



United Nations

UNITED NATIONS
CENTRE FOR DISARMAMENT
DEPARTMENT OF
POLITICAL AND SECURITY COUNCIL AFFAIRS
Reference Library

A/CONF.35/DOC.5
3 July 1968

Original: ENGLISH

CONFERENCE OF NON-NUCLEAR-WEAPON STATES

Geneva, 1968

Item 4 (b) of the provisional agenda

ASSISTANCE TO NON-NUCLEAR-WEAPON STATES, WHO HAVE RENOUNCED THE PRODUCTION,
ACQUISITION AND USE OF NUCLEAR WEAPONS, IN THE IMPLEMENTATION OF PROGRAMMES
OF PEACEFUL USES OF NUCLEAR ENERGY

by

Ryokichi Sagane*

* This paper by Dr. Ryokichi Sagane, Executive Vice-President, Japan Atomic Power Co. Ltd., Tokyo, has been prepared at the request of the Secretary-General. The views and opinions expressed therein are those of the author and do not imply the expression of any opinion on the part of the Secretary-General.

CONTENTS

	<u>Page</u>
A. INTRODUCTION	1
B. DEFINITIONS	1
C. GENERAL TECHNOLOGY AND ITS EFFECTS ON INDUSTRY	5
D. NEW ASSISTANCE	9
E. INTERNATIONAL ARRANGEMENTS FOR NEW ASSISTANCE	11
F. CONCLUSIONS	13

A. INTRODUCTION

"Assistance" is a word which may be defined in a number of different ways, even within the context of the Treaty on Non-Proliferation. We shall first try to look at the possible range this word may cover and then try to define which meaning or meanings we want to focus our attention on. At the end of this exercise I should like to present a proposal for examination in the hope that it might help to solve the problem we are faced with.

It is one thing to point out various deficiencies in the Treaty on Non-Proliferation and to denounce, demand and protest. I believe that there is a considerable area within the framework of the Treaty that is susceptible of criticism. The Treaty stands on a point of view with regard to political, military and other evaluation of the world outlook and is therefore liable to be criticized by those who take different points of view. It is, however, quite another thing that we should try to make the best out of political, military, economic or technical realities of our international community and try to make the world a better place to live in. In our view, the proposed treaty is in itself a reflection of such reality, rather than any great instrument to change the reality overnight.

On the other hand, we would need to be very careful lest the proposed mechanism of non-proliferation include elements which set in motion a force or forces that might work against this principle. Assistance is a useful and sometimes powerful tool for avoiding such consequences. For if the Treaty is, by definition, a mechanism to freeze (or promote, if it is not followed later by arrangements for nuclear disarmament) the status quo of international inequalities, then assistance is by nature an equalizing force. It is within such terms of reference that I should like to discuss this subject.

B. DEFINITIONS

Let us take up various possible aspects of the word "assistance" and examine them one by one. Here we are talking about assistance to be rendered by nuclear-weapon States on the one hand to non-nuclear-weapon States on the other, and we have no specific countries in mind.

1. Objects of assistance

- (a) So-called spin-off from military research and development. This is a category in which weapons-oriented R + D produces civilian technology that is useful for other purposes. In the case of nuclear power, we have a history that the entire industrial technology is an outcome of either the bomb or submarine propulsion technology. In order to avoid confusion, we shall include in this category only those direct products of weapons R + D which are but one step removed from weapons themselves.
- (b) General technology associated with nuclear power. We may include in this area something like the "general level of science, technology and industry", and this is giving more and more indications of becoming a primary measure with which one evaluates the strength and the "place in the sun" of various countries of the world. We shall need to come back to this subject later and go into more details of what it involves.
- (c) Direct civilian benefits to be derived from the applications of nuclear weapons. The best and at the moment the only practical example in this category is Plowshare, or peaceful application of nuclear explosives whereby a very large amount of energy may be contained in a very small vessel and then released in a very short period of time to perform civil engineering work of a type hitherto inconceivable. The digging of canals and the recovery of low-grade natural resources belong to this area.

There remains the problem of how can one define the term "nuclear explosive devices" so that its inclusion in the Treaty will not disturb peaceful application of nuclear energy. However, we shall not dwell on this point now. Since the subject matter is covered in another paper, we are not going into details of Plowshare application.

2. Nature of assistance

- (a) Access to information is obviously one very important area of assistance. To make available to other countries information that has been accumulated through investment of funds, personnel and time in weapons development does not come as an obvious course of action. Again, this specific subject is well covered in another paper, especially with regard to information mentioned in 1(a) above, and we shall treat this area in a much broader sense and as an important component of "assistance" as a general term.
- (b) Providing means and tools is another category of assistance. What is meant in Article V of the Treaty may fall into this classification. Without giving information necessary to the manufacture of nuclear explosive devices, nuclear-weapon States are pledging to make available to other nations means by which they can enjoy benefits resulting from peaceful application of nuclear explosive devices.
- (c) Providing opportunities for training and education is still another form of assistance. There have been examples of the setting up of training centres at national laboratories which persons from other countries have been permitted to attend. In fact, today a considerable number of the world's nuclear scientists and engineers are graduates of such institutions in the nuclear-weapon States.

Also, there have been instances in which professors, instructors and others were sent to non-nuclear-weapon States. A great deal of the spread of knowledge and capabilities in the field of peaceful nuclear power throughout the world today has been achieved thanks to such training and education arrangements.
- (d) Building research reactors or nuclear power plants or providing long-term financial assistance at low interest for this purpose is certainly an important form of assistance. There is nothing very special about nuclear energy in this regard. Building dams or arranging for low-interest loans for steel mill construction are in the same category as and similar in nature to educational and welfare assistance in the form of the building of schools or hospitals in countries where such facilities are greatly needed.

3. Relation with the Treaty on Non-Proliferation

- (a) Looking at the list so far, one feels the need to distinguish the forms of assistance that came to our attention because of the Treaty from those that did not. Reference is made here to the assistance that nuclear-weapon States are asked to give in return for the restrictions that non-nuclear-weapon States are accepting because of the Treaty.
- (b) In contrast to the above is assistance which is properly a part of, or a nuclear chapter in, the general technical and economic assistance which developed countries are giving to developing countries. Emphasis has been added to this type of assistance because of the over-all undertakings signatories to the Treaty have jointly endorsed through such provisions as Article IV. The Treaty, in this sense, provides an occasion to recall the important role nuclear energy is expected to play in the progress of human welfare all over the world. However, it would not be right to regard the Non-Proliferation Treaty as if it were a new covenant for peaceful nuclear energy. The Treaty pledges not to disturb peaceful development, and it would be more important here to make sure that it did not. Then we could proceed to finding ways to make use of this occasion so as further to promote peaceful uses of nuclear energy.

The categories mentioned above do not necessarily constitute an exhaustive list of headings under which the word "assistance" may be classified. Rather, they indicate the extent of the complexity of this subject. In the measure that the Treaty is a reflection of the complicated reality of today so, in the same measure, the complex compound of self-interests, objectives, technological gaps and political and economic strategies have to enter into our consideration of assistance. I should like to emphasize particularly that "assistance" should not be interpreted simply as an act of benevolence in which the rich give to the poor what the former no longer need. The Treaty has added a new meaning to this word.

C. GENERAL TECHNOLOGY AND ITS EFFECTS ON INDUSTRY

It is time now to look specifically at what renunciation of "production, acquisition and use of nuclear weapons" means to the technological and industrial level of a country.

The role of military R + D in the advancement of technological welfare has become one of the favourite subjects of discussion today. Within a given framework of expenditure, so the argument goes, military R + D is not the most effective way to achieve the desired end.

On the other hand, when one is looking for motivation to promote R + D, military or weapons-oriented incentive is a powerful tool in addition to, or often in place of, economic motivation. For any nation, self-defence is a powerful argument - and the most convincing one - to justify large expenditure. Had it not been for the purpose of national defence, it is quite doubtful whether the United States would have embarked on a crash programme of designing, building and operating a 2.5 billion dollar complex of gaseous diffusion plants.

In this sense there is much more to the contribution of weapons-oriented R + D to civilian technology than just the straight and direct application of its results to our day-to-day life. But more time is needed before all the effects are seen. When the Non-Proliferation Treaty prohibits production and possession of nuclear weapons, it is in fact cutting out the entire pyramid of scientific and technological developments which may follow their production and possession and consequent commercial and industrial advantages arising out of such developments.

Let us take examples to illustrate the point:

- (a) When production is prohibited, that often makes R + D activities leading to production impossible also. This point is obvious when one recalls that the Manhattan District Project would have been quite incomplete without Alamogordo. Manufacture and testing out of prototypes is an essential part of any R + D activities. Prohibition of production would also make impossible various industrial capabilities in support of manufacture.

- (b) Separation of uranium isotopes was a direct result of the bomb project. It also brought with it advancement in electromagnetic technology, centrifuge technology, nickel-plating technology, compressor technology, etc.
- (c) In addition to direct technological benefits, the Manhattan Project provided the United States with very precious experience of managing a nation-wide scientific-technical-industrial project. It also gave a large number of scientists and engineers opportunities to accumulate knowledge and gain experience. In the age of big science, such experience may very well determine the future capability of a country. This is seen also from the fact that the prosperity of nuclear power industry in the United States today is supported to a great extent by many able graduates from the Manhattan Project.
- (d) Extraction of Plutonium from irradiated fuel is another example. The extracting process was undoubtedly developed in order to obtain this material for the bomb. Not only has this given nuclear-weapon States chemical reprocessing technology and subsequent commercial advantages in the nuclear fuel cycle, but the progress in industrial chemistry of uranium and plutonium obtained as a result of this experience has been enormous.
- (e) Privately financed chemical reprocessing plants are still having a great deal of economic and other difficulties. Privately financed uranium separation plants are as yet far from becoming an economic reality. This points to the fact that these facilities, although integrated parts of the commercial fuel cycle, are supported at least partially by the weapons demands. At the time when many facilities have become required parts of commercial nuclear activities countries without nuclear weapons projects are at great disadvantage, not only because of the lack of basic technology but also because of the scale effects* on their economics. Reprocessing and uranium enrichment are two outstanding examples.

*

Resulting reduction of costs due to methods of mass production.

- (f) A great deal of information about the physics of plutonium has been accumulated through the bomb project. Criticality study, just to take a small example, has been carried out in a great detail to support the project. Value of this knowledge in terms of fast breeder development is obvious.
- (g) Metallurgy of metallic uranium was developed for the sake of production reactors. In fact the entire line of natural uranium reactors has been developed for this purpose. A great deal of materials development, development of nucleonic instrumentations and reactor control technology has its initial start in the production reactors. Submarine propulsion reactors then played a similar role, and today reactors for space use may be doing the same thing for the future reactor types.
- (h) During the process by which the original and rather crude bombs have been transformed into the highly sophisticated nuclear warheads of today, there have been many areas of physics, chemistry, mechanical engineering, electronic instrumentations etc., which have received a great deal of attention. In many cases, non-nuclear-weapon States do not even know what the problems involved were, not to mention access to the great wealth of data and information accumulated through this process.
- (i) Development of high speed scientific computers and data processing devices is an example of an indirect but very important area of technology to which nuclear weapons made an important contribution. In many cases rapid advance of general technology requires a certain minimum size of projects, numbers of scientific and technical personnel, and a certain level of expenditure. Moreover, the level has to be maintained not just for one year or two years. Continuity of the level and size of project is very important. So far, only weapons-oriented works could provide such "beyond the threshold" activities.

There is indeed no end to the list of examples. This is because of the much complicated pattern of inter-relationship between different areas of technology today. It is possible to take almost any area of scientific and technical development and somehow trace its relationship to nuclear weapons work. Not all of the items mentioned here are directly related to the subjects prohibited

under the Treaty. Interest is directed to the "general technological and industrial level" as a total picture in which nuclear weapons R + D has played an important role. This, in turn has many effects on commercial and industrial activities, and the American light water reactor industry's unmistakable leadership in the world today is a very good example. If that is the case - and the history of the past quarter century seems to bear it out - then who can deny the possibility of exactly the same procedure's being repeated in future with regard to nuclear explosive devices? It is because of such general influence that I believe this subject should be treated as a part of assistance, distinct from "access to information as a direct outcome of the weapons activities".

With regard to the future, one may either exaggerate or minimize such effects of "lead projects" on the general technological and industrial level. Either one may say that the effects are going to be so large that this factor can determine a nation's technical and industrial future; or, on the other hand, one may say that the prime of military-oriented technology is over and that an entirely different type of "lead project" will emerge. We are talking about probability, and I am sure that no one is prepared to deny either possibility entirely. After all, the Non-Proliferation Treaty itself is an attempt to deal with possibilities. Countries that are determined to develop nuclear weapon systems of their own are not joining the rank of signatories to the Treaty.

D. NEW ASSISTANCE

What I have been trying to point out is this: there has been a completely new dimension of assistance opened up because of the Treaty. This has to do with equalizing the differences, or compensating for the possible increase in inequalities, that acceptance of the restrictions of the Treaty may possibly create. Looking back to our earlier attempt to define different possibilities of assistance, we might re-state the case as follows:

- (1) Assistance that relates to peaceful uses of nuclear energy but does properly belong to aid from already developed countries to developing countries: obviously, there are many issues involved in this area, and international efforts are being exerted to define the problems more clearly and resolve them as a new dimension in international economy. This area deals with technically and industrially "proven" items. Within this category, if a nuclear power station is built, it is built not necessarily because it is nuclear but because it is a power station that best meets the particular local needs. Although nuclear power generation has not really reached this stage yet, the distinction has to be definitely recognized. There are already a number of national and international arrangements to take care of this feature, and we need not go into detailed discussion of this subject here. The United Nations has been showing remarkable leadership in this aspect. This type of assistance cannot be defined in terms of nuclear-weapon vs. non-nuclear-weapon States.
- (2) Assistance aimed at providing various countries with basic capabilities of peaceful uses of nuclear power. The efforts of nuclear advanced countries since the First Geneva Conference of 1955 have been a good example. Through the release of various publications, the use of deposit libraries, the acceptance of trainees, the provision of assistance to research reactor construction, and so forth, basic nuclear capability has today spread throughout the world, even to the extent that the Treaty becomes a serious issue. Today capability to provide this type of assistance is no longer limited to nuclear-weapon States, and the International Atomic Energy Agency has been a useful forum for this purpose. Numerous seminars and the dispatch of experts etc. have been sponsored by IAEA. ...

We expect to see further strengthening of the Agency's activities as a means of providing such assistance. Just as the commitment of the nations under the Treaty is international, so it would be desirable to transfer much of the national activities in this area of assistance into the arena of an international agency. In so doing, emphasis has to be placed more on being practical than on being fashionable like some of the earlier bilateral attempts with research reactors. For this type of assistance to be really effective it has to reflect technological and industrial capabilities of recipient countries correctly.

- (3) The third and the new category may not even fit into the ordinary meaning of the word "assistance". It is the area related to the general technology, which has come into being because of the Treaty restrictions. We shall dwell on this subject and expound it a little more.

Obviously the countries hardest hit by the restrictions imposed by the Treaty are those which already have the basic nuclear capabilities and the economic, technological and industrial capabilities to manufacture and possess nuclear weapons, so that means to advance this level further is a matter of immediate concern, if only from the point of view of their commercial and export positions. Although it would not be without difficulty, there are a number of countries which could make their own nuclear striking forces if they really wanted to. As for the case of Japan, I can assure you that we have no intention at all of doing so, as is evident from our Constitution and Atomic Energy Basic Law and from frequent expression of our national feeling against nuclear weapons. Because of experience in the past, we have good reason to take this attitude.

There is, however, a basic difference between proclaimed self-restraint and a written international covenant accompanied by restrictions from outside. It is natural that a country should seek assurance from other countries that they too will follow the same course. If nuclear-weapon-States are refusing to do so, then assurance of equal opportunity for advancement of general technology is a minimum requirement. This is not assistance as an act of benevolent offering, with its extent left solely to the discretion of assisting countries; it is a requirement which technologically and industrially advanced non-nuclear-weapon States regard as a necessary condition for their entering into an international commitment which, as currently worded, involves the danger of creating a permanent - and possibly widening - gap between national levels of general technological and industrial capabilities.

E. INTERNATIONAL ARRANGEMENTS FOR NEW ASSISTANCE

We have so far defined the area of the new assistance and have said that this could not be left solely to the discretion of assisting parties. The best arrangement to emphasize this point is not to leave assistance to bilateral relationship but to create some form of multilateral forum which would become an international clearing house. This could, of course, be done as a part of the activities of the International Atomic Energy Agency, but I have reason to think that it would be better for this to be an activity outside the formal arrangements of IAEA. It will be different from the activity of dissemination and classification of nuclear information, which is being undertaken by IAEA. The major role of the organization, as I see it, is to see to it that the international flow of assistance is carried out according to the spirit of the Treaty on Non-Proliferation, and to take steps to ensure that it is. The following are some of the main features of the new organization.

- (a) It will be a non-political organization aimed only at technical and commercial purposes. Indeed, conscious efforts should be made to separate this from political considerations, so that equal opportunities should not be subjected to policies of individual countries. It should be more like a trade association on an international scale.
- (b) Membership will be voluntary with qualification requirements, so that countries with equal or near-equal technical and industrial background will join. Hence, nuclear-weapon States which are parties to the Treaty may want to participate, but the organization itself will have no formal relationship with the Treaty.
- (c) There will be a number of subdivisions in this organization with different membership according to their need and interest:
 - (i) distribution of special nuclear material;
 - (ii) access to technological and scientific information and data, covering such areas as material science, nuclear data, computer codes, nuclear instrumentation etc;
 - (iii) pooling of engineering experiences, hardware construction and reactor operation.

These subdivisions will discuss and decide what assistance will be required of nuclear-weapon States from time to time.

- (d) With regard to special nuclear material, if its availability is determined by political considerations this will greatly affect the comparative commercial competitiveness of reactor industries in different countries. The new organization will not be an agency for the pooling of such material but will want to make sure that conditions of special nuclear material supply are decided on economic and commercial merits only and not on the basis of national policies. It may also require technical assistance by nuclear-weapon States to groups of nations for the purpose of constructing a new diffusion plant jointly, so that it will be large enough to be economically competitive. Such countries will certainly see no justification in a nuclear-weapon State's objection to the promotion of gas centrifuge technology development. This subdivision will have a larger membership than the others.
- (e) Release of information, data and experiences in areas such as those referred to above as general technology will be specifically requested by the subdivisions of this organization. There is in the world today sufficient awareness about nuclear activities in various countries for the identification of a specific piece of knowledge or information not to be too difficult, even without the full co-operation of nuclear-weapon States which volunteer. Should such a request touch on proprietary information involving private enterprises, equal treatment for terms and conditions of release will become a central issue between domestic and non-domestic recipients of the technology.

Although nuclear-weapon States will be asked to pledge full co-operation obviously no international arrangements can force a sovereign State to part with material or knowledge which it regards as vital for its national defence and security. There may be cases where nuclear-weapon States refuse or minimize effective transmittal, or place a prohibitively high price tag on it. There will then be nothing very much even for the new international organization to do, and it is not a part of the consideration here to find means to force the issue.

Rather, if there are repeated cases of refusal by nuclear-weapon States to co-operate in spite of internationally consorted requests by non-nuclear-weapon States, then it will be interpreted as an indication of their lack of appreciation of the meaning of the Treaty restrictions on non-nuclear-weapon States. If that happens to be the case, non-nuclear-weapon States may be forced to look for an alternative source of supply of necessary material, information and data, and may thus seriously undermine the principles of the Non-Proliferation Treaty itself. None of us would look

forward to such a situation, and this would be sufficient incentive for all parties concerned to exercise a proper measure of self-restraint by making reasonable demands and giving reasonable replies.

F. CONCLUSIONS

I have purposely avoided dwelling on details of the other two types of assistance. For one thing, I feel that discussions of them is somewhat outside the scope of the Treaty considerations, for reasons I have tried to give at several points throughout this paper. There is one more reason, and it is this. It seems to me that the current level of activities through IAEA and other national and international organizations tends to be adequate, considering all the practical difficulties involved. The current level of assistance is obviously far from being ideal, but too much idealism is sometimes very impractical. As I said earlier, solution of the general problem of assistance to developing countries requires much more than non-proliferation consideration, and it is therefore not very adequate to try to resolve it within the given terms of references.

Rather, I see the significant role of assistance in our case to be an internationally agreed means of equalizing the inequality that the Treaty on Non-Proliferation undeniably contains. My proposal for a new international arrangement of a trade association type may - hopefully - help to accomplish this compensating role of "assistance". I have avoided mentioning individual technical details that may be covered under such an arrangement because I was afraid of confusing the logic by introducing too much technical terminology.

I should like to add at the end of this exercise a comment about the technology gap and the possible widening of such a gap as the major concern of many non-nuclear-weapon States with regard to the Non-Proliferation Treaty. It is exactly the same area of concern as when they say that international safeguards might have detrimental effects on the advancement of technology and on freedom of research and development. If assistance is a means to narrow the existing inequality, definite care must be taken so that the built-in safeguard mechanism may not widen it. All these considerations have come into the picture and find their *raison d'être* in the open international pledge which the Non-Proliferation Treaty requires of non-nuclear-weapon States but not of nuclear-weapon States.