

CIVIL LIABILITY FOR NUCLEAR HAZARDS

Civil law rules on conventional third party risks are not adequate for dealing with the special hazards involved in the peaceful utilization of nuclear energy. Nor can the problems arising from these hazards be solved entirely by rules of civil liability. It is nevertheless desirable that special civil legislation be devised for the maximum possible financial protection of the public without, however, imposing on the atomic industry an unreasonable or indefinite burden of liability.

Such special legislation has been enacted in several countries and is planned in a number of others. But national, or even regional, solutions are not sufficient to cope with all aspects of the problem. Radiation damage resulting from a nuclear incident may occur at a considerable distance from the source of radiation; besides the mal-functioning of a nuclear installation may involve manufacturing industries located in a variety of countries. And to these must be added the hazards inherent in international transportation of radioactive, and sometimes fissile, materials.

Under existing rules concerning jurisdictional competence and choice of laws, a single nuclear incident could generate suits in several States and the courts might apply different laws to different claims arising out of the same incident. This would not only expose the industry to unforeseeable risks of liability but also make it difficult to provide adequate and equitable financial protection for the public. Only an international convention can serve as a basis for effective and largely uniform rules regarding civil liability for nuclear hazards. Such a convention should bind not only States in which nuclear energy is now utilized but also others in which damage may be suffered or where nuclear industry is expected to develop in the future.

Draft Convention

A draft convention has now been prepared under the auspices of the International Atomic Energy Agency and sent to the Agency's Member States for comment. The convention has been prepared by a Panel of Experts instituted in December 1958 by the Agency's Director General to advise him on the problems of civil liability and State responsibility for nuclear hazards. The Chairman of the Panel was Ambassador Paul Ruegger of Switzerland, member of the Permanent Court of Arbitration in the Hague, and the other members were Giuseppe Belli (Italy), G.H. Carruthers (United Kingdom), Edward Diamond (United States of America), Yoshio Kanazawa (Japan), B.N. Lokur (India), Anatol Nikolaiev (USSR), Fuad Abdel Moneim Riad (United Arab Republic), Pavel

Winkler (Czechoslovakia) and Enrique Zaldivar (Argentina) - all of them selected on an individual basis. The Panel convened for three series of meetings last year and produced the draft convention which is now being considered by the Agency's Member States.

In preparing the draft, the Panel of Experts recognized the need for leaving to national legislation any matter where the differences between the various legal systems of the world are too wide or fundamental to be eliminated. The draft, therefore, is to be regarded as a "framework convention", the main principles of which represent the essential common denominator. While the experts considered it desirable to leave each State reasonably free to develop its own special legislation, they however found it necessary to establish the basic provisions without which a convention would not be a working piece of international legislation. The solutions, adopted after lengthy and detailed discussion, emerged from an effort to achieve a result that would be acceptable to as great a number of countries as possible, representing different legal traditions. The result is by no means a final set of principles and rules, and improvements may be necessary both in substance and in form; however, it is intended to serve as a basis for discussion and final action at Government level - both of which can best be promoted or co-ordinated by the International Agency.

The draft convention deals with hazards connected with land-based nuclear installations and the transportation of fissile or other radioactive materials; problems of liability for nuclear-powered ships are being considered by a separate panel. The convention consists essentially of a co-ordinating formula, designating the State that will have exclusive legislative and jurisdictional competence over claims arising out of a given nuclear incident and enumerating the minimum international standards which must be adopted before a State can be entrusted with such exclusive competence. Apart from this, it does not seek to create a new and uniform civil law, but rather to increase the effectiveness of existing national or regional legislation by giving it world-wide recognition. The minimum norms contained in the draft convention are, however, designed to be applicable by themselves so as to fill the gap until such time as adequate nuclear liability laws have been devised by a country within the broad framework of this convention.

Absolute Liability

Among the main provisions of the draft convention are those concerning the principle of strict lia-

bility, designation of the person* liable, limitation of liability in amount and time, financial security and jurisdictional competence. The convention establishes the principle that "liability for nuclear damage shall arise without proof of fault or negligence". This appeared to the Panel of Experts to be justified both on moral and practical grounds. Any requirement to prove fault would impose a heavy burden on the claimants without giving the defendant any corresponding practical advantage. It would, however, be necessary to prove causation of damage by a given source.

As regards the person liable, it is stated that the liability will rest with the operator of the installation which is responsible for the damage. If the damage is caused by a consignment of nuclear materials, the person liable will be the operator of the originating installation or of the installation to which it is consigned. Concentration of liability in one person in regard to each incident is designed to facilitate financial coverage as well as the filing and litigation of claims. When damage is attributable to several sources of ionizing radiation covered by the convention, the person responsible for each source will be liable for the full amount of the damage, up to the limits applicable to the liability of each person. This provision is a direct consequence of the absolute nature of third party liability for nuclear damage and has been devised in the interest of the public which should not be compelled to proceed separately against every person liable. At the same time, any operator who has been held liable for more than the ratio of the damage attributable to his installation may seek financial contribution from the operator of any other installation which contributed to the damage.

Except in regard to nuclear consignments, the convention permits States to lower the minimum norms established with respect to the limit of liability and financial security, but in such cases the State will have to provide for the difference. The convention does not specify how States should meet this obligation; it was not considered advisable to set down precise and uniform rules in view of the traditional differences and likely constitutional difficulties. The object is to permit States to adopt a flexible system under which the ceiling of liability or the required insurance coverage for each source of ionizing radiation can be determined in relation to the prevailing relevant factors. All that the draft convention does is to lay down that the operator must maintain adequate financial security to the extent of certain specific limits, providing, at the same time, that the State in which the installation is located may permit him to maintain such security for a lower limit.

The requirement that all liability for nuclear damage must be covered by adequate financial security, or that the State must provide for any re-



Panel of experts on civil liability and State responsibility for nuclear hazards. At head of table, Mr. Sterling Cole, Director General, IAEA; on his right, Dr. Paul Ruegger, Chairman of the Panel

sulting deficit, represents one of the principal features of the convention. Such security is necessary to protect claimants against the possible insolvency of a defendant. Financial security may be in the form of insurance, a bank guarantee or any pledge of the State or of a private person. The State of the operator will have the duty to ascertain that the security maintained is adequate and effective.

Limitation in Amount and Time

One of the principal postulates of any legislation regarding third party nuclear damage is to keep the total amount of liability within reasonable limits. On the one hand, such limitation would protect the industry against a risk of liability that would exceed its financial capabilities. On the other hand, it is an essential pre-condition for the requirement that financial security be maintained for the full amount of the liability, and permits an equitable distribution of compensation in case the damage should exceed the defendant's assets or the ceiling of liability. No actual figures have been recommended by the experts for adoption as reasonable international minima. Most of them were of the view that these minima should correspond generally to what the operators and their insurance market could reasonably be expected to bear. Such an estimate, it was felt, should not be too low because insurance capacity will probably increase, and the State in which the installation is located may be expected to intervene in cases where the available insurance capacity is below reasonable international standards. At the same time, the aggregate damage may exceed the limit of liability, however high it may be, and the convention is not intended to preclude the contracting States from adopting measures outside the realm of civil law to provide compensation for such excess damage.

Two limits are to be specified. One is the minimum applicable to the aggregate damage caused by an

* The term "person" is used in the widest sense, including natural as well as legal persons, e.g. States, political sub-divisions or international organizations.

installation during one year or, in the case of consignments, during one voyage, while the other is the minimum applicable to the aggregate damage caused by each incident. The draft, as it stands, provides that the liability for nuclear damage will be limited in amount but the limits will not be lower than certain minima to be specified.

Another aspect of the limitation of liability is the fixation of a time-limit within which claims may be made. The convention permits the State concerned to establish a period within which actions for nuclear damage must be filed. It is laid down that if the period is calculated from the time when the nuclear incident occurs, it may not be less than ten years. Nuclear injuries frequently produce delayed effects and not all such latent damage will manifest itself within ten years. That period, it is felt, represents a reasonable compromise covering most latent injuries regarding which causation can be established with some degree of certainty. If, however, a State establishes a period computed from the time when the damage and its cause are ascertained or ascertainable, it is not bound by the ten-year minimum.

Jurisdictional Competence

Another major task before the Panel of Experts was to decide the question of jurisdictional competence over actions for nuclear damage, and it decided that jurisdiction would lie only with the courts of the State in which the nuclear installation concerned is located. Thus the convention concentrates all jurisdictional competence over third party suits arising out of a given incident with the courts of the one State which has the closest connexion with the source of ionizing radiation. Except where the incident involves consignments, the choice naturally falls on the State in which the defendant's installation is located even if damage is sustained in another State. As regards incidents caused by consignments, the interest of the claimants demands that jurisdictional competence be placed with the courts of the State in which the incident occurs, and it is accordingly so provided in the draft convention. To require claimants to travel to the courts of the State of the consignor or the consignee would hardly be a satisfactory arrangement.

Apart from these basic provisions, the draft convention contains a number of articles dealing with such subjects as geographical scope, sovereign immunity, and procedure for implementation. Each of these subjects raises complicated issues and in some cases alternative articles are proposed. It is to be expected that all the provisions of the draft convention will be considered by the legal experts and administrative authorities of the Agency's Member States, and to be hoped that the final document that will emerge after such consideration will find universal acceptance.

Nuclear Ships

While the problems of civil liability for nuclear damage caused by land-based installations or trans-

portation of materials are covered by the provisions of the draft convention, equally complicated problems are likely to arise in connexion with liability for the hazards of nuclear-powered marine propulsion. Regardless of whether uniform and compulsory safety standards for nuclear ships are adopted by all nations in the near future, the possibility of incidents can never be ruled out altogether, and it is imperative that adequate international rules be devised to govern liability for any resulting damage. As in the case of land-based installations and transportation, these rules should not only protect the possible victims but also afford a reasonable protection for the shipping interests against excessive liability.

The lines on which such rules can be framed are now being examined by a separate Panel of Experts convened by the IAEA Director General under the chairmanship of Mr. Albert Lilar, President of the International Maritime Committee and Deputy Prime Minister of Belgium. The other members of the Panel, drawn from 23 countries, are Carlo van den Bosch (Belgium), Vladislav Brajkovic (Yugoslavia), Hans Chr. Bugge (Norway), Camilla Dagna (Italy), M. Ghelmegeanu (Romania), Bernhard Gomard (Denmark), Eiichi Hoshino (Japan), B. Konstantinov (Bulgaria), D. Lamani (Albania), Leo J. Leavey (Canada), Ilhan Litem (Turkey), Stanislav Matysik (Poland), Clarence G. Morse (USA), Nagendra Singh (India), Anatol Nikolaiev (USSR), Kaj Pineus (Sweden), Albert Raspi (France), H.E. Scheffer (Netherlands), Kynakos Spiliopoulos (Greece), R. A. Thompson (United Kingdom), H. Weitnauer (Federal Republic of Germany), K. Zabigailo (Ukrainian SSR) and Enrique Zaldivar (Argentina). The Panel, which held its first series of meetings in March, is expected to end its work this summer.

The work of this group has been substantially facilitated by the experience gained in the course of the work of the earlier Panel; it has also had the advantage of having before it the conclusions of a meeting of the International Maritime Committee at Rijeka, Yugoslavia, where the problem of liability for nuclear ships was considered in some detail. In fact, some members of the second Agency Panel had attended the Rijeka Conference and were fully acquainted with its work.

Both at the Rijeka Conference and at the first series of meetings of the Agency Panel the question was raised whether an international convention concerning liability for nuclear ship hazards would not be premature at this stage. But on both occasions the experts eventually came to the conclusion that the problems involved call for prompt action on an international basis. Two nuclear-powered vessels have already been commissioned while some others are being constructed or planned. Any of these ships may be expected to operate on the high seas and to enter foreign ports and territorial waters. Quite justifiably the international community would require some guarantees and legal certainty regarding any possible damage, and this could hardly be furnished on a bilateral or regional basis. In cases of distress,



Experts from 23 countries studying the problem of liability for nuclear ship hazards. On the left of Mr. Sterling Cole (at the centre) is Mr. Albert Lilar, Chairman of the Panel

a nuclear ship may be compelled to enter coastal waters and ports in which they did not intend to call; there may also be collisions with foreign ships or contamination of water bodies affecting fisheries and sea lanes open to all nations.

It is thus obvious that this is a field in which international agreement is absolutely essential. So far as land-based installations or the transportation of materials are concerned, it was possible to establish only flexible minimum norms to be supplemented by national legislation. Such flexibility may have serious disadvantages in the case of mobile sources of hazards like ships. Although, for practical and political reasons, national legislation will still retain discretion in many matters, it is essential that a firm international agreement acceptable to all countries be elaborated and adopted without delay to deal with the basic issues of liability for damage caused by nuclear propulsion.

The objectives of such a convention are fundamentally clear. So far as the public is concerned, there should be an assurance of reasonable and equitable compensation, protected by financial guarantees and supported by simple and speedy judicial processes. From the viewpoint of the operators and owners of nuclear shipping, there should, on the one hand, be certain limits on the amount of their maximum liability and on the period during which claims may be made. And as for conventional shipping and those who supply equipment, material or services to nuclear ships, there should be some protection against third party liability. Any universally acceptable international convention must satisfy these apparently conflicting interests.

Basic Postulates

The IAEA Panel of Experts has already made some progress in determining the lines on which such a convention can be based. Both at the first meetings of this panel and earlier at the Rijeka Conference, certain basic postulates were accepted, and the task now is to elaborate the concrete rules within the broad framework of these principles.

The first principle is that all liability must be covered by financial security. The Agency experts have also expressed the view that there should be an international obligation on the licensing State to ensure that the security is effective and available in the event of an incident. Next, it is generally agreed that liability should be uniformly limited in time and in amount. A uniform ceiling is necessary to permit full coverage of liability by financial security and an equitable distribution of the proceeds; it is also felt by most experts that the ceiling should represent a reasonable estimate of the technical risk to the public and should not be influenced by estimates of available insurance capacity.

Another basic principle is that there should be uniform jurisdictional rules for the orderly and equitable distribution of the limited liability proceeds. Whether there should be a system of parallel jurisdictional competence of the licensing State and of the State in which the incident occurs has been examined, but the majority view seems to be in favour of a system under which a single State will have exclusive competence.

Prompt and equitable distribution of compensation is one of the most important requirements from the point of view of the public. This is a complex objective because one must take into account not only the immediately manifest damage but also the delayed effects of radiation, and if compensation is to be promptly paid for the immediate damage, the distribution of the limited liability proceeds may not be found equitable when the aggregate damage is known and considered. However, it is possible to find practical ways of reconciling the two aspects and some tentative suggestions are being considered, though beyond a general obligation the competent State is left free to devise ways and means to attain that objective. It is also in the interest of the public that with respect to every incident the defendant be clearly designated, and it is generally agreed that all liability should be channelled through the operator. Furthermore, as in the case of damage from land-based installations or transportation, the liability of the operator should be absolute and not dependent on proof of fault or negligence. In cases where damage is caused jointly or severally by more than one ship, liability should be joint and several in order to save the public the cumbersome necessity of proceeding against every person liable.

It is expected that there will be general inter-governmental agreement on these basic postulates. In addition, some special problems may call for

detailed consideration. For example, it may be necessary for the State to assume certain obligations in connexion with the requisite financial security, and the exact nature of such obligations must be settled by agreement.

Whether a comprehensive convention should be established or there should be agreement only on certain basic norms is a question to be decided by the Member States of the Agency. But both in regard to

land-based installations and nuclear ships, a beginning towards the elaboration, adoption and international harmonization of liability rules is a task of the highest priority. Efforts must be simultaneously directed to the establishment of safety and to adequate financial protection in the event of a possible failure of safety. The growth of the atomic industry will depend in a large measure on the success of these efforts on both fronts.

STUDIES ON REACTOR PHYSICS

Most of the peaceful applications of atomic energy are inherently dependent on advances in the science and technology of nuclear reactors, and aspects of this development are part of a major programme of the International Atomic Energy Agency. Independent research and experiment are, of course, being vigorously pursued in several countries and the most useful role that the Agency can play is as a co-ordinating body or central forum where the trends can be reviewed and the results assessed. The pooling of information and the exchange of ideas are to the common advantage of all concerned, and progress is thereby made quicker and more balanced. The results of these studies, to which all Member States of the Agency have easy access, can be put to particularly good use by countries where atomic work is just being planned or begun.

Some of the basic studies are carried out by members of the Agency's own scientific staff. While this is a continuous activity, the Agency also convenes groups of experts from different countries to examine a particular problem in detail and make any necessary recommendations. Furthermore, some of the important subjects are discussed at international scientific meetings held by the Agency, where scientists from many countries can compare their experience and correlate the results.

Reactor Computations

One of the subjects covered by such studies is the physics of nuclear reactors and a specific topic recently discussed was Codes for Reactor Computations, on which a seminar was held in Vienna in April this year. The seminar, which was attended by 100 participants from 20 countries, lasted five days during which 37 papers were presented.

Discussions at the seminar indicated how electronic computing machines could be used more widely and effectively for calculations during the design and operation of reactors. Many types of computing machines have lately come into use and high speed machines are now installed in business establishments and statistical organizations in all parts of the world. Since

these machines are seldom fully occupied, some of the computing time could be obtained for reactor calculations at a very reasonable cost. The pooling and evaluation of experience and ideas that took place at the Agency meeting laid the first international foundation for the full utilization of electronic computing techniques in reactor physics studies. These techniques, which can now be employed with equipment within easy reach, could prevent considerable waste of time and effort involved in cumbersome methods of calculation.

Until recently there was little need for international co-operation in this field because almost all generalized computing codes were designed for the machines of two or three large manufacturers. With the introduction of new types of machines however, it has become desirable to establish a universal machine language to facilitate coding as well as to achieve interchangeability of codes and avoid duplication of work.

Codes were divided into two classes: compiler codes and machine codes. Compiler codes are designed to be used directly by the engineer or physicist who expresses his problems in mathematical terms. The machine accepts the codes in these terms and then translates them into fundamental machine operations. Machine codes, on the other hand, are written directly in the fundamental language of the machine. They can be properly assembled only by experts who understand in detail the particular machine to be used. Compiler codes can be easily transferred from one type of machine to another if the machines are designed to accept them, whereas machine codes must be rewritten for each machine.

Many participants in the seminar were strongly in favour of establishing a universal language for compiler codes. The compiler language which is most widely in use today is primarily designed for one type of machine. Steps towards the establishment of a universal machine language have been taken with the formulation of what is known as the ALGOL system. This and other possible systems were considered by the experts and the basic technical requirements examined.