there are any deficiencies or inconsistencies therein which prohibit full compliance with the purposes and provisions of the Act and shall propose to the President not later than July 1, 1971, such measures as may be necessary to bring their authority and policies into conformity with the intent, purposes, and procedures set forth in the Act.

The Council on Environmental Quality is established by NEPA in the Executive Office of the President. NEPA directs that the Council be composed by three members appointed by the President with the advice and consent of the Senate, and that it have the duty and function of, among other things, reviewing and approving Federal Government activities in the light of the statutory policy, and developing and recommending to the President national policies for environmental improvement.

The AEC initially implemented NEPA as described in a statement of general policy, in the form of an Appendix D to Part 50, effective on publication of April 2, 1970. The statement provided that the Commission's Director of Regulation or his designee will prepare the detailed statement on the environmental considerations involved in proposed nuclear power reactors and fuel reprocessing plants required by the National Environmental Policy Act, after transmitting applications for licences to construct and operate such plants to Federal agencies which have legal jurisdiction or special expertise with respect to environmental impact. The statement of general policy also sets forth that the Commission will incorporate in construction permits and operating licences for such plants a condition to the effect that the licensee shall observe Federal and State standards and requirements for the protection of the environment, including standards and requirements for the control of thermal effects of the release of heated water from the facility to the environment, which are validly imposed under Federal and State law and are determined by the Commission to be applicable to the facility.

After publication of the statement of general policy, the Council on Environmental Quality issued interim guidelines to Federal agencies for the preparation of the detailed statements of environmental considerations, and the Water Quality Improvement Act of 1970 became effective.

A proposed revision of Appendix D, to reflect (1) the guidance of the Council on Environmental Quality and (2) the enactment of the Water Quality

Improvement Act of 1970, was published in the Federal Register on June 3, 1970 (35 FR 8594). Under revised Appendix D, set out in the notice of proposed rule making, applicants for construction permits for nuclear power reactors and fuel reprocessing plants would be required to submit with the application a separate Report on specified environmental considerations.

Copies of such Reports would then be transmitted by the Commission, with a request for comments, to Federal agencies designated by the Council on Environmental Quality as having "jurisdiction by law or special expertise with respect to any environmental impact involved" or as "authorized to develop and enforce environmental standards" as the Commission determines are appropriate. A summary notice of availability of such a Report would be published in the Federal Register, with a request for comment on the proposed action and on the Report from State and local agencies of any affected State (with respect to matters within their jurisdiction) which are authorized to develop and enforce environmental standards.

After receipt of the comments of the Federal, State and local agencies, the Commission's Director of Regulation or his designee would prepare a Detailed Statement on the environmental considerations, including, where appropriate, a discussion of problems and objections raised by such agencies and the disposition thereof. In preparing the Detailed Statement, the Director of Regulation or his designee could rely, in whole or in part, on, and incorporate by reference, the appropriate Applicant's Environmental Report, and the comments thereon submitted by Federal, State and local agencies, as well as the regulatory staff's radiological safety evaluation.

Since the requirements of section 21(b) of the Federal Water Pollution Control Act supersede pro tanto the more general environmental requirements of sections 102 and 103 of the National Environmental Policy Act of 1969, both Applicant's Reports and the Detailed Statements would be required with respect to water quality aspects of the proposal covered by section 21(b), to include only a reference to the certification issued pursuant to section 21(b) or to the basis on which such certification is not required. Licence conditions imposed under Appendix D requiring observance standards and requirements for the protection of the environment as are validly imposed pursuant to authority established under Federal and State law and as are determined by the Commission to be applicable to the facility that is subject to the licensing action involved, would not apply to matters of water quality covered by section 21(b) of the Federal Water Pollution Control Act.

The types of materials licences to which procedures and measures similar to those for nuclear power reactors and fuel reprocessing plant licences would be applied, would be indicated in the notice of proposed rule making.

Further action will be taken in the rule making proceeding in the near future. In the meantime, the AEC and applicants for the covered permits and licences have been following the procedures set out in the proposed revised Appendix D to the extent not inconsistent with existing regulations.

The Water Quality Improvement Act of 1970

The Water Quality Improvement Act (WQIA) of 1970 (Public Law 91-224) became effective on April 3, 1970. That Act, among other things, redesignated section 11 of the Federal Water Pollution Control Act as section 21 and amended redesignated section 21 to require any applicant for a Federal

licence or permit to conduct any activity, including the construction or operation of a facility, which may result in any discharge into the navigable waters of the United States, to provide the licensing agency with a certification from the State in which the discharge originates, or from an interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates, that there is reasonable assurance, as determined by such certifying authority, that the activity will be conducted in a manner which will not violate applicable water quality standards. The certification is to be provided by the Secretary of the Interior in cases where water quality standards have been promulgated by the Secretary under section 10(c) of the Federal Water Pollution Control Act or where the State or interstate agency has no authority to give such a certification. In the event that the State, interstate agency or Secretary fails or refuses to act on the request for a certification within a reasonable period of time, not to exceed one year, after receipt of the request, the certification requirements are waived. Federal licensing agencies are prohibited from issuing any such licence or permit unless a certification has been obtained or waived.

The licensing agency is required to immediately notify the Secretary of the Interior of receipt of an application and certification. When the Secretary determines that the expected discharge may affect the quality of the waters of any State other than the State where the discharge originates, the Secretary is directed to notify such other State, the licensing agency, and the applicant. If such other State determines that the discharge will violate its water quality standards, notifies the Secretary and the licensing agency of its objection to the issuance of the licence or permit, and requests a public hearing on its objections, the licensing agency is required to hold a hearing. The licensing agency – on the basis of the recommendations of the State, the Secretary and any additional evidence presented at the hearing – is directed to condition the licence or permit in such manner as may be necessary to assure compliance with applicable water quality standards. The licensing agency is enjoined from issuing the licence or permit if the imposition of conditions cannot assure compliance.

A certification obtained with respect to the construction of a facility fulfils the requirements for certification for any other Federal licence or permit required for operation unless, after notice to the certifying State, interstate agency, or Secretary of the Interior given by the agency to which the application is made for an operating licence, such State, interstate agency or Secretary notifies the licensing agency within sixty days that there is no longer reasonable assurance that there will be compliance with applicable water quality standards because of changes since the certification was issued in (1) the construction or operation of the facility, (2) the characteristics of the waters into which the discharge is made, or (3) the applicable water quality standards. If a facility or activity for which a certification has been obtained is not subject to a Federal operating licence or permit, the licensee is required to provide an opportunity, prior to initial operation, for the certifying State, interstate agency, or Secretary, to review the manner in which the facility or activity will be operated or conducted in order to assure that applicable water quality standards will not be violated. On notice by the certifying State or interstate agency, or the Secretary, that the operation of the facility or activity will violate applicable water quality standards, the licensing agency is authorized to suspend the

licence after public hearing, until receiving notification that there is reasonable assurance that the facility or activity will not violate applicable water quality standards.

A Federal licence may also be suspended or revoked by the licensing agency upon the entering of a judgement by a court under section 10(h) of the Federal Water Pollution Control Act that the facility or activity has been operated in violation of applicable water quality standards.

Licences or permits issued after the effective date of the Water Quality Improvement Act of 1970 for facilities where actual construction has been lawfully commenced prior to that date, are excepted from certification requirements, but such permits or licences issued without certification shall terminate three years after the date of enactment of that Act unless the licensee submits to the licensing agency a certification before that date. Except for facilities for which construction has commenced in accordance with that provision on the date of enactment, licences or permits issued within one year following the effective date of the Act upon applications pending on the effective date of the Act do not require certification for one year following the issuance of the licence or permit. Licences or permits so issued shall terminate at the end of one year unless the licensee submits to the licensing agency a certification before that date.

No certification is required for an activity affecting water quality for which there are no applicable standards, but the licensing agency is directed to impose as a condition of the licence a requirement that the licensee comply with the purposes of the Water Quality Improvement Act. If such licensee is notified of the adoption of applicable water quality standards and, after six months notice, fails to comply, the licence shall be suspended until notice has been received by the licensing agency that there is reasonable assurance that the activity will comply with applicable water quality standards.

While Federal agencies are not subject to the provisions of subsection 21(b), they are required, by subsection 21(a), consistent with the paramount interest of the United States as determined by the President, to ensure compliance with applicable water quality standards and the purposes of the Act in the administration of any property, facility or activity over which it has jurisdiction.

The AEC is, of course, complying with the above-described requirements of the WQIA by requiring the submission of water quality certificates in cases where they are required and otherwise complying with the requirements imposed on Federal agencies by that Act.

The AEC has not yet adopted a regulation pertaining to implementation of the Water Quality Improvement Act of 1970. It expects to publish a statement of general policy and procedure on that subject in the near future.

Interaction between the National Environmental Policy Act and the Federal Water Pollution Control Act

In considering the impact of Section 102 of NEPA and Section 21(b) of the Federal Water Pollution Control Act (FWPCA) as amended by WQIA, a basic question arises: For matters of water quality covered by FWPCA, do the requirements of Section 21(b) of that Act supersede, pro tanto, the more general environmental requirements of NEPA, or must NEPA also be followed with regard to such matters?

Upon examining the question, the General Counsel of the AEC has concluded that:

A. For matters of water quality covered by the FWPCA, Section 21(b) of that Act applies exclusively. If, however, a particular water quality matter is not within the scope of Section 21(b), the requirements of NEPA must be adhered to as respects consideration and treatment of that matter in AEC licensing proceedings.
B. The only apparent limitation on the applicability of Section 21(b) is that the discharge must be into "navigable waters of the United States". The limited "waiver" provisions in Section 21(b), such as the "grandfather" clauses and the action to be taken in the event there are no applicable water quality standards, do not have the effect of requiring a licensing agency to follow NEPA's Section 102 procedures for such water quality matters.
C. The term "navigable waters of the United States" is not defined in the FWPCA. There are court decisions which indicate that the term extends to all waters that are or may reasonably be made to be navigable, without regard to their interstate or intrastate character.

Other legislation and legislative proposals

In addition to the National Environmental Policy Act of 1969 and the Water Quality Improvement Act of 1970, the Resources Recovery Act of 1970 (Public Law 91-512), signed on October 26, 1970, affects AEC regulatory authority. That legislation, which amends the Solid Waste Disposal Act of 1965 (42 USC 3252-3259) authorizes and requires the Secretary of Health, Education and Welfare (HEW), in co-operation with appropriate State, Federal, interstate, regional, and local agencies, to recommend guidelines for solid waste recovery, collection, separation, and disposal systems (including systems for private use) "which shall be consistent with public health and welfare, and air and water quality standards and adaptable to appropriate land use plans".

Section 211(b) provides that each Executive agency which issues any licence or permit for disposal of solid waste shall, prior to the issuance of such licence or permit, consult with the Secretary (of HEW) to ensure compliance with guidelines recommended under section 209 and the purposes of the Act.

Section 212 provides for a "National Disposal Sites Study". It requires the Secretary of HEW to submit to the Congress within two years a comprehensive report and plan for the creation of a system of national disposal sites for the storage and disposal of hazardous wastes, including radioactive wastes.

Thus, AEC will be required to consult with the Secretary of HEW before issuing licences or permits for disposal of solid waste, to assure compliance with such guidelines as may be recommended by the Secretary.

Legislative proposals pertaining to the adequacy of electric power supplies and the siting of generating and transmission facilities may also affect AEC regulatory jurisdiction.

The Energy Policy Staff of the Office of Science and Technology was charged with the task of developing a program for resolving the environmental problems that have emerged in the siting of steam electric power

plants and extra high-voltage transmission lines. A study group of interested Federal agencies, including the AEC, met with representatives of State and local governments, conservation leaders, State regulatory commissioners and utility commissioners to obtain an appraisal of the various problems. The result was a report, "Electric Power and the Environment", dated August 1970 which recommended:

"(1) Long-range planning of utility expansions on a regional basis at least 10 years ahead of construction
(2) Participation in the planning by the environmental protection agencies and notice to the public of plant sites at least five years in advance of construction
(3) Pre-construction review and approval of all new large power facilities by a public agency at the state or regional level, or by the federal government if the states fail to act
(4) An expanded program of research and development aimed at better pollution controls, underground high-voltage power lines, improved generation techniques, and advanced siting approaches so as to minimize the environmental problems inherent in existing technology."

The report indicated that proposed legislation to implement the recommendations in the report would be forthcoming.

A bill "to secure electric power supplies adequate to the demands of the Nation compatible with environmental quality", prepared by the Federal Power Commission, S. 4421, was introduced by Senator Cotton on October 1, 1970.

The bill appears to implement the recommendations of the Study Group. The bill was described by the Federal Power Commission in its initial environmental statement on the proposed legislation as follows (35 FR 16440):

"The Electric Power Environmental Policy Act of 1970 (Act) is designed to promote and insure adequate and reliable electric power supplies for the Nation by facilitating the timely construction of electric generating facilities and EHV transmission lines upon a basis compatible with environmental quality. Harmony between the needs of the Nation for an adequate and reliable bulk power supply and the national interest in environmental protection is the basic objective of the bill. To this end the proposed legislation would require all public and private electric entities owning or operating bulk power supply facilities to plan, evaluate and seek certification of powerplant sites and EHV transmission lines well in advance of commencement of construction. All such facilities, other than those federally owned or operated or within the jurisdiction of Part I of the Federal Power Act, 41 Stat. 1063, 16 U.S.C. 791-823, as amended,[1] would require certification of site and facility by State or regional agencies established and operated in accordance with the Act. If State agencies are not created, the Federal Power Commission would exercise the certification responsibility until such time as the States take action. With respect to federally owned facilities there

[1] Hydroelectric facilities are exempted from the Act because they are currently fully within the licensing jurisdiction of the Federal Power Commission.

would be FPC certification. Also, there would be Federal certification in those cases where State or regional procedures are established but the State agencies do not act upon a timely basis. The Commission would also be empowered to certify facilities in cases where the national public interest in an adequate and reliable bulk power supply requires certification upon findings that public health and safety are not endangered by the proposed facility and that construction, operation and maintenance thereof will not cause irreparable damage to a necessary ecological system. The FPC would be authorized to delegate to the U.S. Atomic Energy Commission the certification of nuclear facilities."

Reorganization Plan No. 3 of 1970 and its effects

The whole matter of protection of the environment in Federal activities and Federally-licensed activities will be affected by the centralization of many environmental protection functions and responsibilities in the Environmental Protection Agency created by Reorganization Plan No. 3 of 1970.

Reorganization Plan No. 3, transmitted to the Congress on July 9, 1970, established the Environmental Protection Agency (EPA) and transferred to the Administrator of that agency "All functions vested by law in the Secretary of the Interior and the Department of the Interior which are administered through the Federal Water Quality Administration, all other functions which were transferred to the Secretary of the Interior by Reorganization Plan No. 2 of 1966 (80 Stat. 1680), and all other functions vested in the Secretary of the Interior or the Department of the Interior by the Federal Water Pollution Control Act or by provisions of law amendatory or supplementary thereof".

The Plan also transfers the functions of the Secretary of Health, Education and Welfare administered through the Environmental Health Service, including functions exercised by the National Air Pollution Control Administration, the Bureau of Solid Waste Management, the Bureau of Water Hygiene and the Bureau of Radiological Health, with certain exceptions.

Functions vested in the Council on Environmental Quality under section 204(5) of NEPA as pertain to ecological systems are transferred.

The Plan also transfers to the Administrator "The functions of the Atomic Energy Commission under the Atomic Energy Act of 1954, as amended, administered through its Division of Radiation Protection Standards, to the extent that such functions of the Commission consist of establishing generally applicable environmental standards for the protection of the general environment from radioactive material. As used herein, standards mean limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material", and "All functions of the Federal Radiation Council (42 U.S.C. 2021)".

Other functions of the Departments of Interior and Health, Education and Welfare, and of certain other agencies not significant here, are also transferred.

While the Reorganization Plan does not alter the underlying statutory authority for the conduct of the transferred functions, it is expected that the reorganization of the transferred functions into a single agency will increase

the efficiency of the operations of the government in performing those functions and result in a co-ordination of programs for environmental protection on all fronts.

The provisions of Reorganization Plan No. 3 went into effect in early December. It means, as noted, that AEC's functions in setting general standards for radioactivity in the general environment will be performed by the Administrator of the Environmental Protection Agency. However, AEC will continue to be responsible for the imposition of requirements on its licensees necessary to assure that such general standards are not exceeded.

SOME CURRENT PROBLEMS AND APPROACHES

A responsive and effective regulatory program must, of course, keep pace with an advancing technology and new developments.

Today we are facing the advent of the operation of significant numbers of power reactors which have been under construction in the past several years. We are also faced with newly great public interest in the environmental impact of the operation of those reactors. This development makes necessary a careful and in-depth review of both the construction permit and operating licence stage of nuclear power reactors.

Within the ambit of the existing Atomic Energy Act, the AEC is attempting to develop more definitive criteria and standards for design, construction, operation, and maintenance of power reactors, and to issue a series of "Safety Guides" which suggest acceptable solutions to some nuclear safety problems.

A possible new direction may be the initiation of an early review of the suitability of reactor sites. The elimination of mandatory hearings at the operating licence stage, which would require legislation, is another possibility. Without legislation, the Commission might consider the establishment of an earlier hearing at the operating licence stage. I have described some of the legislative proposals which attempt to reconcile the demands for adequate power supply and a clean environment which would be applicable to other licensing agencies as well as the AEC.

REFERENCES

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[3] The Nuclear Plant and Our Energy Needs, Public Utilities Fortnightly 85 19 (1970) 21.
[4] Providing for Public Safety in the Nuclear Industry – The Engineering Approach, remarks by James T. Ramey, Commissioner, USAEC before the National Academy of Engineering, Washington, D.C., May 1, 1969, pp. 5-6.
[5] Considerations Affecting Steam Power Plant Site Selection, A Report Sponsored by The Energy Policy Staff, U.S. Office of Science and Technology (1968) pp. 29-57.
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[7] Future Outlook for the Application of Nuclear Science, supra note 7, pp. 15-16.
[8] Section 101, 42 USC 2131.

[9] Section 11 cc., 42 USC 2014 (cc).
[10] 10 CFR (Code of Federal Regulations) §50.2(b).
[11] Section 185, 42 USC 2235.
[12] Section 189, 42 USC 2239.
[13] 5 USC §551-559.
[14] Section 182b., 42 USC §2232(b).
[15] Section 191, 42 USC §2241.
[16] Section 189b., 42 USC §2239(b), 28 USC §2342-2344.
[17] Section 161, 42 USC §2201.
[18] Sections 222, 223, 232, 234, 42 USC §§2272, 2273, 2280, 2282.
[19] 10 CFR §§50.33, 50.34, 50.35, 50.40, 50.57.
[20] 10 CFR §50.34.
[21] 10 CFR §2.104(b)(2).
[22] 10 CFR §2.104(b)(1).
[23] Section 189a., 42 USC §2239(a).
[24] 10 CFR §50.40.
[25] 10 CFR Part 100.
[26] 10 CFR §20.106.
[27] Progress and Problems in Radiation Standards and Radioactive Waste Disposal, remarks by James T. Ramey, Commissioner, USAEC, Student Faculty Seminar of the School of Public Health, University of North Carolina, Chapel Hill, N.C., April 26, 1965, pp.8-9, 13. This speech contains an informative exposition of the development of radiation protection standards and their application by the Atomic Energy Commission.
[28] Pub. L. 85-256, §4, 71 Stat. 576 (42 USC §2210).
[29] Section 170a. and b., 42 USC 2210(a) and (b); 10 CFR §140.11(a)(4).
[30] Section 170e., 42 USC 2210(e).
[31] Defined in all q.; 42 USC 2014(q).
[32] Pub. L. 89-645, 80 Stat. 891. A detailed discussion of the circumstances and discussions leading to this legislation may be found in Trosten and England, Waiving Defenses: A New Approach to Protecting the Public Against Financial Loss from Use of Atomic Energy, 27 Fed. Bar Journal 27-56 (1967).
[33] Pub. L. 89-645, §1, 80 Stat. 891, 42 USC 2014(j).
[34] 10 CFR §§140.84, 140.85.
[35] Section 170m., 42 USC 2210(m).
[36] 420 USC 2021.
[37] Pub. L. 86-373, §1.
[38] Section 274a., 420 USC 2021(a).
[39] Section 274d., 420 USC 2021(d).

OUTLINES OF THE BASIC ELEMENTS OF LEGISLATION FOR RADIATION PROTECTION

RECOMMENDATION OF AN IAEA STUDY GROUP
HELD IN 1969 IN CO-OPERATION WITH ILO AND WHO

The form in which, and the means by which, radiation protection legislation may be enacted and implemented primarily depend on the constitutional structure and the legal and administrative traditions of the country. However, whatever may be the legal approach to regulatory measures for ensuring the safe use of radioactive substances and other radiation sources, national legislation establishing a radiation control scheme should cover the basic elements described below.

1. PURPOSE OF LEGISLATION

A short statement of the purpose of legislation may be required under some legislative systems. Reference could be made to the need for appropriate protection of workers, of members of the public who may be directly or indirectly exposed to ionizing radiation and of the population as a whole, and for the protection of property and of the environment.

2. DEFINITIONS

Careful attention should be given to the proper definition of key terms. This may not necessarily include scientific and technical terms which are generally accepted. However, account should be taken of the definitions already provided in a number of international recommendations.

3. SCOPE OF LEGISLATION

The scope of legislation should be to regulate and control any activity involving potential exposure to ionizing radiation.

4. RADIATION PROTECTION REQUIREMENTS

The implementation of radiation protection requirements involves a number of elements such as the laying down of dose limits, the appropriate design of equipment and facilities, the provision of adequate supervision and surveillance, the appropriate education of workers and others involved, the provision of surveillance measures in the environment. Adequate guidelines exist in respect of these requirements in a number of international recommendations and publications that are available on these subjects. The dose limits for external or internal exposures should be consistent with the generally accepted international recommendations.

In certain cases, it may also be advisable to transcribe international recommendations or standards into national legislation either (a) by making reference to such recommendations, thus giving them legal value, without incorporating them in detail, or (b) by their incorporation, subject to appropriate adaptation to the national legal and administrative system.

A law (act, decree) on radiation protection may thus be general in character while providing a legal basis for the formulation of regulations, rules, directives, guides, manuals and/or codes of practice by the administrative authorities or specialized bodies, depending on the distribution of functions within the national administration and the need for specific regulations and rules. Such regulations and rules may subsequently be modified relatively easily if the international recommendations are revised. A law too detailed, on the contrary, may soon appear outdated or incomplete as the international recommendations may change in the light of experience and new developments in science and technique.

5. COMPETENT AUTHORITY/AUTHORITIES

The competent authority/authorities responsible for promulgation and implementation of radiation protection legislation should be clearly identified. Such functions may already be the responsibility of an existing ministry or department within the national administration. They may also be entrusted to a specialized body set up at governmental level, whose functions transcend the traditional responsibilities of existing departments or ministries. Whatever may be the system adopted in the light of local circumstances and requirements, it is essential for the sake of efficiency to seek the widest possible agreement between all parties involved.

The competent authority/authorities should be vested with sufficient discretion to formulate regulations and rules as the need may arise. In this connection, it will be noted that existing codes of practice recommended by international organizations cover a wide range of most of the requirements and, therefore, they may be used as such or with appropriate modifications.

6. LICENSING

All activities in radiation installations involving potential exposure to radiation should be subjected to a system of notification, registration or prior authorization granted by a competent authority with, however, the possibility of excluding certain activities from the scope of this system depending upon the risks involved. The utilization of radiation sources for medical purposes is also subject to such system.

The licensing of radiation installations should be based on the adequacy of facilities, the work requirements and the personal qualifications and training of the staff.

7. RESPONSIBILITY

The channelling of responsibility for any activity involving radiation sources should be clearly identified in accordance with the national legal

system. Such responsibility may however be delegated to a person or persons for the day-to-day implementation of the safety measures required. Problems such as third party liability may also have to be taken into account where relevant.

8. RIGHT OF INSPECTION, ACCESS AND INTERVENTION

A basic requirement to ensure compliance with regulatory measures is the provision of adequate inspection services. The problem of right of access to radiation installations should be given careful consideration. Adequate powers for intervention should be provided to the competent authority in case of deficiency of a radiation installation or of its dangerous operating conditions, or in emergency situations.

9. RADIATION ACCIDENTS AND EMERGENCIES

All necessary measures should be taken to forestall and prevent radiation accidents and emergencies. Provisions should be made for the development of suitable emergency schemes to deal with such situations. Such schemes should include special measures such as those for the treatment of personnel who have suffered radiation injury.

In case of emergency assistance to be requested from another country or from an international organization, the draft agreements that have been developed by the IAEA may provide guidance on appropriate arrangements.

10. PROTECTION OF THE ENVIRONMENT AND PROPERTY

Wherever necessary, conditions governing the discharge/dispersal of radioactive materials may be imposed when the license for a particular installation is granted.

Prior to the siting of any radiation installation, careful consideration should be given to the radiological capacity of the environment and to the problems arising from the discharge/dispersal of radioactive materials to the said environment.

In certain cases, the siting of the installation and the discharge/dispersal of radioactive materials from the installation may have to comply with international agreements or conventions.

11. MEDICAL EXPOSURE

The importance of protecting patients subject to medical procedures involving exposure to radiation has long been recognized. This important factor should always be borne in mind in the formulation and implementation of radiation protection regulations with a view to restricting exposures to the patient to the minimum possible consistent with good medical practice.

12. PENALTIES

For infraction of the law and supplementary regulations and rules, administrative sanctions such as temporary or permanent revocation of a licence may be imposed without prejudice to the imposition of additional penalties depending upon the nature/gravity of the infraction. It will be noted, however, that the most important elements of a regulatory scheme are licensing and inspection; they are effective means of ensuring compliance with the health and safety standards required.

Translations into French and Spanish follow.

EXPOSE DES ELEMENTS FONDAMENTAUX DE LA LEGISLATION EN MATIERE DE RADIOPROTECTION

Recommandation adoptée par un Groupe d'étude de l'AIEA organisé en 1969 en collaboration avec l'OIT et l'OMS

La forme et les modalités d'adoption et d'application de la législation en matière de radioprotection dépendent essentiellement du cadre constitutionnel et des traditions juridiques et administratives nationales. Toutefois, quelle que soit la manière dont sont envisagées, sur le plan juridique, les mesures réglementaires visant à faire en sorte que les substances radioactives et autres sources de rayonnements soient utilisées sans danger, toute législation nationale établissant un système de contrôle radiologique devrait tenir compte des éléments fondamentaux indiqués ci-après.

1. OBJET DE LA LEGISLATION

Un bref exposé des motifs peut être nécessaire dans certains systèmes législatifs. On pourrait dans cet exposé souligner la nécessité d'assurer de manière satisfaisante la protection des travailleurs, des membres du public qui peuvent être exposés directement ou indirectement aux rayonnements ionisants, et de l'ensemble de la population ainsi que la protection des biens et du milieu.

2. DEFINITIONS

Il faudrait veiller à définir exactement les termes essentiels. Cette définition ne s'étendra pas forcément aux termes scientifiques et techniques dont le sens est généralement accepté. Toutefois, on devrait tenir compte des définitions qui figurent déjà dans un certain nombre de recommandations établies par des organismes internationaux.

3. PORTEE DE LA LEGISLATION

La législation devrait réglementer et contrôler toutes les activités entraînant un risque d'exposition aux rayonnements ionisants.

4. PRESCRIPTIONS EN MATIERE DE RADIOPROTECTION

L'application des prescriptions en matière de radioprotection comporte un certain nombre de mesures: il faut notamment fixer des limites de doses et des niveaux d'action, assurer un contrôle et une surveillance efficaces des travailleurs, des installations et du milieu ambiant, étudier et entretenir soigneusement le matériel, et donner aux travailleurs et à tous les intéressés la formation nécessaire. On trouve, à cet égard, des directives adéquates dans un certain nombre de recommandations et de publications internationales sur ces questions. Les doses limites pour l'exposition externe et la contamination interne devraient être conformes aux recommandations internationales généralement acceptées. Dans certains cas, il peut être également souhaitable de faire passer les recommandations ou les normes internationales dans la législation nationale, soit a) en se référant à ces recommandations de manière à leur donner une valeur juridique sans les introduire dans le détail, soit b) en les incorporant à la législation, à condition de les adapter au système juridique et administratif national.

Une loi, une ordonnance ou un décret sur la radioprotection peut ainsi avoir un caractère général tout en servant de base juridique à l'élaboration de règlements, instructions, guides, manuels ou recueils de directives pratiques par les administrations ou les organismes spécialisés, suivant le mode de répartition des attributions au sein de l'administration nationale et la nécessité d'établir des règlements et instructions spécifiques. Ces règlements et instructions peuvent ensuite être modifiés assez facilement en cas de révision des recommandations internationales. Au contraire, une loi trop détaillée peut rapidement paraître périmée ou incomplète s'il arrive que les recommandations internationales soient modifiées compte tenu de l'expérience acquise ou des progrès accomplis dans le domaine de la science et de la technique.

5. AUTORITE(S) COMPETENTE(S)

L'autorité ou les autorités compétentes responsables de l'adoption et de la mise en vigueur de la législation en matière de radioprotection devraient être nettement désignées. Ces fonctions peuvent incomber à un ministère ou à une administration nationale déjà établie. Elles peuvent également être confiées à un organisme spécialisé qui sera créé à l'échelon gouvernemental et doté de responsabilités dépassant celles qui incombent traditionellement aux administrations ou ministères existants. Quel que soit le système adopté compte tenu des circonstances et des besoins locaux, il est indispensable pour obtenir le maximum d'efficacité de rechercher l'entente la plus large possible entre toutes les parties intéressées.

L'autorité ou les autorités compétentes devraient être investies de pouvoirs suffisants pour formuler des règlements et instructions à mesure que la nécessité s'en fait sentir. A ce propos, on notera que des recueils de directives pratiques, recommandés par les organisations internationales, répondent à un grand nombre des prescriptions indiquées et qu'ils peuvent donc être utilisés sous leur forme actuelle ou avec les modifications appropriées.

6. DELIVRANCE DE PERMIS D'EXPLOITER

Toutes les activités entreprises dans des installations nucléaires susceptibles d'entraîner une exposition aux rayonnements devraient être soumises à un système d'inscription sur un registre et d'autorisation préalable accordée par une autorité compétente ou de déclaration auprès de cette autorité, sous réserve cependant qu'il soit possible d'en exclure certaines activitées suivant les risques entraînés. L'utilisation de sources de rayonnements à des fins médicales relève également d'un tel système.

Les permis d'exploiter des installations nucléaires devraient être délivrés compte tenu de différents facteurs: qualité des installations, nécessités du travail, qualifications individuelles et formation du personnel.

7. RESPONSABILITE

La responsabilité exclusive pour toute activité comportant l'utilisation de sources de rayonnements devrait être nettement déterminée conformément au système juridique national. Toutefois, la responsabilité de la mise en œuvre quotidienne des mesures de sécurité nécessaires peut être déléguée à une ou plusieurs personnes. Il peut y avoir lieu de prendre en considération certains problèmes tels que celui de la responsabilité aux tiers (responsabilité civile).

8. DROIT D'INSPECTION, D'ACCES ET D'INTERVENTION

Pour assurer l'application des mesures réglementaires, des services d'inspection satisfaisants sont indispensables. Il faudrait examiner attentivement le problème du droit d'accès aux installations nucléaires. L'autorité compétente devrait être habilitée à intervenir lorsqu'une installation nucléaire est défectueuse ou qu'elle fonctionne dans des conditions dangereuses, ou en cas d'urgence.

9. SITUATIONS D'URGENCE ET ACCIDENTS NUCLEAIRES

Toutes les mesures nécessaires devraient être prises pour prévenir les situations d'urgence et les accidents nucléaires. Des dispositions devraient être prises pour mettre au point des plans d'action en cas d'urgence. Ces plans devraient comporter des mesures spéciales, par exemple pour le traitement du personnel ayant subi une irradiation.

Dans les cas où une assistance en cas d'urgence est demandée à un autre pays ou à une organisation internationale, les projets d'accords élaborés par l'AIEA peuvent fournir des indications sur les dispositions appropriées.

10. PROTECTION DU MILIEU ET DES BIENS

Si nécessaire, des conditions régissant l'évacuation et la dispersion des matières radioactives pourront être imposées au moment de l'octroi du permis d'exploiter une installation donnée.

Avant d'arrêter le choix d'un site, il faut, outre les facteurs techniques étudiés, prendre en considération la capacité radiologique du milieu et, pour ce faire, se livrer à une étude écologique du site.

Il se peut que, dans certains cas, le choix du site de l'installation et l'évacuation ou la dispersion des matières radioactives provenant de cette installation doivent être conformes aux dispositions de conventions ou accords internationaux.

11. EXPOSITION A DES FINS MEDICALES

La nécessité de protéger les malades soumis à des traitements médicaux comportant une exposition aux rayonnements est reconnue de longue date. Dans l'élaboration et la mise en œuvre des règlements de radioprotection, il faudrait toujours tenir compte de ce facteur important en vue de limiter les doses auxquelles le malade est exposé au niveau minimal compatible avec l'efficacité du traitement.

12. SANCTIONS

En cas d'infraction à la loi et aux règlements d'application, des sanctions administratives telles que le retrait provisoire ou permanent du permis d'exploiter peuvent être imposées sans préjudice d'autres sanctions selon la nature ou la gravité de l'infraction. Il convient de noter, toutefois, que les éléments les plus importants d'un système de contrôle sont la délivrance du permis d'exploiter et l'inspection, car ce sont des moyens efficaces d'assurer le respect des normes de santé et de sécurité indispensables.

RESEÑA DE LOS ELEMENTOS BASICOS DE LA LEGISLACION EN MATERIA DE PROTECCION RADIOLOGICA

Recomendación de un Grupo de estudio del OIEA, reunido en 1969 en cooperación con la OIT y la OMS

La manera y medios de promulgar y dar efecto a la legislación sobre protección radiológica dependen fundamentalmente de la estructura constitucional y de las tradiciones jurídicas y administrativas del país de que se trate. No obstante, cualquiera que sea el criterio jurídico que se adopte al prescribir normas para garantizar el empleo sin riesgos de las sustancias radiactivas y de las demás fuentes de radiación, una legislación nacional que instituya un sistema de control de las radiaciones debe comprender los elementos básicos que se señalan a continuación.

1. EXPOSICION DE MOTIVOS

En algunos sistemas legislativos, suele ser necesaria una breve exposición de motivos. Cabe señalar la necesidad de proteger adecuadamente

a los trabajadores, a las personas que puedan quedar directa o indirectamente expuestas a las radiaciones ionizantes y a la población en general, así como de proteger los bienes y el medio ambiente.

2. DEFINICIONES

Debe prestarse minuciosa atención a la adecuada definición de los términos esenciales, si bien no es indispensable que tal definición abarque los términos científicos y técnicos de aceptación general. De todas formas, se deben tener en cuenta las definiciones ya formuladas en una serie de recomendaciones internacionales.

3. OBJETO DE LA LEGISLACION

El objeto de la legislación debe ser la regulación y control de toda actividad que implique riesgo de exposición a las radiaciones ionizantes.

4. PRECEPTOS DE PROTECCION RADIOLOGICA

El cumplimiento de los preceptos de protección radiológica implica una serie de elementos como son la fijación de dosis límite, el empleo de equipo e instalaciones de características apropiadas, la organización de servicios adecuados de vigilancia y supervisión, la debida instrucción de los trabajadores y demás personas afectadas, y la organización de servicios de vigilancia del medio ambiente. Buen número de recomendaciones y publicaciones internacionales sobre estas materias contienen directrices adecuadas sobre tales particulares. Las dosis límite para la exposición externa o interna deben estar en armonía con las recomendaciones internacionales generalmente aceptadas. En determinados casos, quizá resulte también aconsejable introducir recomendaciones o normas internacionales en la legislación nacional, lo que puede efectuarse a) haciendo referencia a dichas recomendaciones, dándoles así fuerza legal sin incorporarlas en detalle; b) incorporándolas, previa adaptación al sistema jurídico y administrativo nacional.

De este modo, la legislación (ley, decreto) sobre protección radiológica puede tener carácter general, al tiempo que constituye una base jurídica para la elaboración de reglamentos, reglas, directrices, guías, manuales o compendios por parte de las autoridades administrativas o de los órganos especializados, según la distribución de funciones en el seno de la administración nacional y la necesidad de reglamentos y reglas específicos. Posteriormente, estos reglamentos y reglas podrán modificarse con relativa facilidad si las recomendaciones internacionales son objeto de revisión. Por el contrario, una legislación demasiado detallista puede quedar pronto anticuada o incompleta, ya que las recomendaciones internacionales varían como consecuencia de la experiencia adquirida y del progreso científico y técnico.

5. AUTORIDAD O AUTORIDADES COMPETENTES

Se debe especificar con toda claridad la autoridad o autoridades a las que compete promulgar y aplicar la legislación en materia de protección

radiológica. Estas funciones pueden ser de la competencia de un ministerio o departamento ya existente de la administración nacional. Igualmente, pueden encomendarse a un órgano especializado creado a nivel gubernamental, a cuyas funciones se subordinan las atribuciones tradicionales de los departamentos o ministerios existentes. Cualquiera que sea el sistema que se adopte en vista de las circunstancias y necesidades nacionales, es esencial, por razones de eficacia, procurar la máxima armonía posible entre todas las partes interesadas.

A la autoridad o autoridades competentes se les deben conferir atribuciones bastantes para dictar los reglamentos y reglas que sean necesarios. A este respecto, conviene tener presente que los manuales vigentes recomendados por las organizaciones internacionales especifican detalladamente la mayor parte de las disposiciones necesarias y, por lo tanto, pueden utilizarse tal cual o con las modificaciones convenientes.

6. CONCESION DE AUTORIZACIONES

Todas las actividades desarrolladas en aquellas instalaciones en las que exista riesgo de exposición a las radiaciones deben someterse a un sistema de notificación, registro o autorización previa concedida por la autoridad competente, previendo, no obstante, la posibilidad de excluir determinadas actividades del ámbito de este sistema, según los riesgos de que se trate. La utilización de fuentes de radiación con fines médicos debe quedar también sujeta a dicho sistema.

Al conceder autorizaciones a las instalaciones en que se haga uso de las radiaciones hay que tener en cuenta: la aptitud de dichas instalaciones para su fin, las condiciones de trabajo y la competencia y capacitación de su personal.

7. RESPONSABILIDAD

La atribución de responsabilidades en lo tocante a toda actividad que implique el uso de fuentes de radiación debe especificarse claramente, de conformidad con el sistema jurídico nacional. No obstante, tales responsabilidades podrán delegarse en una o varias personas que velen por el cumplimiento cotidiano de las medidas de seguridad pertinentes. Cuando proceda, habrá también que prestar la debida atención a cuestiones tales como la responsabilidad civil.

8. DERECHO DE INSPECCION, ACCESO E INTERVENCION

Un requisito esencial para asegurar el cumplimiento de lo reglamentado es prever los oportunos servicios de inspección. Se debe considerar atentamente el problema del derecho de acceso a las instalaciones en que se haga uso de las radiaciones. Debe facultarse adecuadamente a la autoridad competente para intervenir cuando surjan deficiencias en una de estas instalaciones, o sus condiciones de trabajo sean peligrosas, o bien en casos de urgencia.

9. ACCIDENTES Y CASOS DE URGENCIA NUCLEARES

Deben adoptarse todas las medidas necesarias para prevenir e impedir los accidentes y casos de urgencia nucleares. Deben preverse planes adecuados para hacer frente a tales situaciones. Estos planes deben comprender medidas especiales, como son las relativas al tratamiento de las personas que hayan sufrido radiolesiones.

Cuando sea necesario pedir ayuda de urgencia a otro país o a una organización internacional, los proyectos de acuerdo elaborados por el OIEA pueden proporcionar orientación sobre el procedimiento a seguir.

10. PROTECCION DEL MEDIO AMBIENTE Y DE LOS BIENES

Siempre que sea necesario, se podrán imponer condiciones a la descarga o dispersión de sustancias radiactivas, cuando se conceda la autorización a una instalación determinada.

Antes de decidir el emplazamiento de toda instalación en la que se haga uso de las radiaciones, debe prestarse atenta consideración a la capacidad radiológica del medio ambiente y a los problemas que en dicho medio puede crear la descarga o dispersión de sustancias radiactivas.

En determinados casos, el emplazamiento de la instalación y la descarga o dispersión de las sustancias radiactivas provenientes de ésta tendrán que ajustarse a acuerdos o convenios internacionales.

11. EXPOSICION A LAS RADIACIONES POR RAZONES MEDICAS

Hace mucho tiempo que se ha reconocido la importancia de proteger a los pacientes sometidos a tratamiento médico que implique exposición a las radiaciones. Este importante factor debe tenerse siempre presente al elaborar y aplicar los reglamentos de protección radiológica, a fin de reducir la exposición de los enfermos al mínimo posible compatible con la eficacia del tratamiento médico.

12. SANCIONES

Cuando se infrinjan las leyes o los reglamentos y reglas complementarios, podrán imponerse sanciones administrativas, tales como la retirada temporal o permanente de la autorización concedida, sin perjuicio de las sanciones adicionales que procedan según la naturaleza o gravedad de la infracción. Debe tenerse presente, no obstante, que los elementos más importantes de un sistema reglamentador son las autorizaciones y la inspección, pues constituyen medios eficaces para asegurar el cumplimiento de las normas de salud y seguridad exigidas.

SECTION II

SUPPLY OF NUCLEAR MATERIALS

THE INTERNATIONAL SUPPLY OF NUCLEAR MATERIALS

E.E. SPINGARN
USAEC, Washington, D.C.,
United States of America

The object of this paper is to study aspects of the international supply of nuclear materials. In so doing, I shall describe the programs carried out by the United States, and also endeavour to explain International Atomic Energy Agency supply policies. This subject has been of the greatest interest, particularly to countries such as those represented here today, which recognize the immense potential that the use of atomic energy holds for improving the general welfare and increasing the standard of living of all persons throughout the world.

The present supply policies of the United States Atomic Energy Commission have been developed from the experience gained over more than twenty-three years.

Under the Atomic Energy Act of 1946, the Government held a monopoly on all domestic reactors and production facilities and owned all enriched uranium and plutonium within the United States. Private persons were prohibited from owning special nuclear material, and were not permitted to control facilities capable of producing significant quantities of these materials within our country.

By 1953, the experience gained in the use of atomic energy and the development of reactors had altered the situation. The United States Government had come to believe that broader participation by private parties was desirable. President Eisenhower proposed, under the title 'Atoms for Peace', a program for extensive co-operation with other governments in the peaceful uses of atomic energy.

This desire for wider participation in the peaceful uses of atomic energy gave birth to the Atomic Energy Act of 1954. This Act reversed the earlier policies of embargo and implemented the Atoms for Peace Program. It called for a far-reaching policy of international co-operation and dissemination of atomic energy information and materials. As set forth in the Act, one of its objectives is the provision of "a program of international co-operation to... make available to co-operating nations the benefits of peaceful applications of atomic energy as widely as expanding technology and considerations of the common defense and security will permit".

This same spirit of increasing the availability of the benefits of atomic energy was reflected in the establishment of the International Atomic Energy Agency in 1957. The United States vigorously supported the establishment of the IAEA, an organization having as a primary function the provision of a source for the supply of nuclear materials under a system of international safeguards.

Under the Statute of the Agency, a detailed mechanism for the supply of nuclear materials was established. Members may make available source material, special nuclear material and other material to the Agency for

distribution to other Agency Members. In addition, the Agency performs a valuable service in expediting the transfer of materials between those nations which have made them available, and recipient nations.

The Statute also provides for distribution by the Agency of services, equipment and facilities in order to fulfil its objectives of accelerating and encouraging the contribution of atomic energy to peace, health and prosperity throughout the world.

In addition, the Agency's Members may establish projects for research and development or practical application of atomic energy, and the Agency may assist such efforts by obtaining necessary materials and equipment, or financing.

Finally, but of the utmost importance in the development of a truly free flow of nuclear materials, the Agency establishes, in connection with Agency projects – or may be requested to establish in other situations – safeguards over the use of these materials.

To implement its dedication to the concept of the IAEA, the United States, in 1959, entered into an Agreement for Co-operation with the Agency. Under the Agreement, the United States pledged to the Agency 5000 kg of enriched uranium together with an amount matching the similar pledges of all other members of the Agency. Additionally, the Agreement provides that more material may be made available as authorized by the United States.

The United States has also agreed to grant each year $50 000 worth of enriched uranium or plutonium to the Agency without charge, for research into the peaceful uses of atomic energy and medical therapy. This program has been implemented each year, for a total of approximately $500 000.

Additionally, the United States pledged to assist the Agency in obtaining source material and reactor materials for the uses set forth in the Statute. The United States continues to believe that the IAEA provides a very desirable means for the development of a free and fluid world market in nuclear materials for peaceful purposes.

Turning now to the supply policy of the United States, there are two broad areas of co-operation. The first, which I shall mention briefly, is the exchange of technical information. It is our firm belief that largely because of this program of exchanging technical information on nuclear matters, the development of peaceful uses of atomic energy has increased at a far greater rate than would otherwise have been possible. The policy of the United States continues to be that information relating to peaceful uses of atomic energy should be available on as wide a basis as possible, consistent with the needs and programs of individual nations and the security of the United States.

I should like now to explain in some detail the second area of international co-operation engaged in by the United States. That is, the supply abroad of nuclear materials. Nuclear materials is a very broad term, but I think it is fair to say that this term relates primarily to natural uranium and thorium, enriched uranium, plutonium, and other isotopes used in industry and science.

The process by which the United States usually supplies nuclear material and technical information abroad consists of two distinct steps. The first of these is the conclusion of an intergovernmental Agreement for Co-operation. These agreements are conceived of as the means whereby our supply undertakings can be expressed in international arrangements concluded at the highest governmental levels. Under these agreements,

arrangements for the supply of nuclear materials, sale of reactors and other equipment, and exchanges of technical information are concluded. These agreements for co-operation provide for the terms, conditions, duration, nature and scope of the co-operation. They relate primarily to the subject matter of the activities contemplated, the types and quantities of special nuclear material which may be transferred, the uses to which it and other nuclear materials may be put, and the fields of possible technical exchanges. The agreements for co-operation also contain guarantees with respect to the transfer of material and equipment beyond the jurisdiction of the recipient country and with respect to their peaceful uses. Safeguard provisions against military use are standard.

The United States now has Agreements for Co-operation with more than thirty foreign countries, the International Atomic Energy Agency, and the European Atomic Energy Community. These agreements form the basic framework for our international program.

As far as the supply of materials is concerned, one important feature of the Agreements for Co-operation is that they typically specify a ceiling quantity of materials to be supplied by the United States. This quantity is determined by examination of the recipient country's estimated nuclear program over a certain period, with particular reference to power reactors which will be constructed in the near future. By this means, the United States is able to reserve a sufficient amount of enrichment capacity to supply the materials required for the proposed program of the country.

Agreements for nuclear power plants are designed to reasonably identify the probable nuclear power needs of our partner for a period for which such projections can be made with some dependability. The projection, therefore, can be modified at any time to take into account adjustments in the power program of the recipient country, and the agreement can be amended to accommodate projections of future construction of power reactors.

In addition, these Agreements for Co-operation establish that prices will be those in effect for domestic users in the United States, and permit supply arrangements to be made between authorized private parties in the two nations, as well as between the governments themselves.

Also, these Agreements for Co-operation provide that contracts will be entered into in order to carry out these supply policies. While Agreements for Co-operation exclusively for research do not contain all the above-mentioned details, they do envisage the execution of supply contracts.

The second major step, therefore, in the international supply of nuclear materials by the United States is the conclusion of a contract with the Atomic Energy Commission. Although these are commercial-type contracts, they represent obligations of the United States Government and constitute a firm commitment to supply the material under the terms and conditions of the contract.

You will recall that the 'Atoms for Peace' program for co-operation with other countries was initiated by legislation in 1954. At that time, however, the requirements of government ownership of enriched uranium and plutonium within the United States were maintained since the material was still in short supply and it was felt that it was premature to change the law in this regard. For that reason, the 1954 Act prescribed procedures whereby the necessary amounts of enriched uranium required by our partners abroad could be allocated for their use by Presidential decision.

During the first twelve years of this program, the amount of enriched uranium allocated by the President grew from 100 kg to a quarter of a

million kg of uranium-235, an amount which would be valued today at more than $2 billion. In 1967, however, the Congress, recognizing the tremendous growth which had occurred in the availability of enriched uranium and the virtually complete transition in its requirement from defense to civilian purposes, eliminated the requirement for a Presidential allocation of enriched uranium for peaceful purposes. Therefore, the overseas supply policies of the United States have also changed.

A basic principle in the economic philosophy of the United States is that industrial operations be conducted to the maximum extent feasible by private organizations operating in an atmosphere of free competition, and that the Federal Government withdraw from any commercial activities as soon as this may practically be done in the general interest.

Consequently, in 1964, the Atomic Energy Act was changed so that ownership of special nuclear materials could be transferred to private parties in the United States.

Several types of contracts for the sale of enriched uranium have been concluded. Multi-sale arrangements, under which orders are submitted for the purchase of material subject to terms of the master document seem to be very attractive. Under such sale contracts, the purchaser may direct that the Commission deliver the material to a United States contractor for purposes of processing the material before actual delivery to the customer.

Such sale contracts, of course, are subject to the terms and conditions of the applicable intergovernmental Agreement for Co-operation.

It should be remembered that, although we have been concerned here primarily with the supply of enriched uranium, natural uranium to be exported from the United States may be sold by private parties in the United States. These sales are generally made in the form of uranium concentrate or uranium hexafluoride.

As an important corollary to the 1964 private ownership legislation, the Government undertook on and after January 1, 1969, to perform uranium enrichment services under contracts whereby the co-operating party, domestic or foreign, would furnish the feed material, and the United States Government would perform the enrichment service for a stipulated charge. This process, known as toll enriching, may be carried out under appropriate Agreements for Co-operation. It represents our most common method of supplying enriched uranium abroad today.

Some of AEC's existing Agreements for Co-operation provide for sale of enriched uranium rather than toll enrichment, and the Commission is fully prepared to fulfil these commitments. It is our conviction, however, as well as our experience to date, that in the future, as over the past year, the distribution of enriched uranium by toll enriching represents a more rational and attractive approach to the supply of enriched uranium. We recognize, however, that the sale approach may continue to be used in special situations particularly where the quantity is small as in research applications.

Since the furnishing of enriched uranium by the toll enrichment process is so significant in our overall policy, I would like to describe it in more detail. The 1964 legislation, in which the principle of private ownership was also established, specified that we would establish toll enrichment criteria to form a guide for implementation of the program. This was accomplished after extensive consultation with interested industry spokesmen both in the United States and abroad, and after legislative hearings before the Joint

Committee on Atomic Energy of the Congress of the United States. The criteria adopted are reflected in all our toll enrichment contracts. One of the basic elements of the criteria is that all contracts, whether foreign or domestic, will be generally consistent with one another.

There are two types of toll enrichment contracts. The first calls for the supply of a fixed amount of enriching services so that a certain quantity of material at an agreed assay is furnished on a defined schedule. This type of contract would be of particular interest to those desiring short-term arrangements for specific quantities of material with defined assays.

The second type of contract is a requirements-type contract. Under it, we agree to supply all or a specified portion of the enriching services needed for the production of enriched uranium for a particular reactor or a group of reactors during the contract term, which may be as long as thirty years. The buyer, however, is not called upon to purchase any particular quantity of material during the contract period. Accordingly, he is not required to forecast any estimated quantity which he would be required to buy under all circumstances.

The requirements contract does, however, specify the particular nuclear facility which will be fuelled with enriched uranium obtained under the contract. While the customer need not take any minimum amount of enriched uranium, he will have to state in the contract, first, the extent to which enriched uranium used in or in support of the facility will be recycled, or delivered to the Commission as feed material; second, the extent to which plutonium produced in the reactor will be recycled; and third, the extent to which, if any, he will use special nuclear material other than that obtained under the contract. Requirements contracts, therefore, provide the maximum flexibility to the reactor operator with regard to an assured fuel supply over a long term.

Under such a contract, the customer informs the Commission from time to time of the quantities of enriching services which are required, at least 120 days in advance of the date at which delivery of the enriched product is desired. In both forms of toll enriching contracts, feed material must normally be delivered to the Commission at least 90 days prior to delivery of the enriched uranium.

In addition, the contracts permit termination in whole or in part by the customer. If sufficient advance notice is given, the customer does not subject himself to any financial liability as a result of such termination. Since this period of advance notice is extremely reasonable, three and one half years, it provides the customer with considerable flexibility in adjusting his deliveries of material to meet the operating experience of his reactor.

The contracts may also be terminated by the Commission upon reasonable notice at such time as private enriching services in the United States become available to the customer for the remaining term of the contract on a basis considered by the Atomic Energy Commission to be reasonable and non-discriminatory and within the ceiling charges of the contract.

The contracts specify a ceiling charge of $30 per kg of separative work, above which the price may not rise except if there is an escalation of labour and power costs. In the event its enrichment facilities are transferred to private ownership, the transfer would be accomplished in such a way as to assure the continued supply of enrichment services on a non-discriminatory basis.

Finally, I should like to mention that, aside from the large program of supplying enriched uranium to our overseas customers, the Commission is also engaged in a large and varied program of supplying by-product material, or radioisotopes, abroad. By-product material is any material yielded in, or made radioactive by exposure to radiation in the process of producing or using special nuclear material. Specifically, our by-product program is related to the extensive uses of radioisotopes for industrial, engineering, scientific and medical purposes.

This program is carried out by means of contracts entered into between the Commission or private parties in the United States and the foreign party. Frequently, such arrangements are made under the terms of an inter-governmental Agreement for Co-operation, which may permit the Commission to co-operate directly with private scientific, medical or industrial institutions. However, such materials may be exported in the absence of an Agreement for Co-operation so long as the transaction is compatible with the national security of the United States. Similarly, the Commission has provided stable isotopes and certain of the transuranium elements for research and industry.

It should also be noted here that a growing commercial supply of many of these materials is now available in the United States. Under such Government and private programs we are able to assist a large number of countries with a vast array of useful materials for their research and programmatic needs in the field of atomic energy.

PROCEDURES FOR THE SUPPLY OF NUCLEAR MATERIALS THROUGH THE IAEA

HA VINH PHUONG
International Atomic Energy Agency,
Vienna

INTRODUCTION

The procedures for the supply of nuclear materials, as developed in the IAEA's practice under the authority of the Board of Governors, are outlined below with a view to describing the steps required and the instruments involved. A distinction is to be made between (a) material requested through the Agency for the establishment or continued operation of projects involving nuclear reactors, including power reactors and other facilities such as critical or subcritical assemblies, and (b) material needed in minor quantities for research or development. The former projects, referred to as 'reactor projects' in the Agency's terminology, require approval by the Board in respect of each case while the latter, considered as 'research projects', are dealt with in accordance with a simplified procedure approved by the Board.

I. STATUTORY BASIS

The provisions of the Agency's Statute on the basis of which a Member State may request the Agency's assistance in securing nuclear materials, such as natural or depleted uranium, enriched uranium, uranium-233, plutonium and thorium, are laid down in:

- Article III. A. 1 enabling the Agency to act as an intermediary; and
- Article XI, paragraphs A to D, regarding the type of assistance which the Agency may provide.

The Agency's rights and responsibilities in furnishing such assistance are set forth in:

- Articles III. A. 5 and XII providing for safeguards control over the supplied material to ensure that it is used only for peaceful purposes;
- Article III. A. 6 relating to the application of adequate health and safety standards; and
- Article VIII. C concerning the dissemination of all scientific information obtaining under Agency assisted projects.

Consideration of a request by the Board of Governors is governed by Article XI. E of the Statute, and the basic elements of an agreement required for the provision of assistance by the Agency are spelt out in Article XI. F.

II. INSTRUMENTS CONNECTED WITH REACTOR PROJECTS

In submitting a reactor project to the Board for consideration, the Secretariat has to state on the basis of the information provided by the

requesting Government[1], whether the project appears scientifically and technically sound, is subject to adequate health and safety standards[2], and could effectively be carried out by the requesting Government with appropriate funds and technical personnel. The paper presenting the project should further specify whether, and to which extent, Agency safeguards[3] will apply to the project, the terms and conditions on which the material is to be provided, and the outlines of the requisite agreement(s) as agreed between the parties. Two instruments are usually required, which are closely interrelated:

- One dealing with the transfer of the requested material from a supplying Member State to the receiving Government on terms, including charges, agreed between them, with the Agency being a party thereto as intermediary (this trilateral contract is known as the 'Supply Agreement'); and
- The other being designed to meet the Agency's statutory requirements in respect of the project involved (this bilateral agreement between the Agency and the Government submitting the project is referred to as the 'Project Agreement').

The negotiation of both instruments is started as soon as a supplier of the material has been selected by, or according to the wishes of, the requesting Government, in accordance with Article XI.C of the Statute, so that the outlines of both texts could be reported to the Board of Governors in submitting the project for approval.

A. Supply Agreement

This is a trilateral contract between the Agency and the two Governments involved in the transaction: the Member State making the material available to the Agency[4] and the one requesting such material. Depending on the preference of the requesting Government, the contract may provide for a lease or a purchase of the material.

The Supply Agreement defines the type and quantity of the material to be transferred through the Agency, sets forth the conditions and charges for such transfer in linking it to the project agreement, contains a hold-harmless clause in respect of the Agency and the supplier as regards the safe handling and the use of the supplied material, and provides for the settlement by arbitration of disputes arising out of the interpretation or execution of the contractual arrangements.

If the transaction involved is a sale[5], the Supply Agreement further provides for the transfer of title to the material upon its delivery by the

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[1] The information required is given in the publication "IAEA Services and assistance", Vienna, 1970 (GEN/PUB/12/Rev.1), Annex VI, pages 71-72.

[2] The Agency's safety standards are defined in document INFCIRC/18 and are published in the Agency's Safety Series.

[3] See "The Agency's Safeguards System (as Provisionally Extended in 1966 and 1968)", INFCIRC/66/Rev.2.

[4] In accordance with Article IX of the Statute, the Governments of the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland, and the United States of America concluded agreements with the Agency in 1959 for the supplying of materials to the Agency. See document INFCIRC/5, parts I, II and III respectively.

[5] See, for example, the Supply Agreement reproduced in INFCIRC/136, part I.

supplier to the requesting party through the Agency. In the case of a lease[6], the term of such lease as well as use charges, payment for material lost or consumed, and the conditions of the return of the leased material are provided in the agreement. In short, this instrument reflects the charges and conditions for the furnishing of the material by the supplier as agreed to by the requesting party, the Agency confining its role in such transaction to that of an 'unpaid broker'. Since most of the materials required for reactor projects assisted by the Agency have been made available by the United States authorities, standard provisions have been formulated which can be found in several Supply Agreements. When the United States is the supplier of the material, the Supply Agreement also provides, wherever appropriate, for the possibility of obtaining the whole or part of the supplied material free of charge under the gift offer of US $50 000 worth of special fissionable material, made each year by the United States to the Agency to assist and encourage research on peaceful uses of atomic energy or for medical therapy.

B. Project Agreement

This bilateral agreement between the Agency and the Government submitting a reactor project is also patterned after standard provisions developed by the Secretariat for the purpose of complying with the Agency's statutory requirements concerning the provision of assistance to Member States. The Project Agreement, which incorporates by reference the terms of the Supply Agreement to the extent that the latter creates rights and obligations between the Agency and the Government submitting the project, specifies the nuclear installation or facility involved, provides for the allocation of the supplied material by the Agency to the Government, for the undertaking by the Government that the project shall be used only for peaceful purposes and for the application of Agency safeguards as appropriate. The agreement further calls for the application of adequate health and safety measures, for the protection of the Agency and its inspectors against third party liability in the case of a nuclear incident occurring when they are carrying out their functions under the agreement, to the same extent as that available for nationals of the country setting up the project, and for the free dissemination of all scientific information resulting from the Agency's assistance under the project. As appropriate, the implementation of safeguards procedures and safety measures may have to be specified in the annexes to the agreement[7].

Following approval of a project by the Board of Governors, which generally endorses the recommendation submitted by the Director General of the Agency on the basis of a technical evaluation made by the Secretariat, both the Supply and Project Agreements may be concluded at any time thereafter. Their implementation starts upon notification by the Agency to the Governments concerned of the entry into force of both agreements, which should be on the same date since they are interrelated. The texts of such agreements are then registered with the Agency and the United Nations, pursuant

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[6] See, for example, the Supply Agreement reproduced in INFCIRC/137, part I.

[7] See, for example, the Project Agreements reproduced in INFCIRC/136 and INFCIRC/137, parts II respectively.

to Article XXII. B of the Agency's Statute and Article 102 of the Charter of the United Nations. The agreements are also published by the Agency for the information of its Members in the information circular series (INFCIRC).

III. INSTRUMENTS CONNECTED WITH RESEARCH PROJECTS

These projects normally involve the supply of minor quantities of nuclear material well below the exemption limits established under the Agency's Safeguards System[8]. Over the years, a standardized procedure has been gradually developed to enable the Agency to expedite the provision of assistance to Member States requesting such material in gram, milligram or microgram quantities for research or development or for use in neutron studies. The procedure is governed by Article XI of the Agency's Statute but is simpler than that followed in respect of reactor projects. It involves, in the first instance, the conclusion of a Master Agreement between the Agency and the Government in need of research quantities of material. Subsequently, with regard to each research project for which specific items are required, a Supplementary Agreement is concluded providing for the allocation of such material to the project and stating the conditions and charges on which the material is made available, with the assistance of and through the Agency, by a supplying Member State.

A. Master Agreement

The Master Agreement for Assistance by the Agency in Furthering Projects by the Supply of Materials has been drawn up as a lasting framework designed (a) to meet all statutory requirements relating to the Agency's assistance, and (b) to cover any supplies of material needed in minor quantities for research or development. It contains standard provisions approved by the Board of Governors and has been to date concluded by the Agency with several Member States[9].

B. Supplementary Agreement

The purpose of a Supplementary Agreement[10] to the Master Agreement is to define the research project involved in each case, to specify the material allocated therefor, and to state the conditions and charges on which the material is to be provided. Usually, this is done through the incorporation of a related Supply Contract between the Agency and the supplier of the material[11] into the Supplementary Agreement between the Agency and the requesting Government. Therefore, prior to the conclusion of a specific Supplementary Agreement, the terms of a Supply Contract as proposed by

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[8] See INFCIRC/66/Rev.2, paragraph 21.

[9] See, for example, the agreements reproduced in INFCIRC/150 and INFCIRC/151, part I.

[10] See, for example, the agreements reproduced in INFCIRC/149 and INFCIRC/151, parts II respectively.

[11] See, for example, the contracts concluded with three different suppliers as reproduced in INFCIRC/95/Add.1, part I, Annex; INFCIRC/149 and INFCIRC/151, parts II, Annexes thereto respectively.

the selected supplier to the Agency should also be agreed upon by the Government requesting the material since the contract is to become an integral part of the Supplementary Agreement and will thereby bind upon the Government as well as the Agency.

C. Delegation of authority by the Board

In view of the minor quantities of nuclear material usually involved in research projects and in order to facilitate the procurement of such material through the Agency, the Board of Governors has authorized the Director General of the Agency[12] to arrange for the supply of research quantities upon request, up to the safeguards exemption limits provided for in the Agency's Safeguards System, and without prior approval of each project by the Board. The Board should, however, be kept informed of the materials thus supplied with the Agency's assistance, by means of periodic reports to the Board and the reports which the Director General makes to Member States of the Agency pursuant to Article IX.G of its Statute[13]. This simplified procedure has enabled the Agency to provide its Members with the services they need as fast as practicable; it is, to some extent, comparable to that permitting the conclusion of 'executive agreements' in some countries, for which a time-consuming process of parliamentary approval is not required on account of the matters involved and out of practical considerations.

[12] Decision reproduced in Agency document GOV/DEC/55(XI), under number (57).

[13] See, for example, the report reproduced in INFCIRC/40/Rev.7.

SECTION III

NUCLEAR LIABILITY AND INSURANCE

THE CONCEPT OF NUCLEAR THIRD PARTY LIABILITY AND ITS IMPLEMENTATION BY LEGISLATION IN OECD MEMBER COUNTRIES

P. STROHL
European Nuclear Energy Agency,
Paris

INTRODUCTION

The concept of nuclear third party liability was developed at a very early stage of the practical application of nuclear energy. Negotiations for the conclusion of the Paris Convention, which is the first Convention on this subject, signed by sixteen European countries on 29th July 1960, were begun at the time when a very small number of power reactors and nuclear plants were in operation in Europe.

Therefore, contrary to the general experience of the 'law's delays' in catching up with the material evolution of society, nuclear law has to some extent anticipated such evolution, the reason being that public opinion first became conscious of the military aspect of nuclear energy, namely, as an instrument of catastrophic destruction. To promote the scientific and industrial facet of this new form of energy, the psychological obstacles must be overcome by establishing a whole mass of technical precautions and by setting up very severe legal rules.

A second point to be made is that nuclear law is most frequently characterized by the novelty of the principles adopted. The rule on the liability of a nuclear operator constitutes a complete reversal of the tradiational principles of law. Since the days of Roman law, every man has been bound to repair any damage caused to another person by, and in consequence of, his own wrongful act or 'tort'. In contrast, the concept expressed by the somewhat inelegant metaphor of the 'legal channelling' of liability on the nuclear operator completely discards the concept of the wrongful act, and the limitation of the nuclear operator's liability derogates from the rule according to which the entire damage which has been caused should be compensated by the person who is held liable.

The whole exceptional system established for dealing with the consequences of a nuclear incident meets the needs of a modern technology whose development is in the general interest since it can contribute to the welfare of humanity but which can also, at least in theory, involve very substantial and quite unfamiliar risks. These factors emphasize the social aspects of this new system of law at the cost of the concept of individual liability based on a wrongful act, which has its origin in communities of farmers and craftsmen.

Another important characteristic of nuclear law lies in its international origin and scope. The system of nuclear third party liability is based on four international Conventions:

- The Paris Convention on Third Party Liability in the Field of Nuclear Energy, which has already been mentioned

- The Vienna Convention on Civil Liability for Nuclear Damage (21st May 1963), whose aim is to implement on a world-wide basis rules similar to those of the Paris Convention
- The Brussels Convention, Supplementary to the Paris Convention (31st January 1963)
- The Convention on the Liability of Operators of Nuclear Ships, concluded in Brussels on 25th May 1962.

Details on the present situation with respect to the signature, accession and ratification of these Conventions, are given in the Annex.

It may be noted in the same context that regulations on protection against radiation are also based on international safety standards.

This harmonization of the legal regime for nuclear activities has been induced by the early tradition of scientific co-operation in the nuclear field, and was facilitated by the creation of permanent mechanisms for international co-operation, the most important of which are the International Atomic Energy Agency, the European Nuclear Energy Agency of OECD, and Euratom.

At present, one of the main difficulties in nuclear law is that the geographical field of application of the above-mentioned Conventions is very limited. In fact, the Paris Convention has only come into force in seven countries, and the three others not at all.

However, this situation does not necessarily call for an interpretation in the negative sense. It is quite usual to encounter a certain amount of resistance and a number of problems when attempting to implement a completely new system of law, particularly in such a field as third party liability which is generally based on very ancient legal concepts. Despite these difficulties, it is encouraging to note that the basic rules of the nuclear Conventions have, to a large extent, been adopted in most of the developed countries, also outside OECD areas, and even by countries which have not ratified or signed these nuclear Conventions.

First, an attempt should be made to describe and justify the legal concept of nuclear third party liability, and also to give some indication on how this concept has been included in national legislation[1]. It is evident that this overall analysis will not cover all aspects of what is already a rather complex branch of law; many details are omitted.

Secondly, the main international effects of the unified regime of nuclear third party liability will be briefly mentioned.

NUCLEAR THIRD PARTY LIABILITY - OVERALL ANALYSIS

Before describing the system of nuclear third party liability, some comments should be made on the technical field of application of this system (Paris, Art. 1 to 4; Vienna, Art. I, II and IV).

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[1] An analysis of legislation concerning nuclear third party liability in OECD countries has been published by ENEA in 1967 and updatings of this publication are issued in the ENEA Nuclear Law Bulletin. Specific references to laws mentioned in the present paper can be found in these publications. The in extenso texts - in English and French - of a number of such laws are published in the Nuclear Law Bulletin or its supplements. For an overall study on the subject see also Ref. [1].

First of all, it is important to underline that these systems do not apply to all nuclear activities. The adoption of an exceptional regime of liability seems to be necessary to ensure appropriate compensation for damage caused by major nuclear incidents, and the Paris and Vienna Conventions have been designed for activities which could involve hazards of an exceptional character for which the rules of common law would be inappropriate. The application of these Conventions is limited to nuclear installations such as reactors, factories for the manufacture or processing of nuclear substances, isotopic separation plants, plants for reprocessing irradiated fuels, facilities for the storage of nuclear substances, etc. They also apply to the carriage of fissionable materials and radioactive products or wastes[2]. This regime does not cover damage caused by radioisotopes used outside nuclear installations for industrial, commercial, agricultural, medical or scientific purposes, or to the carriage of natural or depleted uranium.

It would be a mistake to extend too broadly the application of the exceptional regime of nuclear third party liability to installations and activities which do not create a greater risk than ordinary industrial facilities, for which the rules of common law are appropriate. This basic idea is reflected in stipulations of the Paris and Vienna Conventions which open the possibility for excluding certain nuclear installations or nuclear substances from the application of the Conventions in view of the small extent of risk involved. Such exclusion can result from decisions taken by the ENEA Steering Committee as regards the Paris Convention, and by the IAEA Board of Governors as regards the Vienna Convention. In fact, decisions have already been taken for the exclusion of small quantities of nuclear material in course of carriage[3] and work is under way in this respect for nuclear installations.

Other types of damage caused by nuclear incidents are excluded from the field of application of the Paris and Vienna Conventions, but for different reasons.

First of all, these Conventions do not apply to reactors forming part of a means of transport. This does not mean that the concept of nuclear third party liability should not be applied in such a case and, in fact, the Convention on the liability of operators of ships propelled by nuclear energy (already referred to) is based on the same principle as the Paris and Vienna Conventions, but it did not appear feasible to deal with fixed and mobile installations in the same Convention[4].

Secondly, it is natural that Conventions, dealing with damage caused to a third party by the operator of a nuclear installation, do not cover damage caused to the nuclear installation itself and to property on the site of that installation.

Finally, the Paris and Vienna Conventions do not apply to the means of transport carrying the nuclear substances involved at the time of the nuclear incident. However, both Conventions provide for the possibility of including, by national legislation, damage to the means of transport

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[2] It is clear that the Conventions apply to damage caused by 'nuclear incidents' but, broadly speaking, also to damage caused jointly by such incident and a non-nuclear incident when they are not separable.

[3] Resolution of the IAEA Board of Governors on 11th September 1964 and Decision of the ENEA Steering Committee on 26th November 1964 (see IAEA Legal Series, No. 4).

[4] The Brussels Convention on Nuclear ships is the subject of another paper.

within the regime of the Conventions, under certain conditions which will be mentioned further on (Paris, Art. 7(c); Vienna, Art. IV. 6). In fact, most legislations in countries Signatories to the Paris Convention have decided in favour of such an inclusion, and the ENEA Steering Committee has adopted a recommendation to this effect[5].

Absolute and exclusive liability

The basic principle of nuclear law is the rule of absolute liability also called 'strict liability', and which more or less corresponds to the French notion of 'responsabilité objective'.

Examples of liability which is not based on a proven fault certainly exist in case law and have even existed for more than a hundred years in the legislation of many countries, and the number of such examples has progressively increased.

This evolution can be noted, particularly with respect to incidents occurring in industry, especially as regards damage to workers, or in railway and car accidents, and more generally, for damage originating in hazardous activities or the use of dangerous goods. In such cases, liability is no longer a matter of negligent conduct but is based on the idea that the man who creates an abnormal risk of harm to a third party, or the man who is legally in charge of dangerous goods, should compensate the resulting damage [2].

This trend has found its most specific expression within the rule on the liability of the nuclear operator.

> "Few would contest the proposition that the operator of a power reactor is held to be responsible for the risks he creates, even if he has acted with utmost prudence at every turn". [3]

Under the Paris and Vienna Conventions, the operator of a nuclear installation shall be liable for nuclear damage upon proof that such damage has been caused by a nuclear incident occurring in his nuclear installation or involving nuclear material, in course of carriage to or from his nuclear installation (see Paris, Art. 3 and 4 and Vienna, Art. II, in particular for the determination of the operator who is liable in case of an incident occurring in course of carriage). Under specified conditions, a carrier may be substituted to the operator and will then bear exactly the same liability in his place (Paris, Art. 4(d); Vienna, Art. II. 2).

Contrary to what generally occurs under ordinary private law, the operator of a nuclear installation (or the substituted carrier) cannot escape his liability by proving that his conduct has been entirely blameless, or even that the damage has been caused by the negligence of someone else, for example a supplier who has delivered defective equipment. In the event of a nuclear incident governed by the Paris and Vienna Conventions, it is immaterial who is to blame, or even if anyone is to blame.
The Vienna Convention, and the Brussels Convention on nuclear ships even use the express wording of 'absolute liability'.

The only general exception to this rule concerns incidents directly due to an act of armed conflict, hostilities, civil war or insurrection or a grave

[5] See 12th ENEA Activity Report - Annex 4.

natural disaster of an exceptional character (Paris, Art. 9; Vienna, Art. IV. 3). It is to be observed that these exonerations from liability are more limited than the concept of 'force majeure' which is generally applied.

In one particular case the concept of fault can be applied by national legislation under the Conventions. When the victim of a nuclear damage has contributed intentionally or by gross negligence to the cause of such damage, the liability of the operator involved towards this particular victim may be reduced or abolished according to the competent law. This is expressly provided for by Article IV. 2 of the Vienna Convention and is implied by Article 11 of the Paris Convention (see also Exposé des Motifs, Paras 48 and 52). It may be argued that this is an exception to the rule of absolute liability, but in my opinion it is not the case. The contributory negligence of a victim does not affect the liability of the operator towards victims in general, but it would not be equitable to apply the rule of strict liability for the benefit of a victim who has partially or totally caused damage by his grave misconduct.

The rule of the exclusive liability of the operator is corollary to the rule of objective liability. This means, first of all, that no one other than the liable operator or the substituted carrier can be sued for compensation for nuclear damage, except in one particular case provided for by the Conventions and which concerns international carriage. Both the Paris and Vienna Conventions (Art. 6(b) and II. 5, respectively) do not exclude liability based upon international agreements in the field of transport which were in force or open for ratification at the date of conclusion of these Conventions. Therefore, shippers, carriers, shipowners or other persons may be held liable under such international agreements for nuclear damage, in addition to the operator's liability. In fact, it was deemed impossible to affect other existing international Conventions but this exception to the channelling of liability on the nuclear operator has raised extremely difficult problems with respect to maritime carriage of nuclear substances [4].

In addition, the operator of a nuclear installation who is held liable has no right of recourse, except in very exceptional cases specified by the Conventions. Such exceptional rights of recourse do exist against individuals who have caused the nuclear damage intentionally or to the extent that such a right has been expressly provided for by a contract. These exceptions cover the very unlikely event of sabotage and the case where a supplier or another contractor has accepted liability for nuclear damage to a third party, which is also hard to imagine.

Absolute and exclusive liability is justified by the need for protecting victims of nuclear incidents in two different ways. First, this system of liability avoids for victims the difficulty of having to prove a fault in the origin of an incident and to identify the person responsible for such a fault. The 'inaccessibility and incomprehensibility of evidence in nuclear incident' due to the complexity of techniques have been pointed out; proving a fault would be very difficult in most circumstances. This is particularly true for delayed damage such as radiation disease appearing many years after exposure to radiation. Under the Paris and Vienna Conventions, victims are confronted with a straightforward situation, they know who has to compensate for damage, and who they should sue. Secondly, the channelling of liability on the nuclear operator constitutes the support for the compulsory financial guarantee which is required by the Conventions and which will be described later.

Implementation of absolute liability by national legislation

The majority of OECD countries have adopted, in their legislation, the rule of absolute liability of the operator of a nuclear installation. This is not only true for countries which have already ratified the Paris Convention but also for most of the others.

The legal technique which has been used to implement the Convention in countries which have ratified it, varies from one country to another according to their constitutional system. The Belgian Act (18th July 1966), which is provisional, has referred to the main Articles of the Paris Convention and has supplemented such references by a small number of stipulations. In France, the Paris Convention has been directly incorporated into internal French Law and the Act concerning third party liability in the field of nuclear energy (30th October 1968 - see Nuclear Law Bulletin No. 2) lays down measures which, pursuant to the Convention, are left to the initiative of each Contracting Party. Therefore, nothing concerning absolute liability has been added to what is stipulated in the Convention. Other Acts, for example, in the United Kingdom (5th August 1965 - N. L. B. No. 1, Supplement) or in Sweden (8th March 1968, N. L. B. No. 2, Supplement), repeat the rules of the Paris Convention in the context of national legislation. The Swedish Law stipulates expressly (Section 11) that the operator shall be liable even if there has been no fault or negligence on his part.

In most of the OECD countries which have not ratified the Paris Convention, the rule of absolute liability of the nuclear operator with the limited rights of recourse provided by this Convention, has been established. This is the case, for example, in the Austrian (29th April 1964), Netherlands (27th October 1965) and Italian (31st December 1962) Acts on nuclear third party liability. Canada, which has neither signed nor ratified any nuclear Convention, recently enforced an Act (1970 - N. L. B. No. 6, Supplement), according to which an operator is absolutely liable without proof of fault or negligence and without right of recourse, except in the case of an intentionally unlawful act or omission.

In some countries, however, the rule of absolute liability has not been applied to as large an extent as in the nuclear Conventions.

In the United States, the Law of 'tort' is generally within the competence of each State and the federal Atomic Energy Act does not modify this situation. The extent to which liability, without proven fault, will be accepted, varies from one State to another but it seems that strict liability will be largely applied in the case of a nuclear incident [5]. We will mention later the system of Indemnity Agreements which was introduced by the Price-Anderson Amendment to the United States Atomic Energy Act, and whose effect may be to suppress the nuclear operators' rights of recourse and defence based on fault.

The stipulations of the German Act (23rd December 1959 as amended in 1969, in particular Sections 25 and 26) concerning nuclear third party liability will be described in another paper, but the system of absolute liability is applied to a large extent by this law with respect to nuclear installations and carriage from such installations. However, the solution is somewhat different for holders of nuclear substances outside a nuclear installation because the holder may be exonerated from liability if he proves that, in spite of reasonable precautions and in the absence of defective conditions of the safety devices, the incident was unavoidable. The first

problem is to know to what extent a nuclear incident, caused by holders of nuclear substances, would fall within the field of application of the Paris Convention. The second problem is to assess to what extent exonerations or issues based on fault could be applied, both for the operator and the holder, according to German civil law.

Under Japanese nuclear legislation (Nuclear Liability Act and Indemnity Act of 17th June 1961) the operator is exclusively liable. Rights of recourse against contractors are limited to the case of intentional misconduct[6] but rights of recourse against third parties can be exercised according to the normal law of 'tort'. In addition, the operator may waive his rights of recourse by a special provision in his contract [6].

Limitation of liability

In the second place, nuclear third party liability is characterized by the limitation of the liability of the nuclear operator, both as regards the amount of financial compensation, and in time.

Under the Paris Convention, the maximum liability of the operator in respect of damage caused by a nuclear incident, is fifteen million European Monetary Agreement units of account (equivalent to US dollars); a higher or a lower amount may be fixed by national legislation depending on the financial security available but, in any event, the maximum amount of liability cannot be less than five million dollars (Article 7(b)). In the Vienna Convention, it is stipulated that the liability of the operator may be limited by the installation State to not less than five million dollars for any one nuclear incident. According to these stipulations, the liability of the operator may in theory be unlimited (as far as the Vienna Convention is concerned) or set for such a high amount that it would, in fact, be unlimited (as far as the Paris Convention is concerned) but, in practice, the problem of limitation is directly related to the obligation of a corresponding financial guarantee which will be described further on.

The liability of the operator is also limited in time. The rights of compensation of both Conventions are extinguished if an action is not brought within ten years of the date of the nuclear incident. (Modalities concerning the implementation and the computing of this period are set by Article 8 of the Paris Convention and Article VI of the Vienna Convention.) This also is connected to the obligation for a financial guarantee because it would not be possible to maintain such guarantee for an unlimited period of time.

The limitation of liability is contrary to common law, according to which the entire damage which has been caused should be compensated by the person who is liable therefor. There are several reasons for limitation of nuclear liability. I have already mentioned the obligation of the operator to constitute and maintain a financial guarantee corresponding to his liability claims for limitation. It is clear that it would not be possible to find for nuclear damage an unlimited guarantee, in money and in time, on the insurance market or from banks. It is to be noted that in the spirit of the Paris Convention, the liability of the nuclear operator is still a liability under private law and it is envisaged that this liability should primarily be covered by insurance or other financial security available within the mechanism of private business, and without calling on public funds.

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[6] As under the Japanese Civil Code there is no employer's liability for intentional damage by his employees, this operator's right cannot, in practice, be used.

The second reason for the limitation has probably a technical background: a nuclear incident, theoretically at least, may cause catastrophic damage to a third party, and the relevant compensation may exceed the resources of the operator liable or his insurers. A similar limitation would not be needed with respect to activities which, in the worst possible conditions, could not produce damage of an extraordinary nature and extent.

Finally, the limitation can be interpreted as a counterpart to strict liability. According to this idea, the severe conditions under which the operator would be held liable, even if he is not at fault, would be offset by the limitation of the amount of compensation. A different solution would have hindered the development of nuclear industry.

Compulsory financial security

The obligation for the operator to constitute and to maintain insurance of financial security corresponding to his liability is the third characteristic of the concept of nuclear liability. The amount of this insurance or other security covers the liability established by the Conventions and the other terms also correspond to the conditions of the liability. The terms of this guarantee should be specified by the installation State. The funds provided by insurance may be drawn upon only for compensation for a nuclear incident covered by the Convention (Paris, Art. 10; Vienna, Art. VII).

The aim of this obligation to subscribe an insurance, which is contrary to the normal practice in other fields of activity, is evidently to secure the protection of victims.

The mechanism of nuclear insurance is facilitated by the channelling of liability on the nuclear operator. The fact that only one person will be held liable for an accident occurring in connection with a nuclear installation and the fact that this person has, in practice, no rights of recourse, have paved the way for a channelling of insurance. The subscription to a number of insurance policies by various persons (for example, architect-engineers, suppliers of fuel or equipment, carriers, etc.) who might have been liable under common law, would therefore be avoided, and the practice of double-insurance eliminated. It should be recalled that, with the growing number of power reactors and nuclear plants foreseen in the future, the total amount of financial security needed to cover liability in nuclear industry could become extremely high. It has therefore been necessary to establish a mechanism of insurance which is as economic and efficient as possible.

In order to meet their obligations with respect to nuclear damage, insurers have grouped themselves in 'nuclear insurance pools' based on arrangements combining the methods of co-insurance and re-insurance.

One difficulty with respect to insurance is that the total coverage is given 'by installation', i.e. for all the nuclear incidents for which the operator might be held liable for the duration of the policy. However, the obligation laid down by the Paris and Vienna Conventions is to provide a guarantee corresponding to the maximum liability set 'per incident'. Generally speaking, insurers have not yet agreed to supply such guarantee under a single contract, because they have not acquired experience on the probability of hazards in nuclear industry. It is therefore necessary to make arrangements in order to reconstitute the coverage when the maximum sum available has been reduced following an incident, to enable the operator to fulfil his legal obligation. One solution sometimes envisaged in practice has been to establish a coverage partly by incident and partly by installation.

Implementation by national legislation of the rules concerning limitation of liability and financial security

The liability of the nuclear operator is limited, with a few exceptions, by the legislation of OECD countries. There is an obligation for the operator to subscribe insurance or another financial security in all OECD countries. In the majority of European legislations, the liability of the operator is limited to a fixed ceiling which varies, according to countries: five million dollars in Italy and Spain, ten million dollars in Belgium, Denmark, France, Sweden and Switzerland and fifteen million dollars in the United Kingdom. In Denmark and Sweden, the maximum amount may be reduced to five million dollars, depending on the character of the installation or other circumstances.

In the above-mentioned countries, the amount of insurance to be provided corresponds to the maximum liability. Conversely, in the Netherlands (Act of 27th October 1965), there is a discrepancy between the maximum amount of liability of the operator, fixed at 120 million dollars, and the financial coverage which is much lower (as a general rule about 13.5 million dollars), the difference being compensated by public funds.

In Germany (Act of 1959 and Decree on financial security of 22nd February 1962 as amended in 1965 and 1969), the situation is somewhat more complicated; broadly speaking, the limitation of liability results from an exoneration, by the Government, with respect to damage not covered by the compulsory guarantee, and the amount of such guarantee differs from one installation to another according to the actual risk, with a maximum of about 20 million dollars for reactors and 15 million dollars for other installations. The insurance subscribed by the operator also covers all persons contributing to the operation of the installation or having supplied services or goods (compare with Price-Anderson Act, para. 26 below).

No limitation of liability has been introduced in Japanese legislation (Compensation Act, 17th June 1961), mainly because of psychological resistance, and difficulties in fixing a specific limit. There is an obligation for the operator to maintain financial security, the amount of which depends on the size of the reactor or the nature of the activities concerned (the maximum is about 15 million dollars); this security is provided partly by private insurance, partly by the Government (damage caused by an earthquake, or under normal operation conditions, or discovered after ten years...) pursuant to indemnity agreements. If nuclear damage exceeds the financial security coverage, the Government will provide financial aid to the operator, if deemed necessary, and subject to Parliamentary approval. In practice, it seems that the operator does not have to compensate damage for which he is not financially covered, despite its unlimited liability.

In Canada (Act of 1970 - N.L.B. No. 6, Supplement), strictly speaking, the liability of the operator is unlimited, but the obligation to subscribe an insurance is limited to a maximum amount of 75 million dollars, part of which may be reinsured by the Government; this latter part is the 'supplementary insurance' as opposed to the 'basic insurance', whose amount may be specified by the Atomic Energy Control Board for each installation. However, a limitation of the operator's liability is indirectly achieved by a very original system: when the Government is of the opinion that, following a nuclear incident, this liability could exceed 75 million dollars, it may

issue a proclamation according to which the operator ceases to be liable for damage caused to a third party and becomes liable to the Government for an amount which could not exceed the maximum covered by the basic insurance. Compensation is then taken in charge by the Government and is organized by a Commission specially constituted to deal with claims arising out of the nuclear incident referred to in the proclamation.

I should like to refer briefly to legislation introduced in the United States by the Price-Anderson Act (1957), and subsequent amendments to it.

I have already mentioned that this Act has not directly affected rules in force governing liability in individual States concerning the determination of the person liable, but it has introduced new rules with respect to limitation of liability and insurance obligations. In addition, the legal and financial mechanism it establishes has, in certain circumstances, practical effects which are very similar to those achieved by the system of absolute liability.

This mechanism can be summarized as follows:

(i) A nuclear operator (in order to get a licence) must supply financial protection covering the liability of all persons who could be held liable for a nuclear damage (including the suppliers), up to an amount fixed by the Atomic Energy Commission, taking into account the coverage available from private insurance and the extent of the risk (type and size of the installation, density of population). Since 1966, the maximum amount for insurance was set at 74 million dollars.

(ii) The nuclear operator (in order to get a licence) must conclude an indemnity agreement with the USAEC according to which the latter will indemnify the operator, suppliers and others for their liability in excess of the amount covered by the financial protection, up to 500 million dollars by incident.

(iii) The total liability of indemnified persons is limited to 500 million dollars plus the amount of financial protection (maximum 574 million dollars) by incident.

(iv) With respect to 'extraordinary nuclear occurrences', the USAEC may require the operator to waive rights of recourse or defence based upon a fault (excluding damage intentionally or wrongfully caused by the claimant).

What is remarkable in this system is that the combination of the mandatory coverage of damage caused by all responsible persons through an insurance subscribed by the operator (which has been called 'economic channelling') and of the waiver of defence has, when applied, the same effect as the legal channelling built up by the nuclear Conventions.

Compensation of nuclear damage by public funds

Some examples have been given of legislation where damage exceeding the financial guarantee provided by the nuclear operator is compensated by the Government. In one way or another, such supplementary compensation by public funds is planned and organized by legislation in nearly all OECD countries. The conditions and modalities of financial intervention by the State differ very much from one legislation to another; sometimes a

maximum is fixed for such compensation (for example, Austria 20 million dollars; France 120 million dollars; Germany 125 million dollars; Italy 70 million dollars) and sometimes no limitation is stipulated (for example Canada, Japan, Spain, Switzerland). In a number of cases, Governmental aid is also assigned for compensating delayed damage discovered after the period of coverage stipulated in the insurance policy (for example, Austria, Italy, Japan, Sweden, Switzerland).

The system of compensation by public funds in the nuclear field does not only correspond to the idea that the State ought to face the consequences of a grave national disaster, and the fact that State assistance is better organized is due to psychological reactions against atomic energy. With a more practical approach, the obligation undertaken by the Government to satisfy claims from the victims of a nuclear incident, when the insurance coverage corresponding to the liability of the operator is insufficient, can be seen as the logical consequence of the limitation of the operator's liability. This obligation is therefore closely linked to the concept of nuclear third party liability and is based on the same requirements: protection of victims and development of nuclear industry.

The Paris Convention provides (Article 15) that Contracting Parties may take measures in order to increase the amount of compensation specified. Thirteen out of the sixteen Signatories to the Paris Convention have concluded the Brussels Supplementary Convention with a view to raising the compensation available for nuclear damage up to 120 million dollars per incident. The first tranche is provided by the operator's insurance, the amount of which is specified under the Paris Convention. The second tranche should be paid out of public funds, to be made available, up to 70 million dollars, by the State where the installation is situated. The last tranche (between 70 and 120 million dollars) should be covered by all Contracting Parties to the Brussels Convention and shared among them according to a system based partly on the gross national product, and partly on the thermal power of reactors in each country (see Articles 3 and 12).

The compensation stipulated by the Brussels Convention can be implemented either by raising the maximum liability of the nuclear operator up to 120 million dollars, or by establishing another legal basis for the payment of public funds (Article 3(e)). In any event, the regime of liability set up by the Paris Convention will not be modified by the coming into force of the Brussels Convention, but only supplemented in cases of catastrophic nuclear incidents.

INTERNATIONAL ASPECTS OF NUCLEAR THIRD PARTY LIABILITY

Due to international co-operation, this branch of law has reached quite a high level of unification. Although the scope of the almost unified regime of the nuclear operator's liability is broader than the field of effective application of the nuclear Conventions, their ratification is still of primary interest.

These Conventions will facilitate the settlement of claims for damage resulting from an incident which was serious enough to affect several countries. But the main advantage of the Conventions is to promote, above all, international relations between nuclear industries of different countries, such as

delivery and carriage of nuclear equipment and substances, which are particularly necessary in a field where highly specialized technology and vast investments are required. Problems of civil liability arising out of international transactions could only be solved through the application of effective Conventions.

The first effect of the ratification of nuclear Conventions would be to eliminate important divergencies which still subsist despite unification.

Secondly, the rules of the operator's liability and insurance would be transformed into international obligations for the benefit of each Contracting Party. Whatever may be provided by national legislation (including possible amendments subsequent to the ratification of the Convention) each Contracting Government will bear responsibility towards the others with respect to the rules imposed by the Convention, on which could be based a claim by a contractor, a carrier or a victim from another Contracting country.

Thirdly, all nuclear Conventions contain stipulations for the settlement of disputes arising out of their application and interpretation (Paris Convention, Article 17; Vienna Convention, Optional Protocol; Brussels Supplementary Convention, Article 17; Brussels Convention on Nuclear Ships, Article XX).

Finally, and this is probably the most important effect at international level, the nuclear Conventions contain rules on the competent tribunal, and the enforcement of judgements. The basic concept established by the Conventions is that only one Court shall be competent for all actions arising out of a given nuclear incident. According to the Paris and Vienna Conventions (Article 13 and Article XI respectively), the competent tribunal of the Contracting Party in whose territory the nuclear incident occurred, has jurisdiction. When the incident occurs outside the territory of any Contracting Party or when the place of the incident is not established, competence lies in the Courts of the State in which the installation of the operator liable is situated. Detailed arrangements are included to deal with cases where several courts could be competent.

As a logical consequence of unity of jurisdiction, it has been stipulated that the final judgement rendered by the competent tribunal will be recognized and enforced in the other Contracting countries without re-examination of the merits of the case (Paris, Article 13(d); Vienna, Article XII).

CONCLUSION

In conclusion it can be said that nuclear third party liability has been conceived, built up and implemented in a rather short period of time. It is becoming a complete and practically autonomous legal mechanism in which the various elements are closely connected to each other.

The general opinion is that this new system will be more adequate than the traditional rules of civil liability and tort for protecting individuals against hazards generated by modern techniques. This might also be true in fields other than nuclear energy and therefore the concepts I have outlined might influence the legal regime for other activities. Such influence can already be observed in the elaboration of international Conventions, for example on pollution of the sea by oil and on motor car accidents. However, nuclear third party liability has not yet been submitted to the acid test of practical experience acquired by years of operation of great number of

installations. Any definitive comment should then be postponed. Nevertheless it is possible to say, even now, that very significant legal developments have taken place, mainly due to international co-operation.

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ANNEX

The Convention on Third Party Liability in the Field of Nuclear Energy was signed in Paris on 29th July 1960 by the following European countries:

Austria	Germany	Netherlands	Sweden
Belgium	Greece	Norway	Switzerland
Denmark	Italy	Portugal	Turkey
France	Luxembourg	Spain	United Kingdom

The Paris Convention has been modified by an Additional Protocol signed in Paris on 28th January 1964 by the Contracting Parties to the Paris Convention.

At the present time, the Paris Convention has received the instruments of ratification of:

Turkey	10 Oct. 1961
Spain	31 Oct. 1961
United Kingdom	23 Feb. 1966
France	9 Mar. 1966
Belgium	3 Aug. 1966
Sweden	1 Apr. 1968
Greece	12 May 1970

The Additional Protocol to the Paris Convention has been ratified by the same countries on the following dates:

Spain	30 Apr. 1965
United Kingdom	23 Feb. 1966
France	9 Mar. 1966
Belgium	3 Aug. 1966
Sweden	1 Apr. 1968
Turkey	5 Apr. 1968
Greece	12 May 1970

The Supplementary Convention to the Paris Convention was signed in Brussels on 31st January 1963 by the following Contracting Parties to the Paris Convention:

Austria	Germany	Netherlands	Sweden
Belgium	Italy	Norway	Switzerland
Denmark	Luxembourg	Spain	United Kingdom
France			

The Brussels Supplementary Convention has also been modified by an Additional Protocol also designed to avoid possible conflict with the Vienna Convention and signed in Paris on 28th January 1964.

The Supplementary Convention and the Additional Protocol to this Convention have been ratified by the following countries:

United Kingdom	24 Mar. 1966
France	30 Mar. 1966
Spain	27 Jul. 1966
Sweden	3 Apr. 1968

The Convention on Civil Liability for Nuclear Damage has been elaborated by a world-wide Diplomatic Conference convened in Vienna in May 1963 by the International Atomic Energy Agency.

Up to now, the Vienna Convention has been signed by the following countries:

China	21 May 1963
Columbia	21 May 1963
Yugoslavia	21 May 1963
The Philippines	21 May 1963
Spain	6 Dec. 1963
United Kingdom	11 Nov. 1964
Cuba	10 Dec. 1964
United Arab Republic	19 Aug. 1965
Argentina	10 Oct. 1966

The present state of ratifications of the Vienna Convention is the following:

Cuba	25 Oct. 1965
United Arab Republic	5 Nov. 1965

The Philippines	15 Nov. 1965
Argentina	25 Apr. 1967

In addition, the following countries have acceded to the Vienna Convention:

Cameroon	6 Mar. 1964
Trinidad and Tobago	31 Jan. 1966
Bolivia	10 Apr. 1968

The Convention on the Liability of Operators of Nuclear Ships was adopted on 25th May 1962 at the close of a Diplomatic Conference on Maritime Law in Brussels.

Until now, the present Convention has been signed by the following countries:

Belgium	Ireland	Monaco	Portugal
China	Korea	Netherlands	United Arab Republic
India	Liberia	Panama	Yugoslavia
Indonesia	Malaysia	The Philippines	

The Convention has been ratified by:

Portugal	31 Jul. 1968

The present state of accession is the following:

Republic of Malgasy	13 Jul. 1965
Democratic Republic of the Congo	17 Jul. 1967

NUCLEAR THIRD PARTY LIABILITY AND FINANCIAL SECURITY THEREFOR
Legislative requirements and their implementation in the Federal Republic of Germany

W. BOULANGER
Bundesministerium für Bildung und Wissenschaft,
Bonn, Federal Republic of Germany

In the Federal Republic of Germany, the Act on the Peaceful Uses of Atomic Energy and Protection Against its Hazards (Atomic Energy Act[1]) of 23 December 1959 came into force on 1 January 1960. The Act is relatively young compared to the Atomic Energy Acts of e.g. New Zealand (1945), the United Kingdom (1946), and the United States of America (1946/1954). The drafters of the German bill could therefore study atomic energy acts already existing in other countries and benefit from the experience gained with their application. In some respects they followed in particular the example of the United States Atomic Act of 1954.

For the purposes of licensing and third party liability, the German Atomic Energy Act distinguishes two main categories of nuclear activities, namely

(a) Erection or operation of a nuclear installation, which means an installation for the production or fission or fabrication of nuclear fuel, or for the reprocessing of irradiated nuclear fuel;

(b) Any other form of handling nuclear fuel or other radioactive material, such as import and export, transportation, storage of nuclear fuel outside of Government custody, treating, processing or otherwise using such fuel outside installations requiring a licence, and handling of radioactive material.

A licence for an activity mentioned under a) above may, and a licence for an activity listed under b) above must, be given if the applicant fulfils the requirements established by the Act or by the ordinances promulgated under it. In addition to personal reliability, the provision of financial security to cover third party liability of the operator of the installation or user of the nuclear fuel or material is a main prerequisite for granting a licence.

The operator of a nuclear installation (Article 7 of the Act) is liable to pay compensation for loss of life, personal injury or deterioration of health caused to any person, or for damage caused to property, as a result of any process of nuclear fission carried out in such installation or of radiation from any radioactive substance emanating from such installation or from

[1] The English and French versions of the Atomic Energy Act of the Federal Republic of Germany and Ordinances promulgated thereunder, such as Nuclear Installations Ordinance, Financial Security Ordinance, Ordinance concerning Costs under the Atomic Energy Act, First Radiation Protection Ordinance, are published in "Kernenergierecht" (Volumes 4 and 10), a Legal Series published by the Federal Ministry for Education and Science and edited by the Institut für Völkerrecht, Göttingen University.

any equipment or any activity, including waste disposal, in connection with the operation of the installation (Art. 25). Thus, liability of the operator arises in every case where the damage can be proved to have a causal link to the operator's installation. This means that the operator's liability is objective or absolute; there are even no exonerations on the grounds permitted under Article 9 of the Paris Convention. Differing from the Convention, however, the German operator is not solely liable. Other persons who might wholly or partly have caused the damage by a faulty act or omission remain liable under common law. The financial security to cover claims for compensation against them as well as against the operator must be provided for by the operator. Such financial security may be provided by means of third party liability insurance, by indemnification or a guarantee furnished by a third person, or in other ways. It is sometimes said that the operator has to take up an 'umbrella' insurance covering all nuclear damage caused by his installation. This system is called the 'economic channelling' of liability. In its economic effects it does not appear to differ from the system of 'legal channelling' of liability as adopted by the international nuclear conventions. The amount of financial security to be provided by the operator is determined for each installation or nuclear activity by the licensing authority.

Liability under the German Atomic Energy Act is limited to 500 million Deutsche Mark. To the extent that damage is not covered by the financial security provided by the operator, the Federal Government provides for indemnification up to this maximum amount.

Liability for nuclear activities other than those connected with the establishment or operation of a nuclear installation is, in principle, also linked to causation. If, however, the damage is caused by an event which the holder of the radioactive substance or such persons as are acting for him could not avoid, even by taking every reasonable precaution under the circumstances, and if it is due neither to any defective condition of the safety devices nor to any failure in their performance, the holder shall be exonerated. In other words, there is no liability for causation of damage if the holder can prove that he himself or his agents were not at fault.

Financial security is normally provided by insurance. The private insurance companies in the Federal Republic of Germany have for this purpose formed an insurance pool (Deutsche Kernreaktor-Versicherungsgemeinschaft). Where nuclear installations are operated by companies of private law whose shareholders are the Federal or State authorities or by universities, which are State institutions, financial security is normally provided by a guarantee furnished by the authorities concerned.

Details for the fixation of financial security are regulated by the Ordinance concerning Financial Security pursuant to the Atomic Energy Act (Ordinance of 22 February 1962, as amended). It might be worth mentioning that this Ordinance contains an interesting system for fixing the amount of standard coverage for nuclear installations. The required amount of financial security is calculated by multiplying an amount dependent upon the maximum output of the reactor (basic amount) by a factor dependent upon the population density in the vicinity of the reactor (population factor). The maximum output is the thermal power output at which the reactor may continuously operate according to the terms of its licence. A mathematical formula is given for determing the population factor.

As most atomic energy legislation, that of the Federal Republic of Germany was very strict and stringent right from the beginning. In the light of experience, however, the implementation of some requirements has been softened and thus certain small quantities of nuclear material could be used for which the licensing procedures might be waived. The competent authorities seem also to have reached the conclusion that the special regime of strict liability for nuclear activities outside nuclear installations no longer appears necessary and that so far the liability provisions of common law would suffice. This experience will certainly have a bearing on future amendments of the Atomic Energy Act.

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MARITIME CARRIAGE OF NUCLEAR SUBSTANCES: HARMONIZATION OF NUCLEAR AND MARITIME CONVENTIONS

P. STROHL
European Nuclear Energy Agency,
Paris

INTRODUCTION

It is not surprising that the transport of nuclear substances by sea raises a number of difficult legal problems. In effect, national and international maritime law on the one hand and the special legal regime which has been established by the international conventions on nuclear third party liability on the other, have to be taken into consideration for such transport. The rules of maritime law and the rules of nuclear law, with respect to third party liability, are quite different. The first generally stem from the traditional concept of liability based on fault and the second, from the more modern concept of absolute and exclusive liability of one person, who is the nuclear operator.

In fact, nuclear operators wishing to carry nuclear substances by sea have been faced with quite a few difficulties in insuring such operations satisfactorily. Due to the present legal uncertainty, shipowners and their insurers are very reluctant to take in charge nuclear cargo and they request special guarantees which are not easy to provide. In a number of cases, in addition to a nuclear third party liability insurance subscribed under the conditions and with the maximum coverage stipulated in the nuclear conventions, the shipowner has had to be given an unlimited governmental indemnification for damage exceeding the amount covered by insurance. This situation occurred, for example, in respect of carriage by ENEA joint undertakings and for the radioactive waste-dumping operations into the ocean organized by ENEA in 1967 and 1969.

ENEA, in co-operation with the IAEA, has therefore undertaken the task of finding suitable solutions to improve the legal regime of maritime carriage of nuclear substances and thereby facilitating the insurance of such carriage. This question was thoroughly studied during the Symposium organized jointly by ENEA and IAEA at Monaco from 7th to 11th October 1968, which was attended by representatives of all interested circles: governmental experts in nuclear law, maritime lawyers, shipowners, nuclear and maritime insurers, competent international organizations etc. The studies and discussions of this Symposium appear in the Proceedings which have just been published. The Monaco Symposium has also given rise to proposals for further work to be done to find suitable solutions. The IAEA, the Intergovernmental Maritime Consultative Organization (IMCO), ENEA and the International Maritime Committee are now carrying out this work in collaboration.

APPLICATION OF THE NUCLEAR CONVENTIONS

The Paris and the Vienna Conventions do not only cover nuclear damage in relation to a fixed installation but also damage which occurs during a carriage of nuclear substances. As a general rule the operator of a nuclear installation who sends such substances is made liable; the receiving operator is liable only from the moment he has assumed liability under the express terms of a written contract or when taking the substances in charge; however, where the substances are sent to a person within the territory of a non-contracting State, the sending operator remains liable until the substances have been unloaded from the means of transport [Paris Convention, Article 4(a) and (b); Vienna Convention, Article II(1) and (2)].

It is important to add that both Conventions exclude damage to the means of transport upon which the nuclear substances involved were at the time of the nuclear incident [Paris Convention, Article 3(a) (ii) (2); Vienna Convention, Article IV(5) (b)]. However, a Contracting Party may, by legislation, include such damage within the operator' s liability provided that such inclusion does not result in reducing the liability of the operator in respect of other damage to an amount less than $5 million for a nuclear incident [Paris Convention, Article 7(c); Vienna Convention, Article IV(6)].

This rule is of particular interest for maritime carriage because of the high economical value of ships. In so far as nuclear damage to the transporting ship is not covered by the system of liability laid down by nuclear conventions, common law will apply; the shipowner will have to find a person who could be held liable – the nuclear operator or another – and should then, generally speaking, prove a fault.

Another factor of uncertainty lies in the fact that Contracting Parties may take different views with respect to a possible inclusion of damage to the means of transport within the liability of the operator, as permitted by the Conventions. In order to avoid divergencies, the ENEA Steering Committee, on 9th October 1969, recommended to the Signatories to the Paris Convention to take legal steps in favour of this inclusion, that is, to adopt the clear solution of the operator' s absolute liability under the Convention. It should, however, be recognized that this has the disadvantage of reducing, to some extent, the amount of compensation available for other damage.

The application of the simple and clear rule described in paragraph 2 above is also limited by the geographical scope of the nuclear conventions.

The conventions cover the territories of the Contracting Parties, including their territorial seas. It has moreover been recognized that they are applicable to incidents occurring and damage suffered on the high seas (cf. for example the ENEA Steering Committee Recommendation of 25th April 1968).

But under general rules, international conventions can only create obligations for Contracting States, and the Paris Convention specifies [Article 2] that incidents occurring in the territory of non-contracting States and damage suffered in such territory are excluded from the scope of application of the Convention. There is no such stipulation in the Vienna Convention but the IAEA Standing Committee on Civil Liability for Nuclear Damage has, in 1964, expressed the opinion that this Convention does not cover damage suffered within the territory of a non-contracting State

even if the nuclear incident causing such damage occurred within the territory of a Contracting Party or on the high seas.

Therefore, as soon as a foreign element is involved in a nuclear incident – nuclear operator, ship or territory of a non-contracting State, the victim being a national of, or having a domicile in, a non-contracting State – national legislation which is not based on the nuclear conventions might be applied, in particular by a court of a non-contracting State. In the same way the application of the Paris or Vienna Convention on the high seas would most probably be accepted by a court of a country party to these Conventions but could be rejected by a court of another country.

At the present time, the risk of failure in the channelling of liability on the nuclear operator is rather important because the Vienna Convention is not yet in force and the Paris Convention is only in force in six countries which have ratified it (Belgium, France, Spain, Sweden, Turkey, the United Kingdom). It is therefore vital, in particular as regards international carriage, to encourage further ratification of these Conventions.

APPLICATION OF MARITIME CONVENTIONS

One of the most complicated problems in our field arises from the possible application of maritime conventions in the case of a nuclear incident occurring during carriage by sea. The Paris and the Vienna Conventions contain provisions according to which the rule on the exclusive liability of the nuclear operators shall not affect the application of any international agreement in the field of transport in force or open for signature, ratification or accession at the date of conclusion of these conventions [Paris Convention, Article 6(b); Vienna Convention, Article II(5)]. As a result, victims may bring suit against the carrier, the shipowner or a member of the crew, under maritime conventions.

It has first to be observed that the above-mentioned provisions leave a door open for additional liabilities under maritime conventions but do not set aside nor supersede the liability of the nuclear operator according to the Paris or Vienna Conventions.

Nevertheless, a shipowner, for example, can be held liable for nuclear damage and this is particularly worrisome for him because the rules on limitation of liability under maritime conventions are not as clear and extensive as under nuclear conventions and in fact are often interpreted in a restrictive way by the Tribunals (1924 and 1957 Conventions on the limitation of the liability of shipowners).

Firstly, it must be asked which are the maritime conventions referred to in Article 6(b) of the Paris Convention and Article II(5) of the Vienna Convention. The comments in paragraphs 35 and 36 of the Exposé des Motifs of the Paris Convention may help to clarify this question.

The conventions whose application is preserved are evidently those which include provisions relating to contractual or third party liability for damage occurring during the maritime carriage of nuclear substances. At first sight the following are the conventions concerned:

- Brussels Convention of 1910 on Collision
- Brussels Convention of 1924 and 1957 on the Limitation of Shipowners' Liability
- Brussels Convention of 1924 on Bills of Lading.

However, a restrictive interpretation of Article 6(b) of the Paris Convention could be proposed according to which only those maritime conventions which create liability conflicting with the absolute liability of the nuclear operator should be considered applicable. According to this interpretation, only the 1910 Convention on Collision would apply in the case of nuclear damage; but this seems to be in contradiction with the drafting of paragraph 35 of the Exposé des Motifs of the Paris Convention.

It can also be argued that the 1910 Convention on Collision is not referred to in Article 6(b) of the Paris Convention because it is not 'an international agreement in the field of transport'.

It should be determined whether, when the application of a maritime convention is preserved under Articles 6(b) of the Paris Convention and II(5) of the Vienna Convention, one should consider the text of this maritime convention as it stands at the date of the signature of the nuclear conventions or whether account should equally be taken of the amendments made subsequently. In view of the generally accepted principles of interpretation of international treaties it seems that subsequent amendments are also applicable.

CONSEQUENCES OF THE APPLICATION OF MARITIME LAW ON NUCLEAR THIRD PARTY LIABILITY

As we said, the maritime conventions which are applicable in the case of nuclear damage do not overrule the nuclear conventions. Thus, the liability of the carrier or the shipowner can be in addition to that of the nuclear operator, while still maintaining the liability of the latter.

As a result, the courts which will apply the Paris Convention will have two regimes of liability, one on the basis of this Convention and the other on the basis of the international maritime conventions. This situation might be satisfactory to victims but the consequences might be that all persons potentially liable for the same damage would seek cover by means of insurance; this would entail higher financial costs than if liability were in fact channelled on the nuclear operator. Also, shipowners who are not always protected by a limitation on their third party liability will try to find unlimited security which will have to be furnished by governments.

It is possible, in view of the fact that liability under the Paris Convention does not necessitate proof of fault and that relatively important amounts must be available to compensate victims (5 million EMA u/a[1] at the very least) the latter will be tempted to sue the nuclear operator rather than the carrier or the shipowner. Even in the case where victims might decide to claim against the carrier or the shipowner, under Article 6(b) of the Paris Convention, the latter will benefit from a right of subrogation which will allow them to claim against the nuclear operator, within the limit of his liability, reimbursement of the amounts paid [Article 6(d)].

However, the existence of conflicting rules of maritime and nuclear conventions create a serious problem and experience has shown that maritime carriers do not easily accept the idea of being possibly liable

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[1] European Monetary Agreement units of account.

for a nuclear damage even if they could exercise a right of recourse. It is therefore obvious that the maintenance of the liability rules of maritime law introduce an element of uncertainty. One of the objectives of the work presently carried out by ENEA and IAEA in collaboration with IMCO and the International Maritime Committee is to study the best method to eliminate this conflict. As it would be very difficult to amend the Paris and Vienna Conventions or even the existing maritime conventions which are maintained, the idea has been expressed that consideration should be given to the elaboration of a new maritime convention with the limited aim to exclude any liability under maritime law for damage caused by a nuclear incident[2].

[2] Note by the Secretariat: A Diplomatic Conference, convened jointly by ENEA, IAEA and IMCO from 29 November to 2 December 1971 in Brussels, adopted the Convention relating to Civil Liability in the field of Maritime Carriage of Nuclear Materials, which was open for signature on 17 December 1971. The purpose of the Convention is to exonerate shipowners and others involved in the maritime carriage of nuclear materials from liability for nuclear damage when an operator of a nuclear installation is liable for such damage under the Paris or Vienna Convention on nuclear third party liability. The Convention requires five ratifications for its entry into force; it was signed on 17 December 1971 in Brussels by Brazil, the Federal Republic of Germany, France, Italy, Portugal, Sweden, the United Kingdom of Great Britain and Northern Ireland, and Yugoslavia.

PRACTICAL PROBLEMS IN NUCLEAR INSURANCE

A. CAMPBELL MILES
British Insurance (Atomic Energy) Committee,
(The British Nuclear Pool),
London,
United Kingdom

INTRODUCTION

Nuclear insurance

Nuclear insurance, as other branches of insurance, falls basically into two classes, liability and material damage. To appreciate their significance it might be of assistance to recall the main purpose they serve.

All will be familiar with motor vehicle civil liability or third party insurance. Perhaps the essential purpose of this is to ensure that if injury or damage is caused to a pedestrian or another motorist, adequate financial resources will be available to pay compensation. This cover is in many countries obligatory – as with nuclear liability insurance.

Another class of insurance secures compensation for employees injured in the course of their occupation. Of course, regulations are laid down designed to ensure that the risk of such accidents is minimized. In spite of these regulations, however, there is a residual risk and gradually the view is prevailing that insurance should be made compulsory – again, as with nuclear liabilities.

Insurance cover is also available to relieve us from financial loss should property which we own be damaged by fire, explosion or some other named peril. While material damage insurance is not obligatory in its nature, a prudent owner usually avails himself of the facilities offered. This also applies in the nuclear field.

CLASSES OF NUCLEAR INSURANCE

Civil liability

The provision of financial security by insurance or otherwise in respect of civil liability is usually a condition which the competent public authority attaches to the granting of a licence for operating a reactor.

According to the Conventions, it is for the competent public authority of the State where the installation is situated to satisfy itself that the insurance which the operator is required to take out and maintain is adequate and effectual.

The operator's liability under laws based on the Paris or Vienna Conventions concerning third party liability in this field is absolute, i.e. is independent of any question of his negligence. Insurance must cover this absolute liability for the radioactive properties or a combination of such

properties and any toxic explosive or other hazardous properties of nuclear matter.

Operators alone are liable. Any tort liability which would otherwise fall on contractors or suppliers is made the responsibility of the operator and is covered by his insurance or other financial security. This channelling of all third party nuclear liability to the operator avoids duplication of insurance and complex legal questions arising.

The Conventions allow claimants 10 years from the date of an incident to begin an action to establish a claim in respect of nuclear damage. A nuclear insurance policy would normally allow for this period of prescription.

The insurance or other financial security may be used to meet only an operator's Convention liability which is essentially one of tort. The security cannot be used to meet a liability which an operator may assume under contract, for which separate insurance arrangements would need to be made.

Under both the Vienna and Paris Conventions it is for each country to impose a limit on the liability of its operators subject to a minimum of $5 million in respect of any one incident. Insurers, however, must know the limit of their liabilities in respect of any one site and thus insurance coverage is only available on the basis of one fixed amount for a particular installation. This amount is reduced by each claim payment unless reinstated by agreement, assuming the necessary insurance capacity is available. There is nothing in the Conventions which prevents this, providing that the cover available is not reduced or exhausted as the result of a first incident without appropriate measures being taken to ensure that the financial security up to the minimum amount specified is available for subsequent incidents.

Nuclear insurance of work people

Liability in respect of any person who suffers damage caused by a nuclear incident, whether he is a third party inside or outside the installation or an employee of the operator of the installation, is covered by the Conventions and would therefore usually be protected by the operator's liability policy issued pursuant to national convention-type nuclear legislation. Employees of an operator are thus in a more favourable position than employees in other industries where the employer is not ordinarily liable to pay damages for personal injury to his employees unless the injury has been caused by the employer's own negligence or breach of statutory duty. The reason for treating employees of a nuclear installation more favourably is that, whereas the risks in other industries are tangible and well known, in the nuclear power industry they are still subject to some uncertainty.

The maximum liability of an operator fixed under the Conventions covers his nuclear liability both to the public and his employees. The period of time during which a claim can be made is the same for employees as for the general public i.e. 10 years from the date of the incident. A nuclear liability insurance policy would normally contain provisions to deal with both these points.

Material damage

Material damage cover for nuclear installations is usually provided on a named peril basis, non-nuclear perils being included with nuclear risks.

Property is covered against damage by fire, lightning, explosion, aircraft and other perils normally insurable in the country concerned. In the atomic part cover is given for damage caused as a result of excessive temperature developing within the reactor consequent upon a sudden uncontrolled, unintentional and excessive increase or release of energy or upon the failure of the cooling system.

The policy also includes contamination by radioactivity, which has accidentally escaped, and caused damage to the outside surface of the external nuclear reactor shield or of the primary cooling circuit or any property included in the insurance which is outside the nuclear reactor shield or primary cooling circuit. It is usual for the policy to contain a provision to the effect that it does not cover minor losses: the particular amount concerned is agreed upon by the insured and the insurers.

The usual form of material damage policy issued to a licensee in the United Kingdom, e.g., provides a considerable measure of protection for suppliers of goods or services to a nuclear installation. The insured is required by the terms of the policy to agree, to the extent that he is entitled to be indemnified under the policy, that he will not claim indemnity from any person regardless of fault, negligence or breach of any condition or warranty in respect of damage to the insured's property on the site caused by any radioactive contamination or by fire, explosion or excessive temperature each originating within the reactor, and with regard to damage to the reactor or associated buildings caused by fire, explosion or excessive temperature however arising and wherever originating. The insurers for their part undertake similarly that they will not enforce any rights or seek from other parties any indemnity to which they would otherwise have been entitled.

Consequential loss

Cover for the installation operator in respect of his loss of profits and/or standing charges following an incident can often be provided, subject to insurance capacity being available after the requirements of the material damage insurance for the installation have been met. A form of policy and a basis for rating have been worked out and a few of these policies are now in force.

Products liability

Sometimes insurance is required by a manufacturer or supplier in respect of equipment destined to form an integral part of a nuclear reactor, e.g. reactor vessels, remote handling equipment, fuel cans and reactor control systems. Although legislation enacted pursuant to the Conventions channels liability for 'off-site' nuclear hurt or damage to the operator concerned, circumstances might arise which would leave suppliers exposed to certain claims: for example, liability may attach to the supplier for damage to the installation or for civil liability following an accident which did not involve radiation damage.

The nuclear insurance pools also provide products liability insurance in respect of goods supplied for 'foreign' reactors: even though the country of domicile of the supplier has Convention-type legislation it by no means follows that other countries which his goods or services may reach will have

followed suit, and there is the associated point of doubt as to how a foreign court will determine liability. Considerable costs may need to be incurred in defending a third party claim brought against a supplier even though this might be a bad claim in law.

One of the problems facing insurers in connection with requests for products liability insurance is that of accumulation of liabilities in respect of a particular site where the National Insurance Pool might be insuring the operator and then be requested to cover a supplier in respect of goods or services provided for the installation. For this reason products liability policies issued to suppliers carry a lower limit of indemnity than operator's liability insurance so that insurers may keep their overall commitment per installation within reasonable bounds.

DISTINCTIVE FEATURES OF NUCLEAR INSURANCE

Underwriting problems

The development of nuclear energy as a source of power posed new problems of considerable magnitude for insurers. Hazards quite unlike anything the insurance companies had known before were involved. Little enough was known about the kind of possible accidents and their consequences. And even less was known about the probability of a catastrophic nuclear incident. The comparatively small number of installations increases rating difficulties in view of the large amounts at risk at individual sites without a sufficient spread of risks to compensate for a potentially disastrous level of exposure.

As is well known insurers usually calculate their insurance premiums upon the laws of probability, which are valid only where large numbers are involved. Where there is a sufficient number of individual risks of a similar nature it is possible to forecast with a high degree of accuracy the proportion of the whole that will sustain losses and thereby ensure that the losses of the few will be met by the contributions of the many.

In this new field, however, the number of installations, although growing steadily, is far too small to apply the general insurance considerations as to the probability of untoward incidents. Moreover, even now little is known about the nature or extent of the damage that might flow from the failure of any one of the numerous complicated systems upon which the safe working of a nuclear installation depends. The risk is lessened, though not eliminated, by an essential principle in nuclear reactor design – taking steps to minimize the possibility of failure by using alarm and safety devices which work on the 'fail safe' basis. Depending on the gravity of an incident, such devices are designed either to alert the operating staff on the nature and location of the originating fault or to ensure the automatic shut-down of the reactor.

Main hazards

The main hazards associated with nuclear reactors can be divided into five kinds. First, 'runaway': that is a sudden surge of power caused by lack of control of the nuclear reaction resulting in a possible melting of the fuel elements and consequent release of fission products. Secondly, over-

heating: this may be due to various causes, such as excessive power, loss of coolant, or obstruction of the cooling circuits; it can be widespread or localized. Thirdly, there is the risk of an explosion, which might arise through either a build-up of pressure or a chemical reaction where incompatible substances are brought together. The fourth hazard arises through possible changes in the qualities of materials used in the reactor and circuits after prolonged exposure to radiation. And finally there is the risk of a breakdown of the reactor's structure, from whatever cause, which may result in the uncontrolled emission of fission products to the atmosphere.

Evaluation of risks

The first step in the evaluation of the nuclear hazards may be described as the technical analysis. This involves an extensive detailed study of the plans. Obviously, approval of these is a prerequisite for covering the risk. From this study, it becomes clear into which group or classification the installation falls. Among the existing groups are: critical assemblies, swimming pool reactors, low-pressure light-water, gas-cooled graphite-moderated, pressurized-water and boiling water reactors.

Among these various groups, one finds different individual types of reactor. Each one is examined to establish an estimated relative degree of hazard, taking into account amongst many different considerations thermal capacity. Use of the reactor is also a factor in its evaluation, depending on whether it is used for education, research and testing or for the production of electrical energy. Finally comes a special engineering assessment which takes into account all factors relating to the design and working conditions. A loading is added for any increased risk over that usually present.

A factor in the loading is the reactivity and its relation to the various controls. Attention is paid to the possibility of excess reactivity being developed by some fault in the reactor. Reactivity is a measure of the amount of the possible departure of a reactor from the critical condition, where the reaction is just self-supporting. At any steady state of operation the reactivity is zero. Addition of positive reactivity causes divergence; addition of negative reactivity causes the reaction to die down. Another consideration is the type of fuel, its degree of enrichment and the effect that such enrichment may have on the control of the reactor. Overheated fuel may result in 'meltdown' and general contamination of the reactor system.

The possibility of failure of fuel cans has to be taken into account. Failures may also result from excessive speed of the control rods, or from their seizure. Too rapid a withdrawal would result in overheating of the fuel and failure to act might result in the complete destruction by overheating.

Reactor containment must be taken into account as this may have to resist not only the normal working pressure which may be substantial, but also heat released by chemical reaction or internal fire and explosion. The fuel coolant containment may be subject to explosion, collapse and cracking risks, which may result in the escape of coolant and subsequent overheating of fuel.

In view of the difficulty of separating nuclear from conventional perils insurers make a practice of offering insurance which includes the normal fire and other conventional perils as well as the nuclear perils. The inclusive rate which will include an element for the conventional cover is

applied in full to the reactor block and associated buildings. Separate buildings on the site which do not contain any appreciable quantities of radioactive substances are usually rated at a proportion of the rate applicable to the reactor block.

Special features affecting civil liability

The engineering evaluation system is used mainly to provide an indication of the degree of probability that an incident will occur and the extent to which contamination escaping from such an incident is likely to spread. There are, however, many other important factors which must be evaluated – for example the distribution of population and property in the vicinity of the risk, meteorological data (prevailing winds, rainfall, possibility of flood, tidal wave and earthquake); proximity to rivers, canals, reservoirs, water collecting areas; operational control (codes of practice, quality of staff); monitoring arrangements for possible escapes of radioactivity; alarm systems; adequacy of emergency plans and provisions for storage and disposal of waste.

The legislation situation in the country concerned must be considered as it will affect the liability of the operator. The purely conventional liability aspects of the risk have to be included in the review, and also the limits of indemnity required.

In Britain, licensees are required to insure in accordance with the provisions of the Nuclear Installations Acts 1965 and 1969. Under the Acts, the amount of financial security required is £ 5 million. No distinction is made between third parties and employees and the licensee's liability to any person for radiation risks is covered.

It may be noted here that the governmental experts have agreed that the Vienna Convention on Civil Liability for Nuclear Damage – as also the Paris Convention – provides a highly satisfactory basis for the establishment of national legislation in this field. Moreover, it helps to resolve problems which might arise where a nuclear incident involves nationals of more than one country.

Source of cover

Nuclear installations are usually insured through the medium of nuclear pools set up by the insurers in various countries to provide nuclear insurance facilities for their national installations. The marshalling of the resources of the national insurance markets has been necessary to enable sufficient financial security to be made available to provide adequately for possible hurt or damage to third parties, and in addition to insure the installations themselves against material damage risks.

In addition to concerning themselves with the practical problems of providing insurance facilities for nuclear installations in their own countries, the national nuclear pools are active in assisting and encouraging the formation of pools in other countries whenever they may be required.

In the absence of a national nuclear pool, application for nuclear insurance cover or quotations should normally be made to the national insurance market association concerned. This association will usually be found to be well informed about nuclear matters, and will know how to obtain any advice or assistance it might require from those already engaged in the

international nuclear insurance and reinsurance business. Even though the capacity of the national insurance market, when formed into a pool, might be very limited, nevertheless it has a most important role to play. It will, of course, be familiar with the insurance customs and the relevant legislation applicable at the time, all of which is to be taken into consideration in the arrangement of nuclear insurances. Moreover, its office could provide a base from which the claims work arising from a major incident could be organized with help if necessary from other pools.

This international collaboration of the various pools is obviously only possible to the extent that, as contemplated in the Conventions, insurance and reinsurance premiums as well as sums due as compensation and costs are readily transferable.

Claims organization

Extensive claims organizations already exist in many countries whereby experienced claims adjusters, available at a moment's notice in any part of the country, will be called upon to investigate minor nuclear and, of course, non-nuclear incidents. Should a major incident occur involving many hundreds of claims from the public, a considerable number of claims officials might need to be deployed at very short notice. Pools have made the most careful plans to provide for such an eventuality. They have set up a claims organization with individually nominated claims officials available to go to the scene of an incident. All foreseeable steps have been taken to ensure the fullest service to the public who may be affected.

One hopes that this organization will never need to be called into action – but one must be prepared!

ETAT ACTUEL DE L'ASSURANCE NUCLEAIRE EN EUROPE

F. LACROIX
Centre d'études du risque atomique de la
Commission permanente du risque atomique
du Comité européen des assurances,
Bruxelles, Belgique

INTRODUCTION

En novembre 1969, M. Klarr du Bundesverband der deutschen Industrie commençait son exposé sur les problèmes actuels de l'assurance nucléaire du point de vue de l'industrie par la phrase suivante: «Une industrie moderne sans assurance convenable est aujourd'hui impensable.»

Cette idée s'applique particulièrement aux installations nucléaires et notamment aux réacteurs de puissance et aux réacteurs expérimentaux et de recherche, ainsi qu'aux usines de fabrication et de retraitement des combustibles nucléaires. Elle pose, du point de vue de l'industrie, la nécessité de trouver une «assurance convenable».

Mais avant d'aborder la question de savoir comment les assureurs européens ont résolu ce problème, j'ai cru utile de rappeler succinctement les principales caractéristiques des risques nucléaires. J'exposerai ensuite les particularités essentielles des contrats émis pour couvrir ces risques et terminerai par quelques considérations sur l'organisation du marché de l'assurance nucléaire en Europe.

I. LES CARACTERISTIQUES DES RISQUES ATOMIQUES

Au regard de l'assurance, les risques nucléaires se caractérisent par:

a) L'ampleur exceptionnelle et la multiplicité des dommages qui peuvent survenir à la suite d'un seul sinistre. En raison de la sécurité particulière qui a caractérisé jusqu'à présent les installations nucléaires, il est difficile de se faire une idée exacte des possibilités d'accidents et de leurs conséquences. Néanmoins, plusieurs incidents sont survenus dans le courant des dernières années. Ils ont entraîné soit des arrêts prolongés d'une durée de nombreux mois, soit des retards considérables dans la mise en service de certaines centrales nucléaires. Ces incidents, sans conséquences radioactives importantes, mais qui auraient pu en avoir, semblent montrer que le potentiel de danger reste grand. Sans doute, la probabilité d'une catastrophe est extrêmement faible, mais si minime que soit ce risque, un accident reste possible qui pourrait causer des dommages considérables, tant aux personnes qui en seraient victimes, qu'aux installations nucléaires elles-mêmes.

b) Le nombre relativement petit d'installations nucléaires existantes ou dont la construction est prévue dans les prochaines années, ne permet

pas d'appliquer, maintenant et sans doute encore pendant de nombreuses années, à l'assurance des risques nucléaires la technique normale de l'assurance qui est fondée sur un système de compensation annuelle entre un grand nombre de risques indépendants; la seule compensation que l'on puisse espérer pratiquer dans ce domaine est une compensation établie dans le temps.

c) Le risque radioactif présente la particularité de ne pas être perceptible par les sens et de créer ainsi des situations de danger inapparentes. Si, à la suite d'un contrôle certaines personnes présentent des doses anormales de radioactivité par contamination externe, même si cette radioactivité n'a aucune suite funeste pour leur santé, il leur faudra subir de nombreux contrôles et analyses, voire un traitement préventif coûteux.

d) Les dommages nucléaires peuvent n'apparaître que plusieurs mois, voire des années après l'accident. Du fait de ces effets différés, les assureurs restent engagés pendant au moins dix ans après la date de l'accident. Il faut y ajouter l'aggravation des lésions dans le temps: une lésion apparaissant comme bénigne peut se révéler infiniment plus grave par la suite.

Je n'insisterai pas sur les soins longs et onéreux qu'exige le traitement des personnes irradiées, ni sur les incidences génétiques encore mal connues. Néanmoins, reprenant les considérations développées dès 1967 par M. Deprimoz, Directeur du Pool français d'assurance des risques atomiques, je terminerai cette brève analyse des risques nucléaires en disant avec lui: «Préjudices indirects d'immobilisation, frais annexes de contrôle sanitaire, d'isolation, de traitement préventif, dépenses de décontamination, préjudices corporels de longue durée pour les victimes, voire même transmises à leur postérité, ces divers aspects du sinistre atomique conduisent à cette conclusion: A égalité de victimes, si faible en soit le nombre, l'accident nucléaire coûtera toujours plus cher que l'accident classique.»

J'ajouterai que dans les circonstances actuelles et en l'absence de statistiques valables, les risques nucléaires ne sont pas «mesurables» et, partant, ils ne sont théoriquement pas assurables. Mais ainsi que le disait M. Martin en 1962, «ce n'est pas une raison pour déclarer forfait. N'en est-il pas de même à l'apparition de tout phénomène nouveau, générateur de risque, donc d'assurance? Un pragmatisme provisoire, fait de science et d'expérience professionnelle doit suppléer à la carence des données».

C'est dans ces conditions que les assureurs nucléaires européens ont élaboré les divers contrats d'assurance des risques nucléaires dont nous examinerons maintenant les particularités essentielles.

II. LES DIFFERENTS CONTRATS D'ASSURANCE NUCLEAIRE

Les contrats d'assurance demandés par les exploitants d'installations nucléaires concernent la plupart des branches de l'assurance:

- assurance de la responsabilité civile
- assurance des dommages matériels aux installations, y compris l'assurance du bris de machines
- assurance des accidents du travail.

1. L'assurance de la responsabilité civile

D'une part, le public doit être sûr de trouver une protection adéquate et, d'autre part, le développement de l'industrie nucléaire ne doit pas être compromis par une responsabilité trop lourde qui serait difficilement supportable, en cas de catastrophe. Ces deux raisons ont conduit à l'élaboration des Conventions internationales sur la responsabilité civile dans le domaine de l'énergie nucléaire, la Convention de Paris du 21 juillet 1960 et la Convention de Vienne du 21 mai 1963. Ces Conventions instituent un régime d'exception et leur objet se limite aux risques de caractère exceptionnel auxquels ne peuvent s'appliquer les règles et usages du droit commun. Il en résulte que tous les risques liés à des activités nucléaires n'entrent pas dans le cadre du régime d'exception des Conventions. A titre d'exemple, les risques résultant des radioisotopes utilisés à des fins industrielles, médicales, etc. sont hors du cadre des Conventions et ils restent régis par les règles du droit commun.

Ces risques n'ont pas un caractère exceptionnel et leur couverture fait l'objet d'opérations courantes des compagnies d'assurances. Ils ne sont en général pas pris en charge par les assureurs nucléaires spécialisés. Aussi nous n'en traiterons pas plus longtemps au cours de ce mémoire.

Dans le but d'examiner plus en détail l'assurance des installations nucléaires proprement dites, rappelons brièvement les principes fondamentaux posés par les Conventions et sur lesquels sont basées les polices d'assurance de la responsabilité civile:

- la responsabilité est objective et résulte du risque indépendamment de toute faute
- elle est concentrée sur la seule personne de l'exploitant de l'installation nucléaire où l'accident se produit
- elle est limitée:
  - limitation du montant par accident nucléaire (au minimum 5 millions de dollars)
  - limitation dans le temps (10 ans à compter de la date de l'accident)
- obligation pour l'exploitant de disposer d'une assurance ou d'une autre garantie financière pour faire face à sa responsabilité.

Dans leurs grandes lignes, les contrats émis par les assureurs nucléaires européens ont été adaptés aux caractéristiques de ce droit nouveau. Les polices émises par la plupart des assureurs de l'Europe continentale couvrent les conséquences pécuniaires de la responsabilité civile non contractuelle encourue par l'exploitant d'une installation nucléaire à raison des dommages causés par un accident nucléaire mettant en jeu des combustibles nucléaires, produits ou déchets radioactifs détenus dans l'installation ou en provenant.

Sont normalement exclus de ces polices:

a) les dommages causés par un accident nucléaire survenu pendant un transport de substances nucléaires
b) les dommages causés par des armes ou engins destinés à exploser par modification de structure du noyau de l'atome
c) les dommages causés par l'irradiation ou la contamination de radiations ionisantes résultant du fonctionnement normal de l'installation nucléaire

d) les dommages causés à l'installation nucléaire elle-même et aux biens se trouvant sur le site de cette installation.

Devant la difficulté pratique de pouvoir distinguer avec certitude les dommages nucléaires des dommages non nucléaires, les assureurs ont estimé devoir grouper dans une même assurance les risques nucléaires et les risques traditionnels.

Bien que l'exploitant soit tenu de disposer d'une garantie financière par accident nucléaire, les assureurs, en raison de l'importance du montant de la couverture exigée, n'accordent qu'une couverture par installation correspondant à un montant limité et unique pour une période déterminée et qui sera dégressif en fonction des sinistres survenus.

Cependant, l'exploitant d'une installation nucléaire n'est pas seulement responsable du dommage causé par un accident nucléaire survenu dans son installation nucléaire, sa responsabilité peut s'étendre également au dommage causé par un accident nucléaire mettant en jeu une matière nucléaire qui provient ou émane de cette installation ou encore qui est envoyée à cette installation. Nous abordons ici l'assurance de la responsabilité découlant du transport des matières nucléaires et les problèmes complexes qu'elle soulève.

Les Conventions instituent un régime unique de responsabilité de l'exploitant, tant pour les accidents survenant dans son installation que pour les accidents survenant en cours de transport. En fixant le principe d'une obligation d'assurance, les Conventions permettent tout aussi bien à l'exploitant de faire couvrir sa responsabilité pour les deux catégories d'accidents par un seul et même contrat que de souscrire un contrat distinct pour chaque catégorie. Les deux solutions sont utilisées, mais à l'heure actuelle, la majorité des assureurs de l'Europe continentale se prononcent en faveur de contrats distincts.

Ces contrats couvrent les conséquences pécuniaires de la responsabilité non contractuelle pouvant incomber à l'exploitant du fait d'un ou de plusieurs accidents nucléaires survenus en cours ou à l'occasion du transport garanti. Le montant de la garantie est fixé par transport et l'engagement des assureurs est limité à ce montant quel que soit le nombre des accidents qui surviennent pendant le transport.

En principe cependant, les Conventions ne s'appliquent pas aux accidents nucléaires survenus sur le territoire des Etats non contractants ni aux dommages subis sur ces territoires. Or si la Convention de Paris est actuellement en vigueur entre sept pays européens, la Convention de Vienne ne l'est toujours pas.

Il serait pourtant hautement souhaitable que les transports internationaux de matières nucléaires puissent être couverts par une seule assurance et un seul montant de garantie depuis le point de départ jusqu'à celui de l'arrivée. Or cette solution est actuellement impossible; en vertu de l'article VII de la Convention de Vienne, en effet, les fonds provenant d'une assurance sont exclusivement réservés à la réparation due en vertu de cette Convention. Cette situation impose de prévoir deux montants de garantie distincts, ce qui pose le problème de la capacité financière du marché des assurances. Bien souvent, l'exploitant devra prendre contractuellement à sa charge la responsabilité civile aux termes d'autres droits qui ne connaissent ni la responsabilité civile objective ni la canalisation. Les assureurs acceptent

en principe de couvrir cette responsabilité contractuelle, mais en se réservant le droit d'en décider dans chaque cas d'espèce.

Mais même dans le cadre du champ d'application des Conventions, d'autres questions importantes se posent. Nous nous limiterons au seul problème du dommage au moyen de transport. Face au problème de l'exclusion de la responsabilité civile pour les dommages au moyen de transport, de sa réinclusion, de l'absence totale de responsabilité pour de tels dommages ou de l'existence d'une responsabilité de droit commun en dehors des Conventions, il serait important d'harmoniser la politique des Etats adhérant aux Conventions de Paris et de Vienne.

J'ajouterai que dans le cas des transports maritimes l'application simultanée des Conventions nucléaires et des Conventions maritimes constitue souvent un obstacle aux transports par mer des substances nucléaires.

2. L'assurance des dommages matériels aux installations

Avant d'étudier les caractéristiques principales des polices couvrant les dégâts matériels aux installations, quelques remarques préliminaires s'imposent:

a) En vertu des Conventions de Paris et de Vienne, l'exploitant n'est pas responsable du dommage nucléaire causé à l'installation nucléaire elle-même ni aux biens qui se trouvent sur le site de cette installation et qui sont ou doivent être utilisés en rapport avec elle, cette installation ou ces biens pouvant être la propriété de l'exploitant de l'installation ou celle d'une autre personne. De plus l'exploitant ne peut être rendu responsable pour les dommages en question en dehors des Conventions et en outre, il semble que la responsabilité de toute autre personne soit également exclue.

b) Les programmes nucléaires des divers pays s'orientent vers une implantation massive de centrales nucléaires de grande puissance comportant un ou plusieurs réacteurs dont la puissance unitaire dépasse 500 à 600 MW(e). Une conséquence importante de cette évolution réside dans la valeur de plus en plus élevée de ces installations qui entraîne des besoins de couverture de l'ordre de cent millions de dollars et même plus. D'où un besoin de capacité de plus en plus élevé pour l'assurance des dommages matériels et l'effort considérable demandé aux assureurs nucléaires.

c) Pour des raisons analogues à celles développées pour l'assurance de responsabilité civile, les polices d'assurance des dommages matériels couvrent simultanément les risques conventionnels et les risques nucléaires.

La plupart des polices de dommages matériels émises par les assureurs nucléaires européens couvrent les dégâts causés aux biens assurés par les périls suivants:

- Incendie
- Explosion
- Foudre
- Chute d'avions
- Température excessive à l'intérieur du réacteur si l'accroissement de cette température présente un caractère accidentel

– Contamination radioactive, c'est-à-dire, les dégâts occasionnés aux biens assurés par un échappement accidentel de radioactivité et engendrant dans ces biens une radioactivité excessive rendant tout ou partie de ceux-ci impropres à l'exploitation et nécessitant soit leur abandon soit leur décontamination. La contamination radioactive n'endommage ni ne détruit une chose, mais elle peut la rendre inemployable, soit temporairement, soit définitivement. Les travaux de décontamination peuvent être longs, leurs frais peuvent être très élevés et même dépasser la valeur des biens qui devront être évacués et détruits ou isolés par des moyens de protection adéquats.

En plus des garanties ci-dessus, dites garanties de base, les contrats prévoient généralement sur la base de conventions spéciales des garanties complémentaires couvrant les frais ci-après:

- frais encourus en vue de prévenir ou de limiter les dommages généralement groupés sous l'appellation «frais de sauvetage»;
- frais consécutifs à un sinistre, à savoir frais de démolition, de déblaiement, d'évacuation, de décontamination et d'isolement.

Il est à préciser que les frais de décontamination assurés par les garanties complémentaires couvrent les frais nécessaires à la décontamination des biens se trouvant sur le site mais qui ne sont pas assurés par les garanties de base. Il peut notamment s'agir des frais entraînés par les mesures de décontamination du sol, des chemins, sentier, etc. Cette garantie est limitée à un premier risque.

Certaines polices garantissent d'autres dommages comme ceux consécutifs à la tempête, aux inondations, aux éboulements, aux chutes de pierres, aux glissements de terrains, etc. Il convient de remarquer qu'il n'existe pas une concordance parfaite entre les polices émises sur les différents marchés européens en ce qui concerne la couverture des risques conventionnels.

Pour des raisons de capacité, les assureurs européens ne sont pas à même de couvrir actuellement les dommages indirects résultant du chômage, des pertes de bénéfice, et des frais généraux permanents.

Signalons en outre que les polices comportent en général une clause d'abandon du recours que les assureurs pourraient être en droit d'exercer contre les tiers et notamment contre les fournisseurs, entrepreneurs et sous-traitants.

En ce qui concerne l'assurance des risques de bris de machines dans les installations nucléaires il n'est pas possible de développer ici les nombreux problèmes que soulève cette catégorie d'assurance qui mériterait à elle seule un très long exposé. Les experts des assureurs nucléaires européens étudient ces problèmes depuis plusieurs années. Bien que cette assurance soit considérée comme une affaire périlleuse et soumise à une complexité considérable du point de vue de la souscription pour l'assurance des équipements situés à l'intérieur de la cuve du réacteur (zone de radioactivité élevée), il semble que dans un avenir prochain une couverture limitée des risques bris de machines dans cette zone sera disponible sur le marché européen. Toutefois cette couverture ne serait accordée que sur la base d'un nombre important de conditions et de limitations qui seront précisées.

3. L'assurance des accidents du travail

En règle générale, et dans la plupart des pays les personnes exposées professionnellement aux dangers des radiations ionisantes, ne peuvent pas faire valoir leurs droits à la réparation des dommages corporels subis du fait d'un accident nucléaire survenu dans l'installation où elles exercent leur profession en vertu d'un contrat de travail, sur la base d'une action en responsabilité civile. Les préposés victimes d'un dommage bénéficient à ce titre des prestations prévues par le régime national ou public d'assurance médicale, de sécurité sociale ou de réparation des accidents du travail et maladies professionnelles. Mais dans quelques pays européens, en Belgique notamment, l'assurance des accidents du travail est conclue auprès d'entreprises d'assurances privées. Force est donc aux assureurs de ces pays d'accorder la couverture des dommages corporels dus aux effets des radiations ionisantes. Mais dans tous les pays des garanties complémentaires à celles accordées par le régime national en vigueur peuvent faire l'objet de demandes légitimes et les assureurs accordent ces couvertures dans la mesure de leurs capacités.

Après avoir rapidement relevé les principales caractéristiques des risques nucléaires et les dangers qui en découlent et brièvement défini les particularités essentielles des contrats émis pour couvrir ces risques, nous indiquerons dans la dernière partie de ce mémoire comment les assureurs ont conçu le fonctionnement pratique de ce genre d'assurance.

III. L'ORGANISATION DU MARCHE

Les montants extraordinairement élevés des garanties demandées liés aux caractéristiques propres des risques nucléaires et au nombre relativement limité des installations assurées a exigé une organisation particulière du marché de l'assurance nucléaire, basée sur une mobilisation rapide et coordonnée d'une capacité maximale et sur une étroite collaboration internationale.

La technique habituelle de fonctionnement de l'assurance pour les risques importants est bien connue: l'assureur désire avant tout équilibrer ses risques de telle façon que la survenance de sinistres ne mette pas en péril sa stabilité. A cet effet, il souscrit un risque soit seul, soit en coassurance, et réalise la répartition au-delà de sa capacité propre (son plein) par la voie de la réassurance.

Dans le cas du risque nucléaire, un tel système était pratiquement irréalisable, étant donné l'importance des sinistres, les possibilités de cumuls entre différentes garanties: responsabilité civile, dégâts matériels, accidents du travail etc. Ces cumuls auraient conduit les assureurs à se décharger au maximum sur leurs réassureurs, peu nombreux, qui auraient reçu les mêmes risques de très nombreux côtés et se seraient trouvés confrontés avec des montants dépassant largement leurs possibilités de couverture.

Dans ces conditions, dans chaque pays, les assureurs se sont groupés en «pool» ou «syndicat». Pour chacun des risques pris en considération, chaque membre du pool a fixé le montant maximal qu'il estime pouvoir supporter seul en cas de sinistre et pour une installation déterminée. Ce montant constitue son plein propre sans aucune possibilité de réassurance

individuelle. L'ensemble des pleins individuels représente la capacité du pool pour une catégorie de risques (responsabilité civile, dégâts matériels, accidents du travail).

Ces pleins propres de souscription – et il y a là un véritable paradoxe – sont souvent plus élevés que les pleins de conservation des compagnies d'assurance, dans les risques bien connus, mais l'attitude de l'assureur s'explique à la fois par son souci de l'intérêt général et par son désir de collaborer au développement de l'industrie nucléaire. Ces pleins propres ont été déterminés par chaque compagnie en fonction de sa capacité financière. Pour un pool déterminé, l'ensemble des pleins fixés par pays et par catégorie de risques constitue le tableau des pleins du pool.

Les règles de fonctionnement des pools furent énoncées dans des statuts dont la nature diffère suivant les pays. Les membres du pool ne sont pas solidairement responsables vis-à-vis des tiers. Ils s'engagent généralement, à ne pas assurer seuls les installations nucléaires, mais à le faire uniquement dans le cadre du pool.

Les pools nationaux d'assurances des risques nucléaires

C'est ainsi que les pools ont été créés dans la plupart des pays européens: les pools français, britannique, allemand, danois, finlandais, suisse, belge, norvégien et italien suivront en 1957 l'exemple du pool suédois qui a été constitué le 10 octobre 1956 comme premier pool européen. Suivront en 1958 le pool néerlandais, en 1959 le pool autrichien, en 1962 le pool turc, en 1966 le pool portugais et en 1967 le pool espagnol. Notons également l'existence de pools atomiques au Canada, au Japon, en Afrique du Sud et aux Etats-Unis d'Amérique.

Dans le secteur des gros risques, les pools sont une nécessité financière pour:

a) mobiliser la capacité maximale de souscription sur le plan national
b) conclure pour compte commun auprès des autres pools la réassurance «quote-part» des affaires pour lesquelles la capacité totale nationale est insuffisante
c) accepter pour compte commun des quote-parts en réassurance des risques souscrits auprès des pools étrangers.

Comme chaque membre d'un pool a pris l'engagement de ne pas souscrire des risques nucléaires en dehors du pool, les réassureurs des traités ordinaires sont à l'abri de tout cumul éventuel.

Cette organisation qui fonctionne depuis une quinzaine d'années a permis aux assureurs nucléaires de couvrir les risques proposés dans les différents pays européens. Mais cette organisation a imposé une collaboration étroite entre tous les marchés européens. Participant à la souscription des mêmes risques, chacun devait connaître les conditions de ses engagements. Il a fallu au préalable, se mettre d'accord sur une série de points et définir un ensemble de règles communes de fonctionnement.

L'organisation sur le plan européen

Sur le plan européen, on constate que deux groupes d'organes s'occupent des questions d'assurance nucléaire:

A. Au sein du Comité Européen des Assurances, nous trouvons:

a) La Commission permanente du risque atomique, créée en 1955 et dont la mission est d'étudier les problèmes que pose l'assurance des risques nucléaires, de rassembler et de diffuser toute documentation ou information relative à cette assurance, d'en favoriser le développement et de représenter les assureurs nucléaires auprès des organisations internationales. La CPRA groupe les représentants des Associations nationales d'assurance, membres du Comité européen des assurances. Afin de lui permettre d'effectuer ses travaux, la Commission permanente du risque atomique dispose du Centre d'études du risque atomique ayant une mission d'étude, de documentation, d'information et de représentation.

b) En avril 1957, les six associations nationales des pays de la Communauté européenne ont mis sur pied le Groupe de travail Euratom dont le but est d'étudier en commun l'assurance des risques atomiques dans le cadre des exigences du traité de Rome instituant la Communauté européenne de l'énergie atomique. En créant leur groupe de travail dans le cadre du Comité européen des assurances, les six associations nationales ont voulu par là marquer expressément leur intention de tenir au courant de leurs travaux les autres associations nationales qui ne sont pas concernées directement par le traité de l'Euratom mais avec lesquelles elles entendent poursuivre, en étroite collaboration, l'étude de l'ensemble des problèmes afférents à l'énergie atomique.

B. Les conférences internationales sur l'assurance des risques atomiques, dites Conférences de Londres, organisées sur l'initiative du pool britannique groupent les représentants des pools européens d'assurances nucléaires auxquels se sont adjoints le pool japonais et des délégués des Etats-Unis d'Amérique et du Canada. Ces conférences ont, entre autres, pour but de coordonner l'action des pools dans l'élaboration des conditions des polices, tarifs etc. et dans l'établissement des principes de fonctionnement.

En résumé et si l'on veut essayer de schématiser l'organisation sur le plan de la coordination des activités des assureurs nucléaires sur le plan européen, on pourrait considérer que la Commission permanente du risque atomique du Comité européen des assurances s'occupe de tous les problèmes importants et généraux qui intéressent la profession, tandis que les Conférences de Londres s'occupent de questions plus pratiques et notamment celles relatives à l'établissement et à la conclusion de contrats d'assurance.

Tous les problèmes ne sont certes pas résolus, des difficultés subsistent. Qu'il suffise de rappeler que la Convention de Paris n'est actuellement d'application que dans sept pays européens et que la Convention de Vienne n'a pas encore été ratifiée par un nombre suffisant de pays pour qu'elle puisse entrer en vigueur. Cette situation a pour conséquence que, par exemple, pour les transports internationaux de substances nucléaires, le droit applicable n'est pas toujours connu avec précision et l'assurance peut se trouver ainsi en porte-à-faux. Je ne mentionnerai pas les transports maritimes où des solutions sont actuellement à l'étude au sein des organisations internationales compétentes. Des problèmes de capacité

se posent également pour l'assurance des dommages matériels des grandes installations, l'assurance du bris de machines n'en est qu'à ses débuts.

Néanmoins, qu'il soit permis de souligner que jamais les assureurs n'ont réalisé un tel effort de collaboration, de concertation et d'imagination pour résoudre le problème nouveau qui se posait à eux. Ce mémoire a peut-être su montrer dans quelle mesure ils ont réussi à trouver des solutions concrètes et satisfaisantes.

SECTION IV

CONVENTIONS, AGREEMENTS AND LEGISLATION ON NUCLEAR SHIPS

LEGAL ARRANGEMENTS FOR VISITS OF NUCLEAR SHIPS

W. BOULANGER
Bundesministerium für Bildung und Wissenschaft,
Bonn, Federal Republic of Germany

I. Since I spoke on regulations concerning nuclear ships in the IAEA Training Course on Nuclear Law in April 1968 [1], the factual situation in regard to civilian nuclear ships has somewhat changed. At that time the only non-military nuclear ships in operation were the USSR icebreaker 'Lenin' and the United States N.S. 'Savannah'. They were joined in the meantime by the Federal Republic of Germany's N.S. 'Otto Hahn', a bulk carrier of 16 870 tons. She was commissioned in 1968 and has completed successful trial runs in the North and South Atlantic in 1969. But only a short while ago has she been for the first time in foreign ports, taking a cargo of phosphate to Morocco [2].

According to recent information [3], the 'Lenin' was out of operation the past two winters. Construction of two second-generation nuclear-powered icebreakers of the 'Arktika' class is scheduled for the next five-year plan, which runs from 1971 - 1975. In the USA plans are discussed to lay the 'Savannah' up in 1971 or to convert her into an oceanographic research ship [4].

In Italy, the naval logistics-support ship named 'Enrico Fermi' is scheduled to start service in 1975. The fuel (5000 kg of uranium enriched to 4.7%) will be supplied by France [5]. I have not found any new information on the two nuclear merchant ships reported to be under construction in the People's Republic of China [6]. Japan has launched the oceanographic research ship 'Mutsu' in 1969; she is scheduled for operation in 1972.

II. Experience in a number of countries shows that it is never too early to prepare the legal ground for visits of nuclear ships to national harbours. For this reason it was considered desirable to include this topic in the program of the present seminar. I propose to deal with it from the point of view of the lawyer or administrator who has to advise his Government or National Atomic Energy Commission on preparations in the legal field for the visit of a nuclear ship to a national port.

Firstly, he would think of the International Convention for the Safety of Life at Sea (SOLAS), London, 1960, which contains in its Chapter VIII twelve regulations on the construction and operation of nuclear ships. In addition, Annex C to the Final Act of the London SOLAS Conference of 1960 contains "Recommendations applicable to Nuclear Ships" which are aimed at ensuring the utmost technical safety of the vessel. The SOLAS Convention is in force for the countries which are at present operating or constructing nuclear ships and most of the countries in this area[1], with the exception of the People's Republic of China.

[1] Asia and the Far East. See the Annex.

Secondly, the International Convention on the Liability of Operators of Nuclear Ships, adopted by the Diplomatic Conference on Maritime Law in Brussels on 25 May 1962, would come to mind. It has not yet entered into force. Its provisions were, however, included to some extent by reference in national laws[2] or in bilateral agreements relating to nuclear ships[3].

Thirdly, one would look for a precedent in the 'Savannah' agreements concluded by the United States Government with the Governments of about a dozen host countries (see Annex of Ref. [1]). Similar bilateral agreements are being negotiated for the 'Otto Hahn' between the Federal Republic of Germany and several prospective host countries.

Further, one might wish to study national laws specifically regulating problems of nuclear ships[4] or general Atomic Energy Acts whose language is (or has been made by amendment) broad enough to make them applicable also to nuclear ships[5].

III. Having carefully looked at the aforementioned legal material and, also, at his own national Atomic Energy Act, the provident lawyer or administrator would consider what he can request from the foreign nuclear ship intending to visit a national port or from the Government of her flag State, and what he himself may have to prepare in terms of laws, regulations, or agreements.

The nuclear ship will have to carry a valid "Nuclear Cargo Ship Safety Certificate" or a "Nuclear Passenger Ship Safety Certificate" which states that "the ship, being a nuclear ship, complied with all requirements of Chapter VIII of the (SOLAS) Convention and conformed to the Safety Assessment approved for the ship". (Chapter VIII, Regulation 10 of SOLAS Convention.)

In order to have the safety of the ship evaluated by or for national authorities, the Government of the flag State will be requested to make the Safety Assessment of the ship available sufficiently in advance of the intended visit. If the national Atomic Energy Act expressly or implicitly requires a licence for the operation of the ship's nuclear reactor in territorial waters and ports, the Safety Assessment together with the Operating Manual and, if necessary, additional technical information may serve as basis for national licensing procedures. (Chapter VIII, Regulations 7, 8.)

In order to provide compensation for any damage which might result from a nuclear incident connected with the ship, the latter will be required to have adequate third party liability insurance coverage which should also be valid abroad. The insurance cover might be replaced by another financial guaranty or might be supplemented by a guaranty or indemnification furnished by the flag State. Both the extent of liability (its possible channelling and limitation) and the coverage by insurance or Government

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[2] Sweden: Law of 17 May 1963 (No. 158);
Portugal: Executive order of 5 June 1962;
France: Act of 12 Nov. 1965 as amended by Act of 29 Nov. 1968;
The Netherlands are preparing a bill on liability for nuclear ships.

[3] See e.g. the Treaty between the Federal Republic of Germany and the Netherlands on the Use of Netherlands Territorial Waters and Ports by the NS "Otto Hahn". See below Footnote 6.

[4] See Footnote 2.

[5] E.g. the Atomic Energy Act of 1959 of the Federal Republic of Germany, as amended.

guaranty will depend on the existence of appropriate national law or a bilateral agreement regulating the subject since the Brussels Convention is not in effect between the parties.

There may be other obligations which one might wish the visiting ship or the Government of her flag State to undertake, such as prior announcement of travel routes, reporting of special occurrences in the operation of the ship's reactor, prohibition of the discharge of radioactive products or wastes, access to the ship for other purposes than for inspection as provided in the SOLAS Convention etc. In so far as these obligations are not contained in the SOLAS Convention or the national Atomic Energy Act or any other Convention or Act, they should be included in a bilateral agreement.

If the nuclear ship is operated by the foreign Government, the latter's submission to the jurisdiction of the host State (waiver of sovereign immunity) might also be desirable. If the maximum amount of liability for nuclear damage established by national law, convention or agreement exceeds the value of the ship and cargo, provision should be made for a waiver of the limitation of shipowner's liability permissible under international maritime conventions.

IV. In the preceding paragraphs we have looked at the legal material available and the use which a national lawyer advising his Government might make of it. It might be useful also to look at the practical experience gained in this respect with the latest nuclear ship, 'Otto Hahn'. The Federal Republic of Germany, the flag State, has initiated negotiations on the lines of the 'Savannah' agreements with a number of prospective host countries in March 1968. Assuming that the ship would first be used for carrying iron ore from Narvik to Dutch ports, the Governments of Norway and the Netherlands were the first ones to be approached. An agreement was reached with the Netherlands on 28 October 1968[6] and ratified by the German Bundestag; its ratification by the Dutch Parliament is still pending. The negotiations with the Norwegian Government have not yet been completed. Other countries with whom negotiations have started are Argentina, Canada, Iran, Liberia, Portugal and Venezuela.

It was generally expected that, since a dozen 'Savannah' agreements had been in force for several years, it would be easy to reach similar bilateral agreements for the 'Otto Hahn' quickly. This was not the case, however, and the long delays involved in negotiating such agreements caused wide speculations in the European press. Headlines such as "Ship without Port" or "The Nuclear Flying Dutchman" appeared in newspapers of various European countries above articles indicating that, for whatever reasons, the nuclear ship did not seem to be welcome in ports outside her home country. The news that the 'Otto Hahn' did visit Casablanca in February 1970 and took a cargo of phosphate in the nearby Port of Safi came as a big surprise to interested circles. Contrary to information given by some news bulletins [7] no formal bilateral agreement preceded this visit: a simple request through diplomatic channel had received a positive reply from the Government of Morocco [8]. Even if this may not yet become common practice, such a flexible arrangement should in my view be considered as an encouraging step in the right direction.

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[6] English version in ENEA Nuclear Law Bulletin No. 3, April 1969, p. 50.

The enumeration of legal requirements which might be considered for inclusion in bilateral arrangements or national legislation must by no means be regarded as exhaustive. In specific cases it may seem necessary or desirable to regulate additional subjects. The final decision in this respect largely depends on a given national law and local conditions.

Two practical problems should be briefly mentioned: the evaluation of harbours for visits by nuclear ships and the evaluation of the Safety Assessment of such ships by or for national authorities of the Host Country. To assist Member States in the solution of the first problem, the IAEA has issued in its Safety Series a report prepared by a panel of experts on "Safety Considerations in the Use of Ports and Approaches by Nuclear Merchant Ships" [9]. For the evaluation of Safety Assessments of nuclear ships, a Member State might consider it useful to request the Agency's advisory services. Since so-called "Siting Missions" and other experts' services in nuclear safety have been provided by the IAEA at the request of Member States, the Agency could certainly also be of help to national authorities in the evaluation of the safety aspects of nuclear ships.

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[2] Nucleonics Week (19 Feb. 1970) 7.
[3] Ibid. (12 Feb. 1970) 8.
[4] Ibid. (5 Feb. 1970) B.4.
[5] Ibid. (5 Feb. 1970) 6.
[6] LI YANG, in Energie Nucléaire 9 (1967) 401.
[7] Nucleonics Week (19 Feb. 1970) 7.
[8] Atominformationen des Deutschen Atomforums, No. 2 (1970) 24.
[9] IAEA/IMCO, Safety Considerations in the Use of Ports and Approaches by Nuclear Merchant Ships, Safety Series No. 27, IAEA, Vienna (1968).

ANNEX

SOLAS CONVENTION 1960

Parties	Entry into force
Australia	20 March 1968
Burma	12 October 1965
Hong Kong (extension by the United Kingdom)	7 December 1965
India	28 May 1966
Indonesia	26 January 1967
Japan	26 May 1965
Korea, Republic of	26 May 1965
Malaysia	16 November 1965
Maldives	29 April 1968
Nauru	19 April 1970
New Zealand	14 April 1966
Pakistan	24 May 1966
Philippines	11 November 1965
Singapore	12 May 1969
Taiwan	26 May 1965
Viet-Nam, Republic of	26 May 1965

BASIC FEATURES OF NATIONAL LEGISLATION APPLICABLE TO NUCLEAR SHIPS

P. STROHL
European Nuclear Energy Agency,
Paris

INTRODUCTION

Three main problems can be identified with respect to the building and operation of a nuclear ship:

(i) Requirements concerning safety in the design and construction of the ship and, in particular, its reactor installation;
(ii) Requirements concerning safety in the operation of the ship, in particular during visits in harbours and territorial waters of foreign countries;
(iii) Conditions of liability and compensation for nuclear damage caused by the ship, in particular in harbours and territorial waters of foreign countries.

All these problems are dealt with in a detailed manner by international Conventions (1960 SOLAS Convention chapter VIII, and 1962 Brussels Convention) and bilateral Agreements ('Savannah' and 'Otto Hahn' Agreements).

The primary role of national legislation in this field is therefore to implement the provisions of these Conventions and Agreements and to take steps for their application. The 1962 Brussels Convention not being in force, national legislation may establish rules on the liability of the operator of a nuclear ship, but until now this has been the main object of the bilateral Agreements.

In addition, it should be underlined that the relevant rules in national and international maritime law have to be taken into consideration. Any country is competent for regulating and controlling safety of navigation in its territorial waters. But according to international law there is a right of innocent passage[1] in territorial waters (1958 Geneva Convention on territorial waters and contiguous areas Arts. 14 to 17), and access and use of ports shall be authorized without discrimination (1923 Geneva Convention on the International Regime of Ports).

The 1962 Brussels Convention on the liability of the operators of nuclear ships does not affect the right of a country under international law to deny access to its territorial waters and harbours to nuclear ships of another country (Art. XVII). A refusal could evidently be based on safety considerations.

[1] 1958 Geneva Convention on territorial waters and contiguous areas (Art. 14 - 4). Passage is not considered as innocent, in particular when it imperils the safety of the coastal State.

Most of the rules on navigation, competence of port authorities and other maritime authorities which are applicable to merchant ships will also be applied to ships propelled by nuclear energy.

The role played by national legislation specific to nuclear ships, in addition to the rules referred to in paragraphs 2 and 3 above will therefore be rather modest. In fact, only a few internal laws are presently devoted to nuclear ships because of the importance of international sources and also because only two such ships are put into operation.

SAFETY OF THE SHIP

The SOLAS Convention contains obligations concerning the licensing of nuclear ships, safety assessments, surveys and issuing of safety certificates by the country in which the ship is registered.

In national legislation, a nuclear ship may be considered similar to any other nuclear installation for the purpose of licensing. This seems to be the case in Japan (Regulation law, December 1957), not only for ships registered in that country but also for visiting foreign ships which have to apply for a licence by using the same procedure as for Japanese reactors[2]. The German Act also includes 'non-stationary installations' in the category of nuclear installations subjected to licensing under the 1959 Atomic Energy Act (Sections 7-4), except that the procedure for public announcement and public inspection of the records may be dispensed with.

In the United States it seems that reactors for a privately-owned nuclear ship would be included in the definition of production and utilization facilities for which a licence from the USAEC is required under Section 101 of the Atomic Energy Act.

In Spain, chapter XI of the Act on nuclear third party liability (29 April 1964) deals with the regime for nuclear ships and contains provisions for licensing and safety on the same lines as in the SOLAS Convention. As regards nuclear ships registered in Spain, the Junta de Energía Nuclear shall advise the Authority competent for granting the licence, but this authority might well be the same as for conventional merchant ships (Section 78).

In France, nuclear ships are not covered, for the time being, by the regulation concerning licensing of nuclear installations.

SAFETY DURING NAVIGATION

International Conventions and bilateral Agreements recognize the rights and competence of the receiving country with respect to inspection of the ship, communication of the safety assessment, authorization to be given prior to access, measures to be taken in case of an incident, etc.

Generally speaking, the maritime authorities will exercise this competence but special provisions could be included in the nuclear legislation.

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[2] However, the condition of the licence concerning conformity with the program for the development of nuclear energy is replaced by a condition on financial protection.

IAEA and IMCO have jointly published a guide for governments and port authorities on the safety procedures and precautions to be applied when nuclear ships use ports [1].

The Spanish Act referred to above provides that maritime authorities may refuse access to ports when the required safety precautions have not been taken, and have the right to inspect nuclear ships in territorial waters; the Junta de Energía Nuclear will co-operate to this effect with the maritime authorities (Sections 73 to 75). The stay of nuclear ships in ports is authorized on prior advice of the Junta and the regulations on protection against radiation concerning the 'controlled area' are then applicable.

LIABILITY AND FINANCIAL PROTECTION WITH RESPECT TO DAMAGE CAUSED BY NUCLEAR SHIPS

The problem concerning the operator's liability and the obligation to provide financial security is fully covered by the 1962 Brussels Convention and the bilateral Agreements.

However, there are corresponding stipulations in some national laws. In the United States, the Atomic Energy Commission has been authorized (Section 170(1) of the Act) to enter into an agreement for indemnification with respect to the N.S. 'Savannah'.

The French Act of 12 November 1965 (Nuclear Law Bulletin, No.3) laid down rules on the liability of operators of nuclear ships, similar to the stipulations of the 1962 Brussels Convention and this Act applies both to ships registered in France and to visiting ships. The maximum liability and the amount of financial guarantee is fixed at about 100 million dollars, but for foreign ships this liability could be higher if so provided by the legislation of the country of registration, except if otherwise agreed with the Government of that country. Under a Decree of 19 June 1969, access of nuclear ships to French territorial waters may be refused in the absence of the minimum guarantee required by the law. Application for an authorization should be made to the Ministry of Foreign Affairs.

Spanish legislation on nuclear third party liability is applicable to nuclear ships, Section 71(c), and requires an appropriate guarantee from the Government of the flag state up to the amount fixed by international Conventions or by a bilateral Agreement with Spain.

The Danish Act of 1963 on compensation for damage caused by the operation of nuclear ships refers back to the nuclear third party liability Act, except as otherwise provided (Section 3). It is required, for example, that the amount of insurance to be taken out by the operator shall be increased by a fifth, in the case of a nuclear ship.

The Belgian Act of 9 August 1963 on the liability of the operator of nuclear ships establishes general provisions with respect to that liability, comparable to the rules of the Brussels Convention and sets the maximum amount of liability at 100 million dollars.

REFERENCE

[1] IAEA/IMCO, Safety Considerations in the Use of Ports and Approaches by Nuclear Merchant Ships, Safety Series No.27, IAEA, Vienna (1968).

BASIC FEATURES OF BILATERAL AGREEMENTS REGULATING VISITS OF NUCLEAR SHIPS

W. BOULANGER
Bundesministerium für Bildung und Wissenschaft,
Bonn, Federal Republic of Germany

I. In my first paper on the law of nuclear ships, given at the training course held by the International Atomic Energy Agency in Vienna in April 1968[1], I gave some basic information on the International Convention for the Safety of Life at Sea (SOLAS), London, 1960, the Convention on the Liability of Operators of Nuclear Ships, Brussels, 1962, and the bilateral agreements concluded between the Government of the United States of America and more than a dozen other Governments for visits by the U.S. nuclear ship 'Savannah' to their respective territorial waters and ports. In my second paper presented at the Bangkok Seminar on the Development of Nuclear Law in April 1970[2], I looked at the problem from the point of view of the lawyer or administrator who has to advise his Government on preparations to be made in the legal field for visits by nuclear ships. In other words, I explained where to look for legal material which might be worthwhile to be considered as source material for national law. I also described briefly the experience of the Federal Republic of Germany in negotiating bilateral agreements for their N.S. 'Otto Hahn', an experience not too encouraging at that time. In the present paper I would like to recall briefly some basic information on the SOLAS and Brussels Conventions. Fortunately, I am also in a position to report on new developments which have led to visits of nuclear ships to a number of ports without previous conclusion of formal agreements between the Governments concerned, and also of good aspects for the Brussels Convention to enter into force in the not too distant future.

II. a) When chapter VIII of the SOLAS Convention was drafted in 1960 in the Nuclear Ships Committee of the International Conference on the Safety of Life at Sea in London, the drafters aimed at regulations and recommendations which would be strict enough to ensure the utmost technical safety of nuclear ships, but which would also be broad enough not to hinder technical progress in this field. The proven general regulations of the Convention which apply to conventional ships are also valid for nuclear ships. No exemption from compliance with any regulation of the Convention is permitted for them. The design, construction, and standards of inspection and assembly of the reactor installation of the ship are subject to the approval of the Administration (Government). Of main importance is the "Safety Assessment", which must be prepared to permit evaluation of the nuclear power plant and the safety of the ship in order to ensure that there are no unreasonable radiation or other hazards. The safety assessment should be approved by the Administration, and if a nuclear ship intends to visit another country the assessment should be made available sufficiently in advance to

[1] See Bibliography, first item.
[2] See Bibliography, second item.

the host Government. The latter has thus the opportunity to evaluate the safety of the ship before it gives the permission for a visit to its national territorial waters and ports. Before a ship enters such waters and ports, it may be submitted to a special control directed towards verifying that there is on board a valid "Nuclear Ship Safety Certificate" and that there are no unreasonable radiation or other hazards. If there should be an accident likely to lead to an environmental hazard, the master of the ship must immediately inform his own administration and the competent authority of the country in whose waters the ship may be or which it approaches in a damaged condition. Thus the SOLAS Convention, in its chapter VIII and in Annex C to the Final Act of the Conference ("Recommendations applicable to nuclear ships"), regulates the nuclear safety aspects in a manner which appears highly satisfactory.

b) The Convention on Liability of Operators of Nuclear Ships was adopted by a Diplomatic Conference on Maritime Law in Brussels on 25 May 1962. It has not yet entered into force because no State operating a nuclear ship ("licensing State") has yet ratified it[3]. The Convention follows the pattern established by the Liability Conventions for land-based nuclear installations in its basic principles, namely:

- objective and sole liability of the operator for nuclear damage caused by a nuclear incident involving the nuclear fuel of, or radioactive products or waste produced in, his ship (Article III);
- limitation of the operator's liability in amount and time (Articles III, V);
- obligation of the operator to cover his liability by insurance or other financial security (Article III, 2);
- obligation of the "licensing State", that is the State under whose flag the ship is authorized to be operated (Article I, 2), to ensure payment of claims for compensation for nuclear damage within the prescribed limit to the extent that the insurance or other financial security is inadequate (Article III, 2).

The limit of liability was set at 1500 million gold francs (roughly US$100 million). The sums provided by insurance, other financial security or by State indemnification must be exclusively available for compensation due under the Convention. An action for compensation can be brought either before the courts of the licensing State or before the courts of the contracting States or States in whose territory nuclear damage has been sustained. A final judgement entered by a court having jurisdiction under the Convention shall be recognized in the territory of any other contracting State, except where the judgement was obtained by fraud or where the operator was not given a fair opportunity to present his case. This execution clause together with the obligation of the operator to cover his liability by insurance or other financial security and the obligation of the licensing State to ensure payment of claims for compensation seem to be the outstanding advantages of this Convention.

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[3] Article XXIV. So far only Portugal has ratified, Madagascar and the Republic of Zaire have acceded to the Convention.

c) The 'Savannah' Agreements concluded by the Government of the United States with more than a dozen countries contain arrangements on questions of liability, radiation protection, safety assessment and, as appropriate, national licences. They differ in details according to requirements of national law or local conditions. It could be said that they combine the basic elements of the SOLAS Convention and the Brussels Convention in a form adjusted to national and local conditions. Thus, they have proven very useful in practice. When, after an initial stage of operation for trial, demonstration, and good will purposes the 'Savannah' was transferred from operation by a Government Agent (American Export Isbrandtsen Lines) to a private firm (FAST, First Atomic Ship Transport), the indemnification originally extended by the US Atomic Energy Commission to the Maritime Administration was transferred to FAST. The bilateral agreements concluded with some Governments had accordingly to be adapted by exchange of letters.

d) For some countries the conclusion of 'Savannah' Agreements made promulgation of news laws or regulations or amendments to existing laws necessary. In others, such laws or regulations were enacted in order to provide in a general way for future visits by nuclear ships[4].

III. a) The experience of the US Government with their bilateral agreements concluded for the 'Savannah' appears to have been satisfactory. Even if, in some cases, negotiations for such agreements may have taken considerable time, the commercial operation of the ship was later conducted without major legal difficulties[5]. For Libya and Tunisia the visits of the 'Savannah' could even be arranged without conclusion of formal agreements.

b) When the Government of the Federal Republic of Germany began to prepare for international voyages of N.S. 'Otto Hahn', a bulk carrier, the idea was first to use the ship for carrying ore from Norway to ports in the Netherlands and Belgium. The first proposal for an agreement submitted to the Government of the Netherlands followed closely the pattern set by the 'Savannah' Agreements. The Dutch Government, however, proposed to regulate the problems of third party liability by including into the agreement the relevant provisions of the Brussels Convention on the Liability of Operators of Nuclear Ships. This was accepted by the German Federal Government and the formal agreement was signed on 28 October 1968. It was ratified on 4 June 1969 by the German Bundestag[6]. Ratification by the two houses of the Dutch Parliament is taking much longer; according to assurances received from competent Government officials this is solely due to delays in parliamentary procedure. Draft agreements following the 'Dutch' pattern have also been submitted by the German Federal Government to Norway, Portugal and Liberia[7].

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[4] Sweden, Portugal, Spain, Federal Republic of Germany, Japan, France, South Africa.

[5] See Annex I and Bibliography (Karr and Loosch).

[6] Bundesgesetzblatt (BGBL) II, No.35 (1969) 1211.

[7] The agreement with Liberia was signed on 27 May 1970. The agreement with Portugal is expected to be signed shortly. (Note by the Secretariat: The agreement with the Netherlands entered into force on 18 March 1971. The agreement with Argentina was initialed on 23 March 1971 in Buenos Aires, subject to ratification.)

On close consideration, however, it appeared to lawyers in certain German Federal Ministries that including the liability provisions of the Brussels Convention into a growing number of bilateral agreements would amount almost to piecemeal ratification of that Convention. For reasons of principle – shying away from 'legal channelling' of liability – this appeared undesirable. Therefore a new model bilateral agreement was developed which, in regard to liability, referred to the national law of the host State. This certainly looked attractive to potential host governments. It proved burdensome in many cases, however, because it was not always easy to establish what exactly this national law of some far-away countries might be, which might also belong to different legal systems. Nevertheless, there was similarity in one vital aspect, namely that the operator's liability was limited to 400 million Deutsche Mark – an amount roughly equivalent to the 1500 million gold francs of the Brussels Convention.

While negotiations of more than a dozen bilateral agreements had already been initiated, a surprising breakthrough occurred in February 1970. The Government of Morocco, upon an exchange of diplomatic notes, permitted the use of Moroccan ports by N.S. 'Otto Hahn'. The ship thereupon visited Casablanca and Safi, from where it took its first cargo of phosphate. These visits were followed by others in the following months. Iran was the second country to admit the 'Otto Hahn' without any formal bilateral agreement in April/May 1970. Visits to Senegal (Dakar) and Togo followed. In addition, Mauretania, Sierra Leone, Ghana and Tunisia have also given their agreement in principle for visits by N.S. 'Otto Hahn'. In all these cases there was an exchange of notes. Details as to berth, radiation monitoring, tug assistance etc. were arranged between a representative of the operator and local authorities, to whom the safety assessment and other information material had been made available.

A new approach became visible when the competent German Federal Ministries recently agreed that the Federal Republic should ratify the Brussels Convention on the Liability of Operators of Nuclear Ships. This would, in their view, greatly facilitate the whole matter. Portugal has already ratified the Convention, which was also accepted by Madagaskar and the Democratic Republic of the Congo. If and when the Federal Republic of Germany, being a licensing State, ratifies the Convention, it will enter into force according to its Article XXIV. The law required for ratification is at present being prepared.

It is to be hoped that other countries will then also ratify the Convention. In fact, the Government of the Netherlands has already submitted a draft law to that effect to Parliament, and in Belgium a law to include the provisions of the Brussels Convention into national law is under preparation.

With the entry into force of this Convention for what would, under present conditions, be potential parties to a bilateral 'Otto-Hahn' Agreement, the main problems will be solved: the problems of safety of the ship and its nuclear plant by the SOLAS Convention, the liability problems by the Brussels Convention. What remains will be minor problems of a local nature, which can be arranged between the operator of the ship and nationally or locally competent authorities. Nuclear ships will thereby get much closer to

becoming normal ships, which are acceptable everywhere. This is, one should think, the proper approach.

IV. Since most maritime countries are parties to the SOLAS Convention, ratification of the Brussels Convention by a sufficient number of countries would also make the promulgation of special national laws or regulations for nuclear ships largely unnecessary. If, however, they should be considered indispensable for constitutional or other national legal reasons, such laws and regulations should be kept in strict conformity with the two Conventions. Otherwise, the country would become an 'outsider' and difficult for nuclear ships to visit. Simple but forceful reasons speak for an early ratification of the Brussels Convention. In addition to the countries already mentioned, Japan seems to be very interested: for that country, widespread adoption of the Brussels Convention would be advantageous for the future operation of its N.S. 'Mutsu'. The same holds true for the Italian N.S. 'Enrico Fermi' and, according to some information, the United States would also seem to be interested in such course of action. The entry into force of the Convention would open the path to a revision conference at which nuclear warships could be excluded from the Convention, thus removing at least one barrier for adherence to it by the USA and the USSR.

Until such time at which both the SOLAS and the Brussels Conventions are in force for a sufficient number of countries, it appears advisable that national authorities should refrain from taking any steps which might raise legal problems for nuclear ships to visit their national ports. Experience has shown that it is burdensome to prepare, negotiate and conclude formal bilateral agreements which may require ratification in one or both countries. It appears to be much easier and just as effective to make administrative arrangements instead. The most formal act could then be an exchange of diplomatic notes. In many cases informal arrangements with the operator of the ship would help to expedite the conclusion of the matter.

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ANNEX I

FOREIGN COUNTRIES AND PORTS VISITED BY N.S. 'SAVANNAH'

Belgium	Antwerp
British Crown Colony	Hong Kong*
Canal Zone	Balboa*
	Panama Canal*
Cyprus	Famagusta*
Denmark	Copenhagen
England	Southampton
France	Le Havre*
	Marseilles*
Germany	Bremerhaven*
	Hamburg*
Greece	Piraeus*
Ireland	Dublin
Israel	Ashdod*
	Haifa*

* Visited during experimental commercial operation, August 1965 - January 1970.

Italy	Genoa*
	Leghorn*
	Naples*
	Trieste*
	Venice*
Korea	Inchon*
	Pusan*
Lebanon	Beirut*
Libya	Tripoli*
Netherlands	Rotterdam*
Norway	Oslo
Okinawa	Naha*
Philippines	Manila*
Portugal	Lisbon*
Spain	Barcelona*
	Bilbao*
	Cadiz*
	Alicante*
	Cartagena*
	Gijon*
	Rota*
	Valencia*
Sweden	Hälsingborg
	Malmö
Taiwan	Kaohsiung*
	Keelung*
Tunisia	Tunis*
Yugoslavia	Rijeka*
	Split*

ANNEX II

FOREIGN COUNTRIES AND PORTS VISITED BY N.S. 'OTTO HAHN'

Morocco	Casablanca	23 - 25 Feb. 1970
	Safi	26 - 27 Feb. 1970
	Safi	13 - 14 Mar. 1970
Iran	Bandar Abbas	30 Apr. - 7 May 1970
Morocco	Safi	1 - 3 June 1970
	Casablanca	4 - 5 Aug. 1970
	Casablanca	21 - 22 Aug. 1970
Senegal	Dakar	9 - 11 Sep. 1970
Togo	Togo-Port	7 - 9 Oct. 1970
	Kpéme	9 - 10 Oct. 1970

Morocco	Casablanca	31 Oct. - 1 Nov. 1970
	Casablanca	17 - 18 Nov. 1970

Other countries which have given permission for use of their ports:

Ghana
Mauritania
Sierra Leone
Tunisia

SECTION V

NUCLEAR LEGISLATION IN ASIA AND THE FAR EAST

NUCLEAR LEGISLATION IN JAPAN

N. MAEDA
Policy Division, Atomic Energy Bureau,
Science and Technology Agency,
Tokyo,
Japan

INTRODUCTION

During the last fifteen years since the commencement of research, development and utilization of atomic energy in Japan, many laws have been enacted. Table I gives an outline of the present status of nuclear legislation in Japan and Table II shows the development of such legislation.

As is shown in Table II, there has been no enactment for several years and none is expected, at least in the near future. However, recent developments in nuclear activities in Japan would appear to urge an improvement of present legislation.

I. THE ATOMIC ENERGY BASIC LAW (BASIC LAW)

The Basic Law[1] lays down the objective of, and the basic policy for, the utilization of atomic energy in Japan and sets the framework for the development of nuclear legislation. The objective is to seek the contribution of atomic energy to the welfare of mankind and to the elevation of the living standard of the Japanese people, through research, development and practical application of atomic energy.

According to the basic policy defined in this law, the following five principles are to be observed in the utilization of atomic energy:

(a) It should be limited to peaceful purposes
(b) It should be carried out in a democratic manner
(c) It should be carried out independently
(d) Its results should be made public
(e) It should contribute to international co-operation.

Table III shows the titles of chapters of the Basic Law and their relation to subsequent laws.

As shown in Table III, there are many laws issuing from the provisions of the Basic Law which will be explained below. However, there are several nuclear laws that did not originate from any specific provisions of the Basic Law and there are also some provisions in the Basic Law which did not lead to the enactment of any subsequent law as might be expected.

II. LAWS FOR THE ESTABLISHMENT OF VARIOUS ORGANIZATIONS

A bird's-eye view of the organizational aspects of nuclear energy in Japan is given in Table IV.

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[1] Law No. 186 of 1955.

TABLE I. OUTLINE OF NUCLEAR LEGISLATION IN JAPAN

Note: 1. Most of the laws listed are usually supplemented by one Cabinet Order and several Ministerial Ordinances and Ministerial Announcements.

2. Short titles shown in parentheses will be used hereinafter.

I. Atomic Energy Basic Law (Basic Law)

II. Laws for the establishment of various organizations:

1. Law establishing the Science and Technology Agency (STA Law)
2. Law establishing the Atomic Energy Commission (AEC Law)
3. Law concerning the Technical Standards for Prevention from Radiation Hazards (Radiation Council Law)
4. Japan Atomic Energy Research Institute Law (JAERI Law)
5. Power Reactor and Nuclear Fuel Development Corporation Law (PNC Law)
6. Japan Nuclear Ship Development Agency Law (JNSDA Law)

III. Laws concerning governmental control:

1. Law for the Regulation of Nuclear Source Materials, Nuclear Fuel Materials and Reactors (Regulation Law)
2. Law concerning Prevention from Radiation Hazards due to Radioisotopes, etc. (Prevention Law)

IV. Laws concerning nuclear third party liability:

1. Law on Compensation for Nuclear Damage (Compensation Law)
2. Law on Indemnity Agreement for Compensation of Nuclear Damage (Indemnity Law)

V. Miscellaneous related laws:

1. Law concerning Temporary Measures for Expediting Development of Nuclear Source Materials (V-1 Law)
2. Law to Indemnify Foreign Contractors Fabricating Nuclear Fuel (V-2 Law)
3. Electric Utility Industry Law
4. Ship's Safety Law
5. Port Regulation Law
6. Road Transportation Law
7. Vehicles for Road Transportation Law
8. Railroad Business Law
9. Civil Aeronautics Law
10. Patent Law
11. Labour Standards Law
12. Workmen's Compensation Law

TABLE I (cont.)

VI. Treaties and other international agreements:

1. Statute of the International Atomic Energy Agency (IAEA Statute)
2. Agreement on the Privileges and Immunities of the IAEA[a]
3. Agreement between the IAEA and the Government of Japan for Assistance by the IAEA to Japan in Supplying Uranium for the Research Reactor Project JRR[b]
4. Treaty on the Non-Proliferation of Nuclear Weapons (NPT)[c] – not yet ratified by Japan.
5. Agreement for Co-operation between the Government of Japan and the Government of the United States of America concerning Civil Uses of Atomic Energy (Japan-US Co-operation Agreement)
6. Agreement between the Government of Japan and the Government of the United Kingdom of Great Britain and Northern Ireland for Co-operation in the Peaceful Uses of Atomic Energy (Japan-UK Co-operation Agreement)
7. Agreement of the Government of Japan and the Government of Canada for Co-operation in the Peaceful Uses of Atomic Energy (Japan-Canada Co-operation Agreement)
8. Special Nuclear Material Lease Agreement between the Government of Japan and the United States Atomic Energy Commission acting on behalf of the Government of the United States of America
9. Agreement between the IAEA, the Government of Japan and the Government of the United States of America for the Application of Safeguards by the Agency to the Bilateral Agreement between those Governments concerning Civil Uses of Atomic Energy (Japan-US Safeguards Transfer Agreement)[d]
10. Agreement between the IAEA, the Government of Japan and the Government of the United Kingdom of Great Britain and Northern Ireland for the Application of Agency Safeguards in respect of the Agreement between those Governments for Co-operation in the Peaceful Uses of Atomic Energy (Japan-UK Safeguards Transfer Agreement)[e]
11. Agreement between the IAEA, the Government of Canada and the Government of Japan for the Application of Agency Safeguards in respect of the Bilateral Agreement between those Governments for Co-operation in the Peaceful Uses of Atomic Energy (Japan-Canada Safeguards Transfer Agreement)[f]
12. International Convention for the Safety of Life at Sea, 1960 (SOLAS Convention)

[a] IAEA document INFCIRC/9/Rev.2 and Add.2.
[b] INFCIRC/3, part II.
[c] INFCIRC/140.
[d] INFCIRC/119.
[e] INFCIRC/125.
[f] INFCIRC/85.

TABLE II. DEVELOPMENT OF NUCLEAR LEGISLATION IN JAPAN
Month indicates date of enforcement.

Enactment		Year	Major event
Basic Law	(Jan.)		
AEC Law	(Jan.)		
STA Law	(May)		
JAERI Law	(May)	1956	Japan joined the IAEA.
Nuclear Fuel Corp. Law	(May)		
V-1 Law	(May)		
Regulation Law	(Dec.)	1957	First research reactor attained criticality.
Prevention Law	(Apr.)		
Radiation Council Law	(May)	1958	Japan-US and Japan-UK Co-operation Agreements concluded.
V-2 Law	(Dec.)	1959	
		1960	Japan-Canada Co-operation Agreement concluded.
Compensation Law	(Mar.)	1961	AEC Law amended to establish the Advisory Committee on Reactor Safety.
Indemnity Law	(Mar.)		
		1962	First reactor made in Japan attained criticality.
JNSDA Law	(Jun.)	1963	First power reactor attained criticality.
		1964	Japan joined the OECD.
		1965	Regulation Law amended. First commercial power reactor attained criticality.
		1966	
PNC Law	(Jul.)	1967	Nuclear Fuel Corporation Law abolished.
		1968	New Japan-US and Japan-UK Co-operation Agreements concluded.
		1969	Nuclear Ship 'Mutsu' launched.
		1970	First light-water power reactor reached criticality. Japan signed NPT.

TABLE III. THE CONTENT OF THE BASIC LAW AND ITS RELATION TO SPECIFIC LAWS

Chapter	Articles	Content	Issuing Laws
I	1 - 3	General Provisions	
II	4 - 6	The Atomic Energy Commission	AEC Law
III	7	Atomic Energy Development Institutions	JAERI Law & PNC Law
IV	8 - 11	Development and Acquisition of Minerals Concerning Atomic Energy	V-1 Law
V	12 - 13	Control over Nuclear Fuel Materials	Regulation Law
VI	14 - 16	Control over Reactors	
VII	17 - 19	Measures for Patented Inventions	Patent Law
VIII	20	Protection from Radiation Hazards	Prevention Law
IX	21	Compensation	V-1 Law

II.1. STA Law and AEC Law

Although the Science and Technology Agency (STA) is part of the Prime Minister's Office, there is a separate law establishing the STA, the STA Law[2]. The STA Law lays down the STA's competence and responsibilities as well as the framework of its organization. It also provides that the STA is an administrative body headed by a Director General, who should be a Minister of State. The STA is the central authority for nuclear administration and should have the Atomic Energy Bureau among its four bureaux. The Cabinet Order implementing the STA Law gives a detailed picture of the Atomic Energy Bureau and the related Order of the Director General of the STA gives more details about its organization, namely, its ten divisions, by whose titles one can have a general idea of their tasks.

Since the functions of the Atomic Energy Bureau appear almost the same as those of the Atomic Energy Commission (AEC) and since the relationship between the STA and the AEC is rather complicated, both laws may require some explanation.

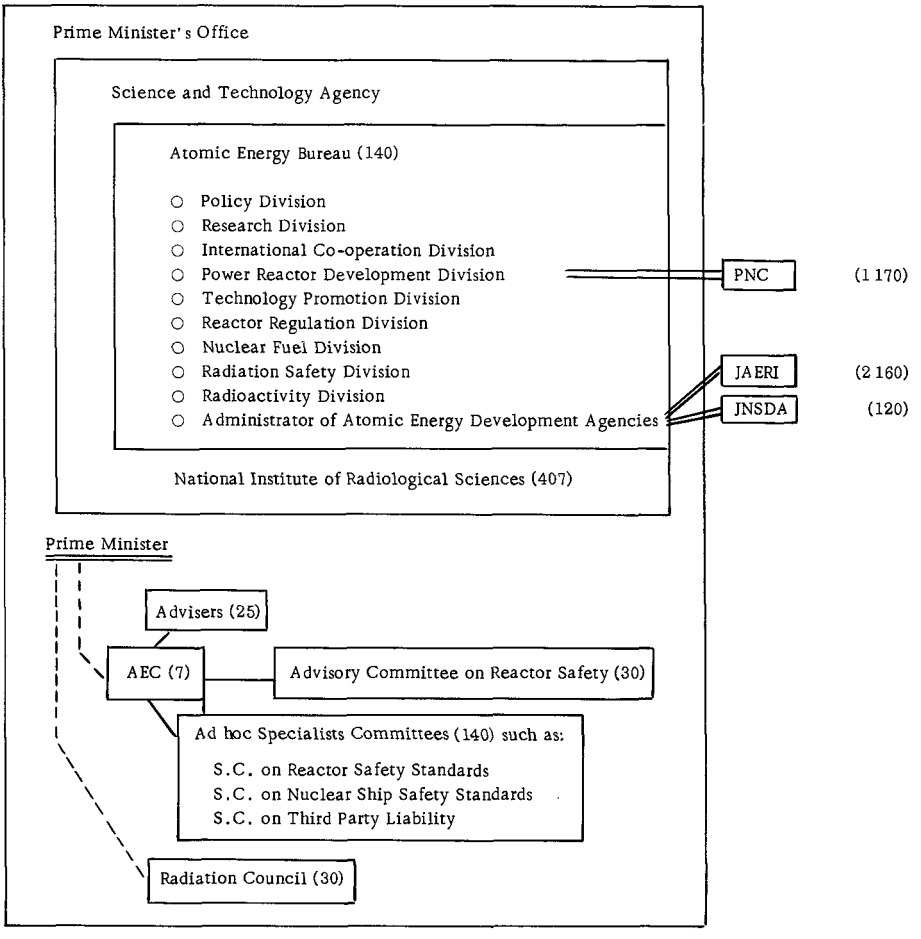
According to the provisions of the Law concerning the National Administration System, the AEC is not an administrative body but a consultative body, in spite of which, however, it is empowered to make administrative decisions of its own by the AEC Law[3], thus occupying a unique position in the Japanese legal system.

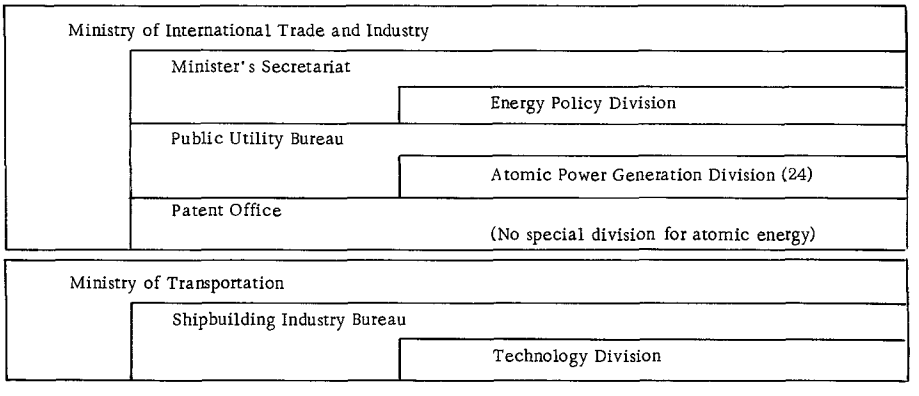
The AEC Law sets up the AEC in the form of a specialized agency attached to the Prime Minister's Office. The AEC consists of 4 full-time and 2 part-time Commissioners and a Chairman who should be the Director

[2] Law No.49 of 1956.

[3] Law No.188 of 1955.

TABLE IV. ORGANIZATIONAL ASPECTS OF NUCLEAR ENERGY IN JAPAN





Note: Figures in parentheses indicate the staff or composition of various agencies and committees.

General of the STA and, accordingly, a Minister of State. The Commissioners are appointed by the Prime Minister with the consent of both Houses of the Diet (Parliament).

The AEC Law further provides for the setting up of another consultative body, the Advisory Committee on Reactor Safety. The Cabinet Order for the Enforcement of the AEC Law provides for the appointment of Advisers and Specialists on a part-time basis. In practice, the Advisers meet once a month to exchange opinions with the Commissioners, while various Specialists Committees are charged with the study of specific problems. It is a common practice for the AEC to consult with a Specialists Committee before making any important decision and it is not unusual for a Specialists Committee to require more than a year for submitting its report on an important issue.

As to the AEC's secretariat, the AEC Law provides that 'the miscellaneous affairs of the Commission should be dealt with by the Atomic Energy Bureau of the STA' (Art.15). Does it follow that the AEC should have no secretariat? The answer is yes and no. This has been the subject of intensive discussions resulting in the coming establishment of an office for the AEC.

In comparing the AEC Law with the STA Law, one finds that the jurisdiction of the AEC and the STA's Atomic Energy Bureau overlaps. However, on closer examination one can detect a distinction, which can hardly be clear enough in translating the texts in question into a foreign language. On the utilization of atomic energy and related matters, the AEC plans, evaluates plans and makes decisions, while the Atomic Energy Bureau plans, draws up plans and enforces decisions.

If shown in a chronological order, such functions are performed as follows:

	AEC	STA's Atomic Energy Bureau
(i)	plans	plans
(ii)		draws up plans
(iii)	evaluates plans	
(iv)	makes decisions	
(v)		enforces decisions

Thus the AEC and the STA are supposed to function as if they were a single integrated body and they actually do so. Up to this point, there is no need for a separate secretariat for the AEC. However, problems arise from the fact that the Atomic Energy Bureau is charged with day-to-day tasks of administration and, owing to the development of industrial uses of atomic energy and the resulting growth of nuclear administration, the Bureau has become increasingly occupied with routine work. The AEC, therefore, prefers to have its own staff who may not be overloaded with administrative problems of a routine nature. After a thorough consideration of the matter, it was decided that the present system should be retained and neither the AEC Law nor the STA Law should be changed. But it was also decided that, within the framework of the present laws, an office be established to work only for the AEC. Whether this was a wise compromise or not, time will show.

II.2. Radiation Council Law

Although its full title is Law concerning Technical Standards for Prevention from Radiation Hazards[4], it may be referred to as the Radiation Council Law because most of its provisions, apart from definitions and basic policy principles, relate to the Radiation Council.

The Council is a specialized body directly responsible to the Prime Minister. It is made up of a maximum of 30 members appointed on a part-time basis for two years by the Prime Minister. No consent of either House of the Diet is necessary for their appointment. The Council gives opinions and advice, upon request or at its own initiative, to the authorities concerned in regard to: (a) Technical standards for the prevention of radiation hazards; and (b) Methods of measurement of the level of radiation, etc.

The Radiation Council has no secretariat of its own and Article 10 of the Law creating it reads the same as Article 15 of the AEC Law, which has been cited above. There are, however, no such problems here as have been mentioned in the case of the AEC.

II.3. JAERI Law[5], PNC Law[6], JNSDA Law[7] and Cabinet Order to Establish the National Institute of Radiological Sciences

These institutions for research and development are covered by the excellent Analytical Study of Nuclear Legislation, made by the European Nuclear Energy Agency((ENEA) in 1969[8] and it is not necessary to further elaborate on their legal status, functions and organization.

III. LAWS CONCERNING GOVERNMENTAL CONTROL

The Regulation Law[9] and the Prevention Law[10] are the two largest nuclear laws in Japan. The former deals with matters within the nuclear fuel cycle and the latter with matters outside the nuclear fuel cycle.

III.1. Regulation Law

This law has four objectives:

(a) To ensure the peaceful uses of nuclear fuel and reactors
(b) To ensure their planned use
(c) To protect the public safety
(d) To abide by international commitments.

In order to achieve these objectives, this law calls for regulations on various activities in the nuclear fuel cycle. Since there are many

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4 Law No.162 of 1958.

5 Law No.92 of 1956.

6 Law No.73 of 1967.

7 Law No.100 of 1963.

8 Nuclear Legislation, Analytical Study, OECD-ENEA 1969, Organization and General Regime Governing Nuclear Activities, pages 121-125.

9 Law No.166 of 1957.

10 Law No.167 of 1957.

activities requiring specific regulations, several Ministerial Orders have been issued, which are as follows:

(a) Rules on Refining Business of Nuclear Source Materials and Nuclear Fuel Materials
(b) Rules on Fabricating Business relating to Nuclear Fuel Materials
(c) Rules on the Establishment and Operation of Reactors
(d) Rules on Plans of Operation for Power Reactors
(e) Rules on the Uses of Nuclear Source Materials
(f) Rules on the Uses, etc. of Nuclear Fuel Materials
(g) Rules on the Uses of Internationally Controlled Materials
(h) Rules on the Reprocessing of Irradiated Nuclear Fuel (to be issued).

Although the regulations vary in scope, it would suffice to cite the criteria laid down in the regulation on reactors, on which are also based the other regulations.

There are four criteria for the licensing of reactors and, unless an application can satisfy all of them, no licence is to be issued. They are as follows:

(a) The reactor should not be used for non-peaceful purposes
(b) The licensing should not hinder the planned development and utilization of atomic energy
(c) The applicant should have technical ability and financial security to set up a reactor facility and such technical qualifications as to operate the reactor competently
(d) The siting, structure and equipment of reactor facilities are such that they will cause no hindrance to the prevention of hazards arising from nuclear fuel material and things contaminated by fission products etc. and from the reactor itself.

In the case of power reactors, the Ordinance of the Prime Minister's Office and the Ministry of International Trade and Industry[11] specifies rules so minutely that it may be of help to have here again a bird's-eye view by using a chart. Table V is drawn to indicate the successive stages in the implementation of regulations on the establishment of reactor facilities.

There remain two important features of the Regulation Law which should be mentioned: one is about safeguards and the other about foreign nuclear ships.

Attention may be drawn to the first and fourth objectives of this Law. The measures provided for achieving these two objectives automatically satisfy the requirements of safeguards. In other words, the Regulation Law has in itself a built-in safeguards system. At present Japan is a party to three trilateral Safeguards Transfer Agreements with the USA and the IAEA, with the UK and the IAEA, and with Canada and the IAEA. Japan's obligations under these agreements are discharged through the relevant provisions of the Regulation Law and when the Non-Proliferation Treaty is ratified, the obligations resulting therefrom will also be discharged in the same way, possibly after minor amendments of the Cabinet Order for Enforcement of the Regulation Law[12].

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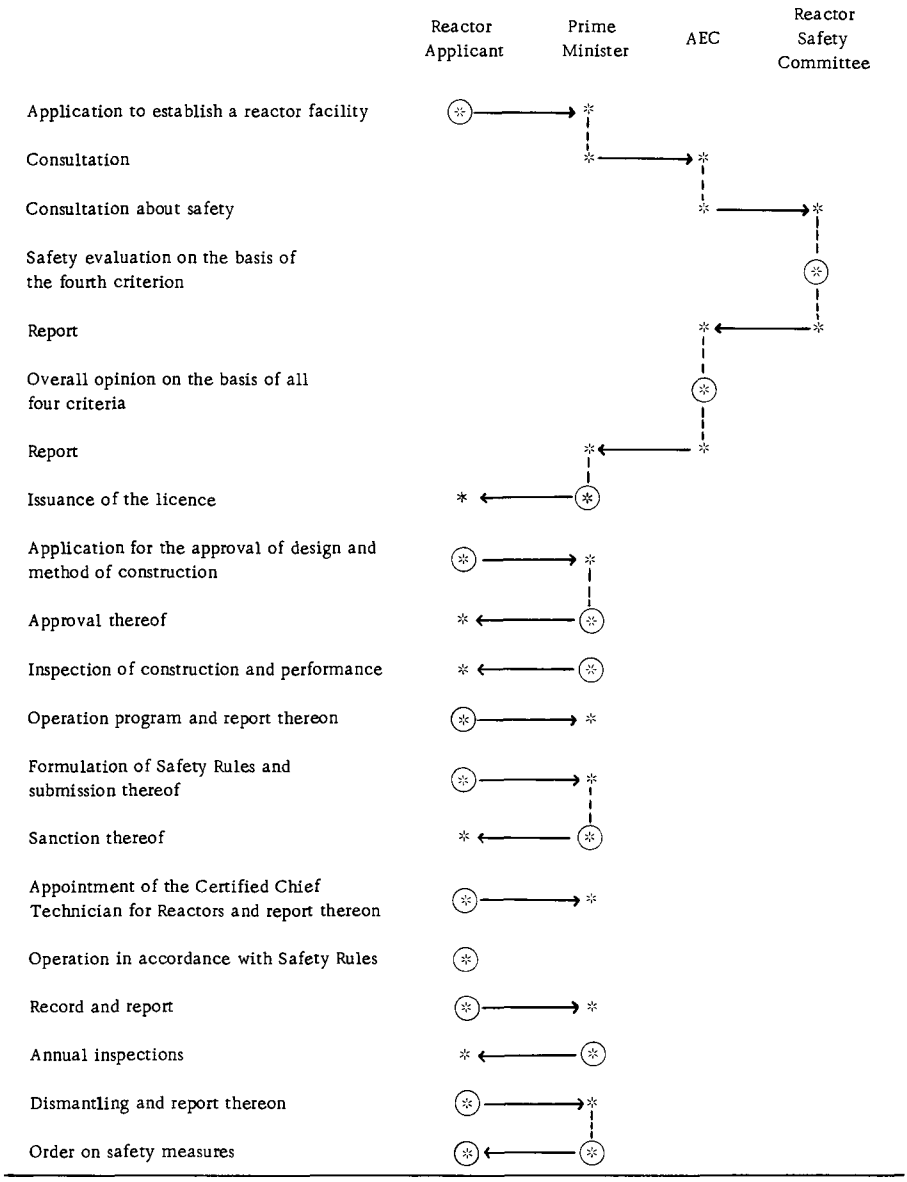
[11] Ordinance No. 1 of 1963. The Technical Standards concerning Nuclear Equipment for Power Generation and the Technical Standards concerning Nuclear Fuel Materials for Power Generation are both enacted by ordinances of the Ministry of International Trade and Industry under the Electric Utility Industry Law. The former is supplemented by an extensive Ministerial Announcement.

[12] Cabinet Order No. 324 of 1957.

TABLE V. IMPLEMENTATION OF REGULATIONS ON THE CONSTRUCTION AND OPERATION OF A REACTOR FACILITY



With regard to the second point, the provisions on foreign nuclear ships were introduced into the Regulation Law by its seventh amendment. Foreign nuclear ships except warships must obtain a licence from the Prime Minister in order to enter the territorial waters of Japan. The procedures for the application for and issuing of the licence are similar to those applying to Japanese reactors. However, the criteria are somewhat different. The second criterion for licensing Japanese reactors is omitted here and a new criterion is substituted which provides that "sufficient compensation for nuclear damage is secured by an international agreement".

Once the licence is issued, no further regulation applies. An advance notification of entry into a port is, however, required and the Minister of Transportation may order the operator of a foreign nuclear ship to take certain safety measures if it is deemed necessary.

III.2. Prevention Law

This Law is merely aimed at securing public safety by preventing hazards which may arise from radioisotopes and radiation generating apparatus.

The Law also provides for detailed regulations on licensing, technical standards, operation, etc. Here, however, two major points should be mentioned, which differ from the Regulation Law: the licensing authority is the Director General of the STA instead of the Prime Minister, and neither the AEC nor the Radiation Council has anything to do with licensing or other control.

IV. LAWS CONCERNING NUCLEAR THIRD PARTY LIABILITY

The Compensation Law[13] together with the Indemnity Law[14] constitute the nuclear liability system in Japan. Since a detailed analysis of this system is available in a publication of the ENEA on nuclear legislation[15], only a few characteristics of Japan's nuclear liability laws are recalled here.

The objectives of the Compensation Law are to protect victims of a nuclear damage and, concurrently, to encourage a sound development of the nuclear industry. This Law stipulates the following three principles, two of which (b and c) are important deviations from the principles of the Civil Code:

(a) unlimited liability
(b) absolute liability or liability without fault
(c) channelling of liability.

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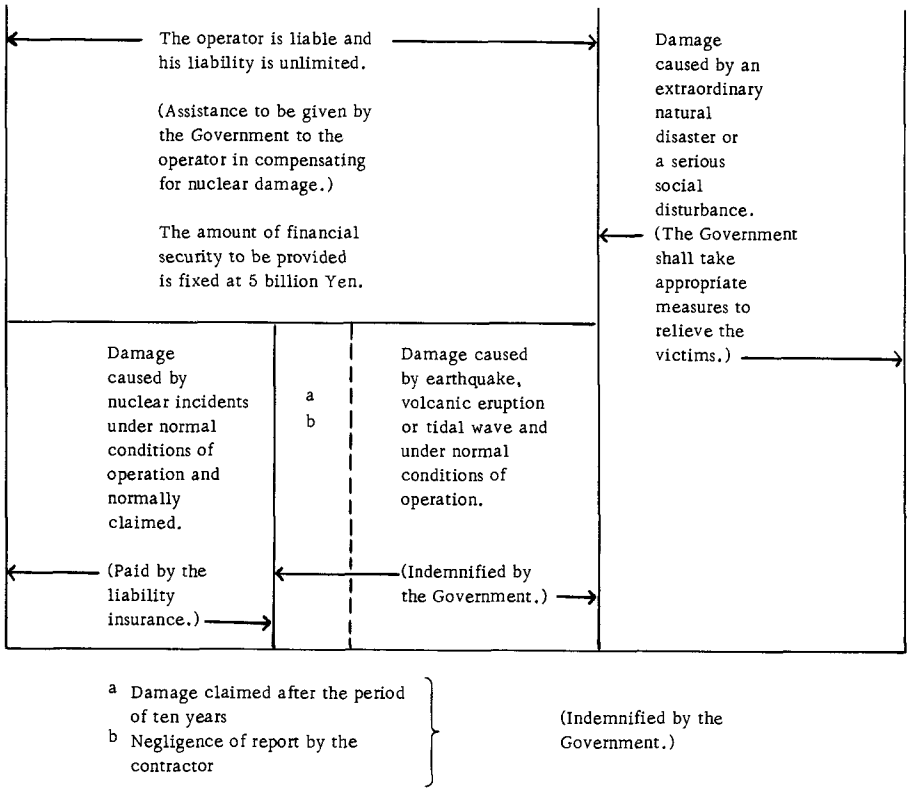
[13] Law No.147 of 1961.

[14] Law No.148 of 1961.

[15] Nuclear Legislation, Analytical Study, Nuclear Third Party Liability, OECD-ENEA, 1967, pages 43-46.

TABLE VI. LIABILITY AND FINANCIAL SECURITY



With these principles, the Law seems to impose a heavy burden of liability on the operators, etc.[16] and, in fact, it does. However, it provides operators, etc. with both insurance and indemnity agreement, by which their financial security is assured up to five billion yen. It further provides an assistance to the operators, etc. Table VI illustrates: the ranges where an operator is liable and where he is not; that once he is liable, his liability is unlimited; how his financial security is assured; and what is the role of the Government.

To touch upon a few important points which cannot be seen in the chart itself: First, financial security varies ranging from ten million to five billion yen according to the size of reactors or the kinds of activities

[16] "Operations, etc." means the following activities, and "operators, etc." means those who perform such activities:

(a) operation of a reactor
(b) processing of nuclear fuel materials and fabrication of nuclear fuel
(c) reprocessing of irradiated nuclear fuel materials
(d) use of nuclear fuel materials
(e) transportation, storage or disposal of nuclear materials connected with the activities specified in (a) to (d).

Activities (b), (c) and (d) are specified in the Cabinet Orders.

involved; second, people who are engaged in the operations, etc. are not covered by the Compensation Law, they are instead covered by the Workmen's Compensation Law; third, the Compensation Law does not differentiate between reactors installed on ships and other reactors and, therefore, it applies to nuclear ships as well. However, while the Regulation Law contains provisions on the liability of the operator of a foreign nuclear ship as mentioned above, the Compensation Law only applies to the operators, etc. as defined in the Regulation Law and, therefore, the operator of a foreign nuclear ship does not fall into the category of operators, etc. Consequently, a competent court would apply the Civil Code to determine the liability of the operator of a foreign nuclear ship rather than the Compensation Law; this means that neither the principle of absolute liability nor that of channelling of liability would be applied. This was the largest obstacle that prevented the US nuclear ship 'Savannah' from visiting Japan.

It is true that the 'Savannah' case was only one amongst other considerations pressing for a review of the Compensation Law. Even without this problem, however, the Law has reached the stage where it needs to be revised anyway, because it prevents the Government from concluding indemnity agreements for reactors which start operating on or after 1 January 1972 (Article 20), and because the nuclear industry in Japan has developed much more than was expected at the time of the enactment of the Law. The matter is under active consideration by the AEC's Specialists Committee on Third Party Liability, which consists of men of knowledge and experience from universities, insurance business, power industry, reactor manufacturers, nuclear fuel industry, maritime industry, etc. The Committee is expected to complete its study in the second half of 1970 and, on the basis of its recommendations, an amendment of the Compensation Law will be submitted to the Diet in 1971[17].

V. MISCELLANEOUS LAWS

The utilization of atomic energy entails many kinds of activities which have to be taken care of either by a new law superseding existing ones or by adding new provisions to the existing legislation.

The Law concerning Temporary Measures for Expediting Development of Nuclear Source Materials and the Law to Indemnify Foreign Contractors Fabricating Nuclear Fuel are examples of such new laws. The former provides for necessary deviation from the Mining Law. Although at present it has comparatively little importance since no rich deposits have been found so far in Japan, this Law was expected to be of great importance.

New enactment is rather exceptional. In most cases partial amendments are preferred. For instance, in the case of the Port Regulation Law, a new article has been introduced. Many other laws, however, have provisions wide enough in scope to cover both nuclear and non-nuclear activities. Therefore, it was not necessary to amend such laws. Instead, only ministerial ordinances have been amended and new ordinances issued. The Electric Utility Industry Law is a specimen having all of such

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[17] The amended Law on Compensation for Nuclear Damage was enacted on 1 October 1971 as Law No. 53 of 1971.

components – a special provision in the text of the Law itself, new provisions in the related Ministerial Ordinance and entirely new Ministerial Ordinances concerning power reactors.

As a result of such development, regulations have become somewhat complicated. It is, therefore, necessary for the authorities concerned to keep under constant review the status of nuclear legislation and to try to improve its provisions where appropriate in order not to hinder the development of the nuclear industry.

VI. TREATIES AND OTHER INTERNATIONAL AGREEMENTS

Japan has concluded many international agreements, some of which are shown in Table I.

There is nothing that needs particular explanation but attention may be drawn to a few features. First, the Basic Law regards it as one of the basic principles to contribute to international co-operation. Second, the objective of all agreements is limited to the co-operation in peaceful uses of atomic energy. Third, only unclassified information is exchanged under the provisions of these agreements.

It may be added that the JAERI and the PNC concluded many co-operation arrangements with the United States Atomic Energy Commission (USAEC), the United Kingdom Atomic Energy Authority (UKAEA), the French Commissariat à l'énergie atomique (CEA) etc. Some examples are given below:

(a) Arrangement between the USAEC and the PNC for co-operation on fast breeder reactors;
(b) Agreement between the CEA and the PNC for exchange of information and collaboration on liquid metal cooled fast reactors;
(c) Arrangement between the USAEC and the JAERI to exchange information in the field of radiation chemistry;
(d) Agreement between the UKAEA and the PNC for irradiation at Dounreay Fast Reactor;
(e) Agreement between the PNC and the UKAEA for the sale of information on Steam Generating Heavy Water Reactors.

NATIONAL LEGISLATION ON ATOMIC ENERGY IN ASIA AND THE FAR EAST

A survey of existing legislation in the Member States of the International Atomic Energy Agency in Asia and the Far East, prepared by the Legal Division, IAEA

NOTE BY THE SECRETARIAT

On the basis of the information available to the IAEA Secretariat, this survey has been prepared to serve as a quick reference to the legislation governing the peaceful uses of atomic energy in the Member States of the Agency in Asia and the Far East.

Of the fifteen countries involved, nine have enacted legislation dealing with atomic energy and setting up national bodies to promote, co-ordinate, assist, develop, regulate and supervise activities in this field. The safety of such activities is ensured through the enforcement of regulations based on relevant international recommendations, in particular the IAEA safety standards, or through the exercise of regulatory powers vested in the competent authorities. Liability and compensation for nuclear damage are also regulated by law in some of these countries, broadly in accordance with the principles embodied in international conventions on third party liability for nuclear damage.

For ease of reference, the survey is divided into the following parts:

I. Scope of Enabling Legislation
II. National Authorities on Atomic Energy
III. Radiation Safety Regulations
IV. Liability and Compensation for Nuclear Damage

This survey was prepared for the Seminar on the Development of Nuclear Law, held in Bangkok, Thailand, in April 1970, and has been subsequently revised to reflect the latest legislative and regulatory developments in the countries concerned.

I. SCOPE OF ENABLING LEGISLATION

1. Ceylon

The basic Act[1] is primarily concerned with the establishment of an Atomic Energy Authority and the specification of its powers, rights, duties, and functions. Within this framework, the Act lays down provisions covering the production of atomic energy and utilization of radioactive materials for peaceful purposes; health and safety measures; control of the import, export, production, acquisition, treatment and transport of radioactive materials and plants for use in atomic energy; the acquisition of lands, plants, and rights to patents and under contracts; civil liability and rights to compensation.

[1] Atomic Energy Authority Act No. 19 of 1969 (25 June 1969).

2. India

The basic Act[2] provides that no activity may be carried out without proper authorization. A system of authorization is contemplated for: mining activities, the acquisition, production, possession, use, disposal, export or import of any prescribed substances, minerals containing such substances, radioactive materials, or of any plant for the production, development, use of, and research into atomic energy, or of any prescribed equipment. Supplementary to this control, the competent authority may acquire compulsorily: rights to work minerals; prescribed substances, minerals and plants; and rights under contract. No patents may be granted for inventions relating to any of the above activities.

3. Indonesia

The basic Law[3] establishes control on all activities relating to atomic energy. Mining activities are reserved to the National Atomic Energy Agency, as is the production of nuclear and special nuclear materials. Any other activity may be carried out only under licence, unless such activity is undertaken by the Government or a Government agency.

4. Japan

The basic Law[4] and subsequent legislation are designed to control the whole range of nuclear activities. Mining and prospecting, the construction and operation of refining, fabricating and reprocessing facilities and of atomic reactors, 'other users' of nuclear fuel material, and the use, sale and disposal of radioactive substances are subject to control. In general, none of the foregoing activities may be undertaken without authorization. Further legislation relating to patent rights for inventions is referred to in the existing legislation.

5. Korea (Republic of)

The basic Law[5] requires the licensing of activities involving radioactive substances, fissionable and source materials, and of the operation of nuclear reactors and related facilities. No provision is made as to mining rights, which are to be dealt with by a separate law. The right to acquire patents for inventions relating to the foregoing is limited.

6. Pakistan

The basic Ordinance[6] is primarily concerned with the establishment of the Atomic Energy Commission and the Council. The activities to which the Ordinance extends are reflected in the functions of the Commission and the Council. (See II. 6 below.)

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[2] Atomic Energy Act No. 33 of 1962.

[3] Atomic Energy Law No. 31 of 26 November 1964.

[4] Law No. 186 of 1955.

[5] Atomic Energy Law No. 483 of 1958, as amended.

[6] Pakistan Atomic Energy Commission Ordinance No. XVII of 27 May 1965, as amended by Act No. XIII of 1968.

7. Philippines

The basic legislation[7] generally subjects to licensing the mining, manufacture, production, transfer, acquisition, ownership, possession, import or export of any radioactive materials, and the transfer, construction, receipt, ownership, possession, import or export of any atomic energy facility.

8. Thailand

The basic Act[8] prescribes the licensing of nuclear activities. Thus a license is required for the production, possession or utilization of nuclear materials, atomic energy, by-product materials or source materials. A licence is also required for the import or export of such materials.

9. Viet-Nam (Republic of)

The basic Decrees[9] vest the Atomic Energy Office with control powers on the acquisition, production, commerce, import and export of all nuclear materials. The acquisition, production, construction, commerce and possession of radiation installations are restricted to institutions and specialists duly authorized. The exploitation of radioactive deposits is forbidden to private persons, but prospecting by such persons is permitted under licence.

II. NATIONAL AUTHORITIES ON ATOMIC ENERGY

1. Ceylon

The Atomic Energy Authority is placed under the supervision of a competent Minister.

(a) Composition

The Authority, which is a body corporate, consists of not less than four and not more than seven members appointed by the Minister from among persons with the experience and capacity to deal with matters connected with atomic energy, administration or finance. The Act does not specify the competent Minister, and the matter is thus left to the discretion of the Prime Minister. The Minister appoints a Chairman from among the Members of the Authority.

(b) Functions

To undertake and arrange for the conduct of research and development relating to: the production of atomic energy and related activities; the

[7] Republic Act No. 2067 of 1958, as amended by Republic Act No. 3589 of 1962. Republic Act No. 5207 of 15 June 1968.

[8] Atomic Energy for Peace Act of 1961, as amended in 1965.

[9] Presidential Decrees No. 507/TTP of 11 October 1958, and No. 26/TTP of 27 January 1959.

utilization of fissionable and radioactive materials for medical, agricultural, industrial and other peaceful purposes; and to ensure the protection of health in connection with activities involving radioactive materials.

In carrying out its functions the Authority may seek the advice of an Advisory Committee appointed by the Minister. The Committee consists of such members as may be determined by the Minister.

The Authority is given certain powers to enable it to carry out its functions.

2. India

The Central Government is the competent authority.

(a) Delegation of powers

The Central Government may by order delegate its powers or duties under the basic Act to a subordinate authority or a State Government. (Department of Atomic Energy/Atomic Energy Commission)

(b) Functions

The Central Government is empowered:

(i) To produce, develop, use and dispose of atomic energy and carry out research relating thereto.
(ii) To manufacture, produce, acquire, dispose of, store and transport any prescribed or radioactive substance and any articles required in connection with the above activities.
(iii) To declare certain information and certain areas as 'restricted information' and 'prohibited areas' respectively.
(iv) To exercise control to prevent radiation hazards, to secure public safety and to ensure the safe disposal of radioactive wastes.
(v) To provide for the production and supply of electricity from atomic energy and for measures conducive thereto.
(vi) To take all necessary steps for the fulfilment of its functions in the field of nuclear energy.

3. Indonesia

(i) The Atomic Energy Council[10]
(ii) The National Atomic Energy Agency[11]

(a) Composition

(i) The Council consists of seven permanent members and twelve non-permanent members, and is presided over by the President of the Republic. The Secretariat of the Council is provided by the Agency.
(ii) The Agency is headed by a Director General having the status of a Minister, appointed and dismissed by the President. The

[10] Presidential Decree No. 298 of 1968.
[11] Government Regulation No. 33 of 1965.

Director General is assisted by a Planning Body headed by himself and consisting of experts appointed and dismissed by the President.

(b) Functions

(i) The Council is an advisory body to the President of the Republic on policy matters connected with the development and application of atomic energy in Indonesia and at international level.
(ii) The Agency promotes, conducts, assists, regulates and controls research on, and the application of, atomic energy.

4. Japan

The highest authority on matters pertaining to atomic energy is the Prime Minister's Office. To carry out this responsibility, the following bodies have been established within the Prime Minister's Office:
(i) The Atomic Energy Commission.[12]
(ii) The Science and Technology Agency.[13]

(a) Composition

(i) The Commission is a specialized agency attached to the Prime Minister's Office and consists of four full-time and two part-time Commissioners appointed by the Prime Minister with the consent of both Houses of the Diet (Parliament).
(ii) The Director General of the Agency, who is a Minister of State, is concurrently chairman of the Commission. He is assisted by an Administrative Vice-Minister and a Parliamentary Vice-Minister. In addition to the Director General's Secretariat, the Agency has four Bureaux to serve as Secretariat for Committees set up by the Prime Minister. One of these Bureaux is the Atomic Energy Bureau, composed of ten Divisions.

(b) Functions

(i) The Commission determines: policies on the use of atomic energy; co-ordination of the activities of the various Government organs dealing with atomic energy; estimates of expenditure on atomic energy; regulations concerning nuclear fuel material and reactors; fundamental principles of protection against radiation hazards. The Commission is also responsible for encouragement of research and training of technical personnel.
(ii) The functions of the Agency, acting through the Atomic Energy Bureau, are broadly similar to those of the Commission and may be considered as an elaboration of the latter's duties. The Agency implements the decisions of the Commission. There are also a number of consultative and other agencies such as the Radiation Council[14], the Committee[15] on Reactor Safety[12], the

[12] Law No. 188 of 1955.
[13] Law No. 49 of 1956.
[14] Law No. 162 of 1958.
[15] Law No. 92 of 1956.

Japan Atomic Energy Research Institute[15] and the Power Reactor and Nuclear Fuel Development Corporation[16], which are entrusted with specialized functions within the general framework of nuclear activities.

5. Korea (Republic of)

The Office of Atomic Energy and the Atomic Energy Commission are placed under the supervision of the Minister of Science and Technology[17].

(a) Composition

(i) The Office of Atomic Energy, which consists of the Bureau of General Affairs, the Atomic Energy Research Institute, the Radiology Research Institute and the Radiation Research Institute in Agriculture, is headed by a Director General appointed by the President of the Republic on the recommendation of the Minister of Science and Technology.

(ii) The Atomic Energy Commission consists of not less than five and not more than seven members, including the Chairman of the Commission, who is the Minister of Science and Technology. The other members are appointed by the President on the recommendation of the Minister. Two of these members hold office for three years and may be reappointed. The others are non-permanent members of the Commission. The post of Vice-Chairman of the Commission is held by the Director General of the Atomic Energy Office.

(b) Functions

(i) The Office is responsible for matters pertaining to the uses of atomic energy. Appropriate organizations for the development of source materials and the production of fissionable materials and nuclear power may be established under the supervision of the Office. Advisory bodies may also be set up within the Office by presidential decree.

(ii) The Commission decides matters relating to:
- fundamental policies of research, development, production, utilization and control of atomic energy;
- the planning, consolidation and co-ordination of research activities in the nuclear field;
- protection against nuclear hazards;
- the training of technical personnel;
- inspection and control of nuclear installations and activities.

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[16] Law No. 73 of 1967.

[17] Atomic Energy Law No. 483 of 11 March 1958, as amended by Laws No. 733 of 2 October 1961, Nos. 1537 and 1615 of 16 December 1963, No. 1833 of 3 August 1966, No. 1948 of 30 March 1967, and No. 2093 of 24 January 1969.

6. Pakistan

(i) The Pakistan Atomic Energy Commission.
(ii) The Council.

(a) Composition

(i) The Commission, which is a body corporate, consists of four full-time members (a Chairman, a finance member and two technical members) and four part-time members (a Central Government scientist, one scientist each from the eastern and western areas of Pakistan, and the Chief Scientific Adviser to the President, ex officio). All members, with the exception of the ex officio member, are appointed by the Central Government.
(ii) The Council consists of: a Chairman (who is the Minister in charge of Science and Technology), the members of the Commission, ex officio, the Secretary to the Government for Science and Technology, two Directors of the Laboratories established by the Commission, two scientists nominated by the Inter-University Board, and five scientists nominated by specified Departments of the Government (Agriculture, Defence, Health, Natural Resources, and Science and Technology).

(b) Functions

(i) The Commission performs all activities, including research, necessary for the promotion of the peaceful uses of atomic energy and for the execution of development projects involving nuclear power stations and the generation of electric power. The Commission may also undertake other agreed functions on behalf of the Central or Provincial Governments. In carrying out its functions the Commission is guided by the Central Government on policy matters.
(ii) The Council lays down broad principles to be followed by the Commission, reviews the work and considers the annual report of the Commission, and disposes of such other matters as may be referred to it by the Central Government or the Commission.

7. Philippines

(i) The National Science Development Board.
(ii) The Philippine Atomic Energy Commission.

(a) Composition

(i) The Board consists of a Chairman having the status of a Cabinet Minister, a Vice-Chairman and the following members: the Chairman of the National Research Council, the Commissioner of the National Institute of Science and Technology, the Commissioner of the Philippine Atomic Energy Commission, the Director of the Office of National Planning of the National Economic Council,

a representative of the University of the Philippines, a representative of industry, a representative of scientific and/or technological associations or societies, a representative of agriculture and a representative of education.

(ii) The Commission consists of a Commissioner and Deputy Commissioner, appointed by the President of the Philippines on the recommendation of the Chairman of the Board.

The technical and administrative personnel assigned to the Commission is appointed by the Chairman of the Board, upon recommendation of the Commissioner and subject to approval by the Board.

(b) Functions

(i) The Board determines the overall planning and co-ordination of the whole spectrum of scientific and technological activities.

(ii) Under the supervision of the Board, the Commission is responsible for:

- the establishment of laboratories for nuclear research and training;
- the performance of research and development relating to the peaceful uses of atomic energy;
- approval and facilitation of the procurement of radioactive materials and equipment for use in laboratories;
- the evaluation of project proposals on nuclear research from public and private sectors, and recommendation of any necessary assistance therefor;
- the licensing of atomic energy materials and facilities, and the promulgation of regulations and rules therefor;
- co-ordination of research work in nuclear science;
- representing the Philippines at international conferences dealing with atomic energy;
- checking the progress of assisted research projects and activities in the nuclear field;
- recommendation for the award of training, grants and scholarships.

The Commission also exercises control over the Atomic Energy Research Centre, and any other centres which may be created by the Board upon the recommendation of the Commission.

8. Thailand

(i) The Atomic Energy Commission for Peace is placed under the Chairmanship of the Prime Minister.

(ii) The Office of Atomic Energy for Peace, placed under the supervision of the Minister of National Development, is headed by a Secretary General.

(a) Composition

(i) The Commission consists of the Chairman, eight qualified persons appointed by the Cabinet, seven members representing various

Departments (National Development, Foreign Affairs, Public Health, Agriculture, Industry, Budget and Prime Minister's Office) and the Secretary General of the Office of Atomic Energy for Peace who is Secretary of the Commission.

(b) Functions

(i) The Commission is authorized:
- to establish policy on, and to initiate, encourage and control nuclear research, procurement of source materials, production and utilization of nuclear materials for peaceful purposes;
- to advise the Government in the determination of special nuclear materials and source materials;
- to lay down rules for the control and carrying out of activities subject to licences issued under the Act;
- to determine various standards applicable to atomic energy;
- to promote and propagate knowledge relating to atomic energy.

(ii) The Office of Atomic Energy for Peace is the executing agency of the Government for implementing the Commission's decisions and for supervising the peaceful uses of atomic energy.

9. Viet-Nam (Republic of)

(i) The Office of Atomic Energy[18]
(ii) The National Commission for Protection Against Ionizing Radiation[19]

(a) Composition

(i) The Office of Atomic Energy consists of a Director General appointed by the President, assisted by an Administrative and Financial Assistant, and an Advisory Committee on scientific and technical matters. The supervision of the Office is entrusted to a Council of Administration of seven members representing various ministries and Government agencies (Education, Defence, Health, Agriculture, Budget, Planning, and Atomic Energy). The Education Minister is the Chairman of the Council, whose Rapporteur is the Director General of the Office for Atomic Energy.

(ii) The Commission consists of a President, who should be the Director General of the Office of Atomic Energy, ex officio, and the following members:
- the Director General of Health and Hospitals,
- the Inspector General of Labour,
- a representative of the medical association,
- a number of members selected on the basis of their qualifications in the field of radiation applications and nuclear research.

[18] Presidential Decree No. 507/TTP of 11 October 1958; Presidential Order of 4 September 1959, as amended on 18 September 1961; Prime Minister's Order of 8 May 1964.

[19] Legislative Decree No. 006/66 of 3 March 1966.

(b) Functions

(i) The Office of Atomic Energy:
- directs the training of personnel;
- carries out scientific and technical research related to the peaceful uses of atomic energy;
- considers appropriate measures for protection against radiation;
- directs and organizes prospecting for deposits of radioactive ores;
- promotes, assists and develops the peaceful applications of atomic energy;
- collects and disseminates information about atomic energy and deals with international organizations in nuclear energy;
- generally takes all steps necessary to enable the country to benefit from atomic energy.

(ii) The Commission:
- advises the Government and the Office of Atomic Energy on regulatory measures for radiation protection;
- lays down safety rules and recommendations to ensure such protection;
- supervises the application of safety regulations and procedures;
- encourages studies, collects and maintains documentation on radiation protection.

III. RADIATION SAFETY REGULATIONS

1. Ceylon

The 1969 Act provides that regulations will be issued to ensure that no damage from ionizing radiation is sustained by workers and the population at large, as a result of nuclear activities or the use, sale or transport of radioactive materials. Draft Atomic Energy Regulations were prepared by the Atomic Energy Authority in 1971 in consultation with the IAEA Secretariat.

2. India

The 1962 Act contemplates that the Central Government will issue regulations to prevent damage from radioactive substances or radiation generating plant. Regulations to this effect were drawn up in 1965 and made executively applicable to all users of radioisotopes and radiation workers prior to enactment through Parliament as Radiation Protection Regulations, 1971. The Directorate of Radiation Protection of the Department of Atomic Energy is responsible for implementing a country-wide radiation hazards control program.

3. Indonesia

The 1964 Law provides that the Government shall control the application of atomic energy in any field to ensure the safety and health of workers and the population. To this end, a Government Regulation was issued in

1969[20] vesting licensing responsibilities in the National Atomic Energy Agency and providing for the application of Safety standards and measures in the utilization of radioisotopes and radiations. A Manual on Safety Provisions for Radiation work, based on the IAEA safety standards, has also been issued[21]. A draft Transport Regulation is under preparation by the authorities, on the basis of the IAEA Regulations.

4. Japan

Radiation protection, nuclear source materials and fuel materials, the storage and carriage of radioactive materials by various modes of transport, the operation of nuclear power reactors and nuclear ships and related facilities are regulated by a most comprehensive legislation[22].

5. Korea (Republic of)

The basic Law of 1958, as amended, provides for 'great care' to be exercised so as to protect persons and the public from exposure to radiation hazards. The Law envisages safety standards to be laid down relating to nuclear installations, radiation devices and radioisotopes. A comprehensive Ordinance[23] has been issued relating to radioisotopes; radiological safety officers are required to have adequate qualifications and safety specifications for various radiation or nuclear facilities and preventive measures are set out. Regulations for the licensing of nuclear installations have also been enacted[24], which also apply to nuclear vessels.

6. Pakistan

To ensure the safety of operations carried out under its control, the Pakistan Atomic Energy Commission has issued a Manual of Radiation Safety Procedures and Regulations[25] based on relevant international recommendations, in particular the IAEA Safety Standards. With the advisory services of a legal consultant provided by the IAEA, a draft Nuclear Energy Control Ordinance aimed at ensuring nuclear safety and radiation protection, and at regulating the construction and operation of nuclear power plants and facilities, was elaborated by the Commission in 1970.

7. Philippines

Radiation safety has been the subject of several regulatory measures. Regulations based on the IAEA Basic Safety Standards have been issued for protection of workers and patients; dealing with disposal of radioactive wastes; and requiring accounting for radioactive materials.

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[20] Government Regulation No. 9 of 1969 concerning the Application of Radioisotopes and Radiations.

[21] On 20 October 1971, under the authority of the National Atomic Energy Agency.

[22] See "Current Nuclear Legislation in Japan" by Norihiko Maeda in this publication.

[23] State Council Ordinance No. 244.

[24] Promulgated by Presidential Decree No. 4055 of 10 September 1969. Regulations concerning the Installation, Operation, Management, etc. of a Reactor.

[25] PAEC, Atomic Energy Centre, Lahore; document AECL/HP/2, October 1961.

Regulations for the safe transport of radioactive materials are also based on the IAEA Regulations.

The problem of water and air pollution has been dealt with by regulation to ensure the prevention of such pollution by, inter alia, radioactive materials. National standards for drinking water have also been established to provide, inter alia, sampling of water supplies to ensure that prescribed limits of concentration are not exceeded.[26]

A comprehensive Act dealing with both the regulatory and liability aspects of nuclear facilities and materials has been promulgated[27]; draft licensing regulations and procedures were prepared in 1971 with the advisory services of an IAEA legal consultant.

8. Thailand

The basic Act as amended contains general provisions for protection of health and prevention of danger to persons and property. Thus conditions may be imposed on licences and inspections carried out to further these aims. The terms of the Act are wide enough to permit specific regulations to be issued by the competent Minister. Some general rules for the handling and disposal of radioactive materials are laid down in an earlier regulation[28]. A Ministerial Regulation prescribing conditions for the licensing of radioactive and special nuclear materials applies to the production, possession, utilization, processing, import and export of such materials[29]. The elaboration of licensing regulations for nuclear power plants was started by the Thai Commission of Atomic Energy for Peace following the advisory services of a legal consultant provided by the IAEA in 1971.

9. Viet-Nam (Republic of)

Within the National Commission for Protection against Ionizing Radiation, a Standing Committee composed of the Director General of the Atomic Energy Office (Chairman), the Director General of Health and Hospitals, and the Inspector General of Labour, ex officio, is responsible for handling current matters connected with radiation safety and for recommending safety measures therefor. The Commission has also a team of inspectors to carry out monitoring activities and to ensure compliance with safety regulations. An inventory of radiation sources in service in the country is required by law, and the safety standards applicable to radiation installations are based on the IAEA standards[30].

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[26] Rules and Regulations issued pursuant to the Science Act 1958, as amended by Republic Act No. 3589; Administrative Order No. 96 of 1962 of the Secretary of Health; Rules and Regulations of the National Water and Air Pollution Control Commission; National Standards for Drinking Water, 1963, of the National Committee on Drinking Water Standards; Administrative Order No. 139 of 1965; Rules and Regulations on the Safe Transport of radioactive materials in the Philippines, 1966.

[27] Atomic Energy Regulatory and Liability Act of 1968, Republic Act No. 5207.

[28] Order No. 0842 of 1956, Art. VIII to X.

[29] Ministerial Regulation No. 2 (B. E. 2504) of 10 July 1961, issued under the Atomic Energy for Peace Act of 1961.

[30] Presidential Decree No. 26-TTP of 27 January 1959; Legislative Decree No. 006/66 of 3 March 1966; Ministerial Orders No. 10-VHXH/NTLC of 7 January 1967 and No. 62-VHXH/ND of 1 March 1967, as amended in 1971.

IV. LIABILITY AND COMPENSATION FOR NUCLEAR DAMAGE

1. Ceylon

The 1969 Act imposes liability on the Authority and provides for compensation in the following circumstances:

(i) Where injury is caused to any person by ionizing radiation from any material in Authority premises or in the course of carriage on behalf of the Authority or from waste discharged from Authority premises;

(ii) where an employee contracts any prescribed disease as a result of such employment.

An employer is liable to pay compensation to employees, engaged in any process involving ionizing radiation, for any prescribed disease resulting from such employment.

Claims for compensation must be submitted within thirty years.

2. India

The Central Government is empowered to make rules determining the extent of a licensee's liability for any damage to any person or property caused by ionizing radiation or radioactive contamination, and for provision, by insurance or other means, of sufficient funds to ensure settlement of all claims.

3. Indonesia

Under the basic Law of 1964, the operator of an atomic installation is held liable for any damage arising therefrom, unless caused by natural disaster or 'force majeure'. He is responsible for accidents during transportation until receipt of the material by the consignee, unless otherwise agreed.

The Government is to make arrangements for indemnification for such accidents.

4. Japan

The relevant legislation, promulgated in 1961 and amended in 1971[31], includes the following main features:

- channelling of liability for nuclear damage to, and strict liability of, the nuclear operator except in the case of damage caused by an extraordinarily grave natural disaster or by a serious social disturbance;
- limitation of the financial security required from the operator for compensation for nuclear damage (the maximum amount of 5 billion yen per installation, established in 1961, was raised to 6 billion yen in 1971);
- coverage of the operator's liability by insurance and by an indemnity agreement with the Government or by a deposit either in cash or in securities approved by the Government;

[31] Law No. 147 of 17 June 1961 on Compensation for Nuclear Damage; Law No. 148 of 17 June 1961 on Indemnity Agreement for Compensation of Nuclear Damage, as amended by Law No. 53 of 1 October 1971.

– limitation of the operator's liability in time (claims must be submitted within 10 years from the date of a nuclear incident);

– the limitation in amount of the liability of the operator of a nuclear ship visiting a foreign country is to be determined by a bilateral agreement; however, in the case of a foreign nuclear ship visiting Japan, the amount of the operator's liability cannot be less than 36 billion yen per incident.

The Government is authorized to enter into an agreement with the operator of a nuclear installation or nuclear ship (except the operator of a foreign nuclear ship) to provide for indemnification by the State in the cases not covered by the operator's insurance, such as nuclear damage caused by earthquake or volcanic eruption or arising from normal operation of a nuclear installation or nuclear ship, or nuclear damage in respect of which a claim for compensation would be justified after the ten-year period. The Government may further be authorized by the Parliament to provide such aid as may be necessary to compensate for nuclear damage, should a nuclear incident result in claims exceeding the operator's financial security. Such additional compensation also extends to nuclear damage caused by a foreign nuclear ship visiting Japan.

5. Korea (Republic of)

Legislation on nuclear third party liability[32] is based on:

– strict liability of the 'nuclear service operator', defined to cover licensees in respect of reactor operations, fabricating and reprocessing services, the utilization of fissionable materials, research institutes, and atomic energy development and production agencies established under the basic Atomic Energy Law;

– limitation of his liability to 1.5 billion Won per installation or nuclear ship (but no limitation in time is provided for such liability);

– compulsory financial security, supplemented by an indemnity agreement contracted with the Government;

– settlement of disputes on compensation for nuclear damage by a Reconciliation Committee to be established by Presidential Decree.

6. Pakistan

The draft Nuclear Energy Control Ordinance of 1970 contains liability provisions consistent with the principles of the Vienna Convention of 1963.

7. Philippines

The relevant legislation[33] has incorporated the principles of the Vienna Convention of 1963 ratified by the Philippines on 15 November 1965:

– strict liability of the operator of a nuclear installation;

– limitation of his liability to 5 million US dollars per incident;

– compulsory financial security;

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[32] Nuclear Damage Compensation Law No. 2094 of 24 January 1969.

[33] Rules of Procedure of the Nuclear Indemnity Board;
Atomic Energy Regulatory and Liability Act of 1968, Part VII.

- extinction of rights of compensation after ten years from the date of the nuclear incident;
- exclusive jurisdiction of one court over claims relating to a nuclear incident.

In addition to the operator's insurance cover or other financial security, the Government is authorized to provide the necessary funds to settle claims within the maximum amount established for compensation in respect of any nuclear incident. Should this limit of the operator's liability be exceeded, the Government may recommend to the Congress the appropriation of additional funds as warranted.

(It may be noted that, in contrast to the Japanese and Korean laws which require the operator's financial security per installation, the Philippine legislation has adopted the concept of liability limit in amount per incident as reflected in both the Paris and Vienna Conventions on nuclear liability. This means that at any time the maximum amount of financial security provided by law should be fully available for each incident, even in the case of repeated incidents in one facility within a short period of time. However, on account of the safety record of nuclear installations, it appears unlikely that more than one nuclear incident absorbing the total fixed amount could occur within a limited time.)

8. Thailand

With the assistance of the IAEA, the Nuclear Law Committee of the Commission of Atomic Energy for Peace started in 1971 the drafting of a law on civil liability for nuclear damage taking into account the provisions of the Vienna Convention of 1963.

9. Viet-Nam (Republic of)

Workmen's compensation for radiation injury is included in current legislation but no legislative action has been contemplated regarding nuclear third party liability.

LECTURERS AND PARTICIPANTS

SEMINAR ON THE DEVELOPMENT OF NUCLEAR LAW
Bangkok, 6 - 11 April 1970

PARTICIPANTS

W. BOULANGER	Legal Division, IAEA	
C.H. CHENG	Atomic Energy Council, Taipei	Taiwan
N. CRISTOBAL	Legal Division, Philippine Atomic Energy Commission, Manila	Philippines
A.I. HASHMI	Pakistan Atomic Energy Commission, Karachi	Pakistan
P.N. KRISHNAMOORTHY	Directorate of Radiation Protection, Bhabha Atomic Research Centre, Bombay	India
F. MACADIE	International Relations Office, Australian Atomic Energy Commission, Coogee, N.S.W.	Australia
N. MAEDA	Policy Division, Atomic Energy Bureau, Science and Technology Agency, Tokyo	Japan
A.A. NATAADIDJAJA (Mrs.)	Legal Division, National Atomic Energy Agency, Djakarta	Indonesia
N.B. NHU	National Commission of Radiation Protection, Office of Atomic Energy, Saigon	Viet-Nam
S.Y. PARK	Nuclear Power Section, Office of Atomic Energy, Seoul	Republic of Korea
W. RATANAWICHIT	Juridical Council, Prime Minister's Office, Bangkok	Thailand

H.K. SHAPAR	General Counsel's Office, USAEC, Washington	United States of America
E.E. SPINGARN	General Counsel's Office, USAEC, Washington	United States of America
S. SRISUKH	Office of Atomic Energy for Peace, Bangkok	Thailand
P. STROHL	Legal and External Relations, European Nuclear Energy Agency, Paris	Organization for Economic Co-operation and Development

OBSERVERS

P. CHUNGWATANA	Atomic Power Division, Electricity Generating Authority of Thailand, Nonthaburi	Thailand
V. KESHAGUPTA	Health Physics Division, Office of Atomic Energy for Peace, Bangkok	Thailand
H. MOGI	Policy Division, Atomic Energy Bureau, Science and Technology Agency, Tokyo	Japan
Y.F. NING	Legal Committee, Atomic Energy Council, Taipei	Taiwan
A. PEARCE (Miss)	Embassy of New Zealand, Bangkok	New Zealand
M. RUCHUPAN	Juridical Council, Prime Minister's Office, Bangkok	Thailand
T. SUMITRA	Atomic Power Division, Electricity Generating Authority of Thailand, Nonthaburi	Thailand

SECRETARIAT

Technical and Administrative Secretary	HA VINH PHUONG Legal Division, IAEA

INTER-REGIONAL TRAINING COURSE ON THE LEGAL ASPECTS OF NUCLEAR ENERGY
Athens, 7 - 18 December 1970

AGENCY LECTURERS

HA VINH PHUONG	Legal Division, IAEA	
R.M. STEIN	Legal Division, IAEA	

VISITING LECTURERS

W. BOULANGER	Bundesministerium für Bildung und Wissenschaft, Heussallee 2-10, 5300 Bonn 9	Federal Republic of Germany
P.N. KRISHNAMOORTHY	Deputy Director, Directorate of Radiation Protection, Bhabha Atomic Research Centre, Trombay, Bombay - 85 (AS)	India
F. LACROIX	Director, Centre d'Etudes du Risque Atomique, Comité Européen des Assurances, Square de Meeus 29, 1040 Brussels	Belgium
A.C. MILES	Secretary, British Insurance (Atomic Energy) Committee, Aldermary House, Queen Street, London, EC4N 1 TH	United Kingdom
A. de los SANTOS LASÚRTEGUI	Legal Adviser, Junta de Energía Nuclear, Ciudad Universitaria, Madrid-3	Spain
H.K. SHAPAR	Assistant General Counsel for Licensing and Regulation, United States Atomic Energy Commission, Washington, D.C. 20545	United States of America
P. STROHL	Head, Legal and External Relations Division, European Nuclear Energy Agency, 38, bd Suchet, Paris 16e	France

PARTICIPANTS

R.B. AKBARI (Mrs.)	Health Physics Division, Tehran University Nuclear Centre, Teheran	Iran
S. AMARANTOS	"Demokritos" Nuclear Research Centre, Athens	Greece

A. BAZA-NESTORIDOU (Mrs.)	Health Education Section, Ministry of Social Affairs, Athens	Greece
D. CHRISTOPHILOPOULOS	Public Power Corporation, Athens	Greece
L. HESSE	Office of the Attorney-General, Accra	Ghana
A. HIDAYATALLA	Radiation and Isotopes Centre, Khartoum	Sudan
B.O. ILUYOMADE	University of Ife, Ife	Nigeria
K.H. ISMAIL	Atomic Energy Establishment, Cairo	Egypt
O. JEMIYO	Federal Ministry of Justice, Lagos	Nigeria
M. MITRI	Ministry of Justice, Beirut	Lebanon
J. MOUSTAKAS	Ministry of National Defence, Athens	Greece
G. PAPADOPOULOS	Ministry of Industry, Athens	Greece
N. PAPADOPOULOS	"Demokritos" Nuclear Research Centre, Athens	Greece
A.L. RIFAI	Supreme Council of Sciences, Damascus	Syrian Arab Republic
U. SOMUNCU	Turkish Atomic Energy Commission, Ankara	Turkey
S.S. ZULU	Ministry of Justice, Lusaka	Zambia

OBSERVERS

M.S. EL-BANHAWEY	Ministry of Foreign Affairs, Cairo	Egypt
D. MARKETOS	Health Protection Division, Greek Atomic Energy Commission, Athens	Greece
I. NESTOR	State Committee on Nuclear Energy, Bucharest	Romania
G. PAPADATOS	"Demokritos" Nuclear Research Centre, Athens	Greece

I. SPASSOV	Ministry of Foreign Affairs, Sofia	Bulgaria
S. TSIALAS	Radiation Protection Section, Greek Atomic Energy Commission, Athens	Greece
S. TSOMLEKTSOGLOU	Public Power Corporation, Athens	Greece
Z. ZIDEK	Czechoslovak Atomic Energy Commission, Prague	Czechoslovakia

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